

City of Gig Harbor

2018 COMPREHENSIVE WATER SYSTEM PLAN UPDATE

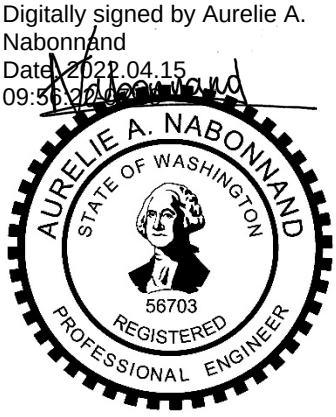
FINAL | April 2022

City of Gig Harbor

2018 COMPREHENSIVE WATER SYSTEM PLAN UPDATE

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Abbreviations

AACE	American Academy of Cost Engineers
AC	asbestos cement
ADD	average day demand
AFY	acre-foot per year
AMR	advanced meter reading
APWA	American Public Works Association
ASR	aquifer storage and recovery
Avg.	average
AWWA	American Water Works Association
BAB	Build America Bond
BAT	backflow assembly tester
BL	buildable lands
BPS	booster pump station
CAD	computer-aided design
Carollo	Carollo Engineers, Inc.
CCF	hundred cubic feet
CCL	Contaminant Candidate List
CCL3	Third Contaminant Candidate List
CCL4	Fourth Contaminant Candidate List
CCR	Consumer Confidence Report
CCS	cross-connection control specialist
CDC	Center for Disease Control and Prevention
CEMP	Comprehensive Emergency Management Plan
CEU	continuing education unit
CIAC	contribution in aid of construction
CIP	Capital Improvement Program
City	City of Gig Harbor
COLA	cost of living adjustment
CRC	Capacity Reservation Certification
cVOC	carcinogenic volatile organic chemicals
D/DBP	disinfectants and disinfection by-products
DBP	disinfection by-products
DI	ductile iron
DOH	Washington State Department of Health
DNS	Determination of Non-Significance
DSL	distribution system leakage

Ecology	Washington State Department of Ecology
ENR	Engineering New Report
EOC	Emergency Operations Center
ERP	Emergency Response Plan
EPS	extended period simulation
ERU	Equivalent Residential Unit
ESA	Endangered Species Act
ESSB	Engrossed Substitute Senate Bill
FACA	Federal Advisory Committee Act
FCV	flow control valve
ft	feet
ft/s	feet per second
G	general projects
GFC	general facility charge
GIS	geographic information system
gpd	gallons per day
gpd/ERU	gallons per day per Equivalent Residential Unit
gpm	gallons per minute
GWR	groundwater rule
HAA	haloacetic acid
HGL	hydraulic grade line
Hist. Avg.	historic average
HTH	high test hypochlorite
IDSE	Initial Distribution System Evaluation
IFC	International Fire Code
in	inch
IOC	inorganic chemical
kW	kilowatt
LCR	Lead and Copper Rule
LF	linear feet
Max	maximum
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
M/DBP	microbial/disinfection by-products
MDD	maximum day demand
MFL	maximum fibers per liter
MFR	multi-family residential
MG	million gallons

mg/L	milligrams per liter
MG/year	million gallons per year
mgd	million gallons per day
MMM	multimedia mitigation
MnO2	manganese dioxide
MWL	Municipal Water Law
MWS	Municipal Water Suppliers
N	new water main projects
NDWAC	National Drinking Water Advisory Council
ODW	Office of Drinking Water
PCE	tetrachloroethylene
pCi/L	picocuries per liter
PF	Peaking Factor
PFCG	Peninsula Financial Consulting Group
PGG	Pacific Groundwater Group
PHD	peak hour demand
Plan	Water System Plan
PN	public notification
ppm	parts per million
PRV	pressure reducing valve
psi	pounds per square inch
PVC	polyvinyl chloride
PWD	City of Gig Harbor Public Works Department
PWS	Public Water System
Qa	maximum average withdrawal rate
Qi	Instantaneous Water Right
R	asbestos cement replacement projects
RCW	Revised Code of Washington
ROE	Report of Examination
RTCR	Revised Total Coliform Rule
RWSA	retail water service area
S	supply projects
SCADA	supervisory control and data acquisition
SDWA	1974 Safe Drinking Water Act
SEPA	State Environmental Policy Act
sf	square feet
SFR	single-family residential
Shore Acres	Shore Acres Water System

SMCL	secondary maximum contaminant level
SOC	synthetic organic chemicals
ST	storage projects
Stroh's	Stroh's Water Company
TCE	trichloroethylene
TCR	Total Coliform Rule
THM	trihalomethane
TT	treatment technique
U	upsize projects
UCM	Unregulated Contaminant Monitoring
UCMR1	Unregulated Contaminant Monitoring Rule
UCMR2	Final Second Unregulated Contaminant Monitoring Rule
UCMR3	Final Third Unregulated Contaminant Monitoring Rule
UCMR4	Final Fourth Unregulated Contaminant Monitoring Rule
UCS	Unified Command System
µg/L	micrograms per liter
UGA	urban growth area
ULID	Utility Local Improvement District
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VOC	volatile organic chemicals
WAC	Washington State Administrative Code
WCCW	Washington Correction Center for Women
WDM	Water Distribution Manager
WDM1	Water Distribution Manager 1
WDM2	Water Distribution Manager 2
WFI	water facility inventory
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program
WRIA	Water Resource Inventory Area
WSDOC	Washington State Department of Corrections
WSDOT	Washington State Department of Transportation
WUE	water use efficiency
WWTP	wastewater treatment plant
WWSC	Washington Water Service Company

EXECUTIVE SUMMARY

ES.1 Introduction

This Water System Plan (Plan) updates the City of Gig Harbor's (City) 2008 Water System Plan. It was developed collaboratively by City Staff, Carollo Engineers, Inc. (Carollo), Pacific Groundwater Group (PGG), and Peninsula Financial Consulting Group (PFCG).

In accordance with the Washington State Administrative Code (WAC) 246-290 and Washington State Department of Health (DOH) requirements, this Plan:

- Defines the City's retail water service area (RWSA).
- Describes the existing water system.
- Establishes minimum performance criteria for the system.
- Projects future demands within the RWSA.
- Identifies system deficiencies.
- Presents a capital improvement program.
- Offers a financing and implementation plan.

ES.2 Description of Water Service

The City is located in northwest Pierce County on the Kitsap Peninsula, across the Tacoma Narrows from the City of Tacoma. The City and the water service area are bounded on the east by the Puget Sound and unincorporated Pierce County on all other sides. Unincorporated county is served by Class A and B systems, largely operated by Washington Water.

The City was incorporated in 1946 and had a census population of 803 residents in 1950. The City has developed as a residential community through the years, with some associated commercial and light industrial growth as well. City limit populations for 2010 were approximately 7,126 residents. The total 2030 urban population growth target is approximately 10,500. Future increases in population are predicted due to the City's proximity to the City of Tacoma, which make Gig Harbor an attractive region for development.

The boundaries of the City's water system and RWSA are shown in Figure ES.1. The City's RWSA only serves a portion of residents within the City limits and the urban growth area (UGA) boundary. Many residents within the City limits and the City's UGA receive water service from a variety of adjacent water purveyors. The City's RWSA encompasses 2,848 acres (approximately 4.45 square miles). At the end of 2017, the City had 2,583 service connections.

Figure ES.1 also shows the City's existing water system facilities. The system is currently divided into three pressure zones: the 320 Zone, 440 Zone, and 450 Zone. The City currently operates eight groundwater wells to supply their water service customers. These are Well Numbers 2, 3, 4, 5, 6, 8, 10, and the newly constructed Well 11, which came online in 2018. The City's water system contains six reservoirs, with a total capacity of 4.6 million gallons (MG).

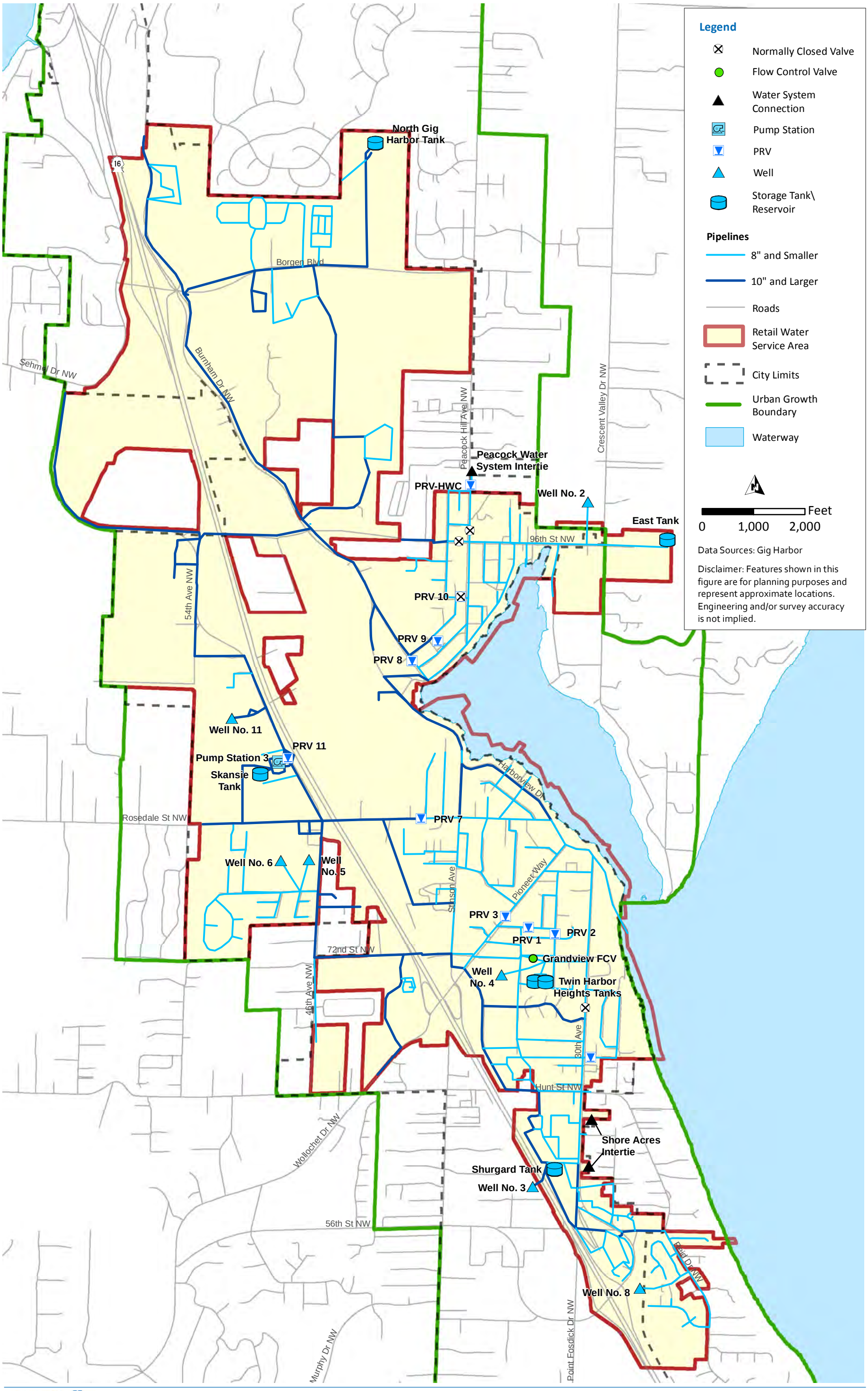


Figure ES.1 Existing Water System Facilities

ES.3 Policies and Criteria

The City manages and operates its water system in accordance with all known federal, state, and local regulations. The City has discretion in setting the performance, design criteria and standards for its water system; however, these must meet or exceed the minimum standards for public water supplies set by the DOH through WAC 246-290.

Policies established by the City provide the framework for planning, design, operation, and management of its system. The City's criteria provide the requirements necessary to implement and enforce the established policies. The criteria focus on planning and design parameters developed to establish consistency and to ensure adequate levels of service throughout the system.

Other publications, such as the City's Standard Utility Extension Agreement, Water Distribution Construction Standards, Municipal Code, Developer Extension Agreement and Water Distribution Public Works Standards document the design standards and procedures for development of the water system.

ES.4 Planning Data Water Demand Forecast

Chapter 3 of this Plan presents the water demand forecast (projections) for the RWSA for the ten-, and 20-year planning periods. Projecting a realistic future water demand is necessary for evaluating the capability of the water systems in meeting future water service requirements, planning for infrastructure projects, and securing adequate water supply. Future water demands are used as input conditions for the analyses of the water systems that are used to develop the Capital Improvement Program (CIP).

Low, medium, and high-water demand projection scenarios were developed by adjusting various demand projection parameters, as shown in Table ES.1. The medium demand projection scenario was used for the system analysis described in Chapter 4, which determined future pumping storage and distribution system deficiencies and identified potential improvements to achieve the City's established capacity criteria. The low and high projection scenarios give a sense of the possible range of future demands.

Table ES.1 Projected Parameters

Projected Scenario	Low		Medium		High	
Parameter	Parameter	Notes	Parameter	Notes	Parameter	Notes
Starting ERU Value (gpd/ERU)	205	75th %	205	75th %	205	75th %
ERU Annual Reduction 2017-2028	0.25%		0.00%		0.00%	
Peaking Factor (MDD/ADD)	2.23	Avg.	2.33	75th %	2.43	Max
DSL (Percent of Production)	4.7%	Hist. Avg.	4.7%	Hist. Avg.	6.6	Max
Other Authorized Use (Percent of Production)	0.32%		0.32%		0.32%	

Notes:
Abbreviations: ADD - average day demand; Avg - average; DSL - distribution system leakage; ERU: Equivalent Residential Unit; gpd: gallons per day; Hist. Avg. - historic average; Max: maximum; MDD - maximum day demand.

Figure ES.2 shows a graph of the City's historical ADD and MDD demands and the projected demands of the medium scenario, with a low-to-high range for both ADD and MDD. The large increases in the projected demands at certain years are due to the water reserves being increased by 50,000 gpd. The City's ADD was approximately 1.1 million gallons per day (mgd) in 2018. In 2037, it is estimated to be between 1.4 mgd and 1.5 mgd. The medium demand scenario predicts 1.5 mgd. In 2037, MDD is estimated to be between 3.1 mgd and 3.6 mgd. The medium demand scenario predicts an MDD of 3.4 mgd in 2038.

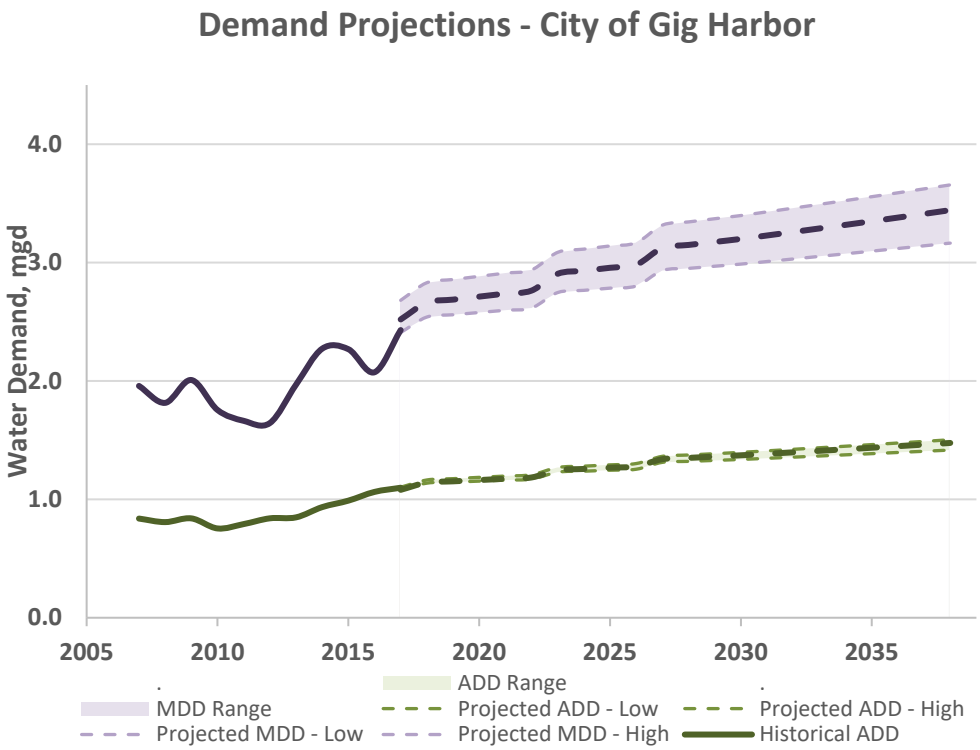


Figure ES.2 Demand Projections

ES.5 System Analysis

Carollo evaluated the City's water distribution system for its ability to meet the City's criteria under 2027 and 2037 conditions using the medium demand projection scenario. The system analysis considered supply capacity, adequacy of storage facilities, and adequate pressures and fire flow capability using the City's updated hydraulic model. Carollo also assessed the City's water quality of its wells and reviewed the City's current and anticipated water quality regulations and compliance history.

Chapter 4 of this Plan discusses the City's water quality testing, monitoring, and compliance with regulations while providing recommendations to eliminate each of the deficiencies identified as part of the system analysis. These recommendations form the basis of the City's CIP outlined in Chapter 8. New pipeline upsize and new pipe installation projects are recommended to meet level of service goals in the service area.

Finished supply water quality meets and/or exceeds all applicable current and future anticipated regulatory requirements, with the exception of its iron and manganese levels. It is recommended to implement a treatment system for Well 6 in the long-term and to closely monitor the iron and manganese levels in the other wells, especially the newly constructed Well 11.

ES.6 Water Use Efficiency Program

The City promotes water conservation and efficient use through a variety of activities that encompass their Water Use Efficiency (WUE) Program. The program encourages conservation and utilizes continued improvements to reduce leakages and water loss in the City's system.

The City plans to continue its efforts to encourage efficient water use. Going forward, the program will continue to focus on measures targeted at residential customers. The WUE Program goal for the future will be to reduce residential water consumption by 0.25 percent per year.

The projected demands with the WUE Program are shown in Figure ES.3. For ADD, WUE measures are projected to provide a reduction of 0.1 mgd, or 6.7 percent, by 2037. For MDD, WUE measures are projected to provide a reduction of 0.3 mgd, or 8.8 percent, by 2037. Water conservation measures shall be consistent with, and strive to exceed, all local, State, and Federal laws and regulations.

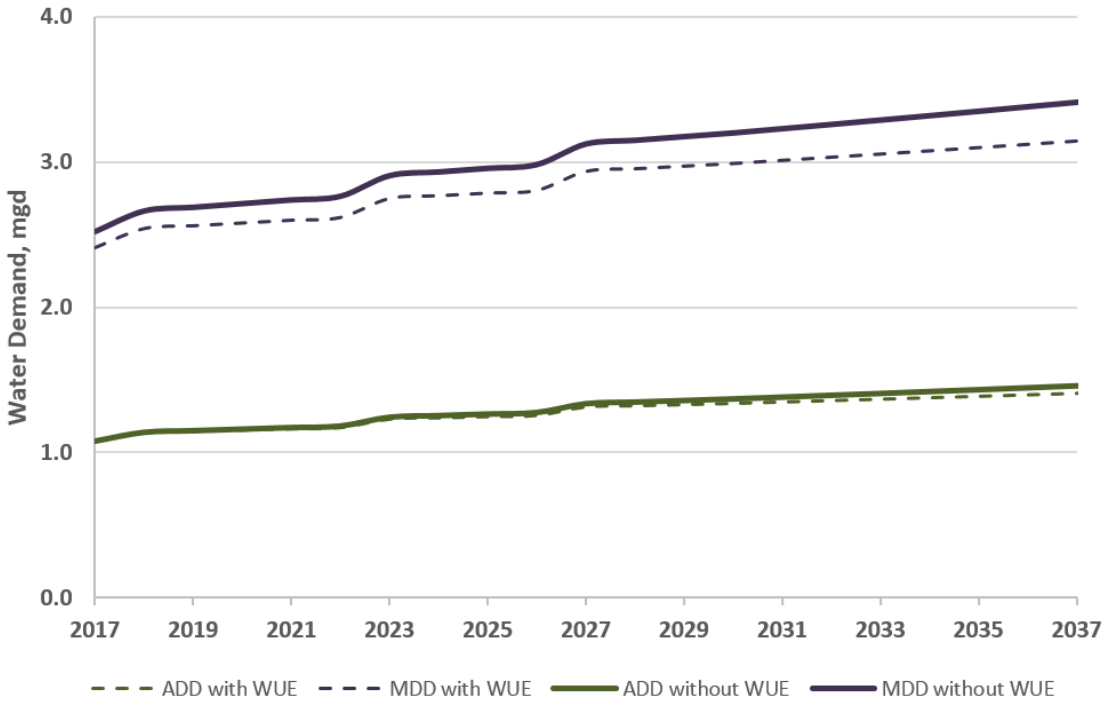


Figure ES.3 Projected Demands with Water Use Efficiency

ES.7 Water Rights, Supply Analysis, and Source Water Protection

The City relies solely on groundwater wells to meet all of its current supply needs. The City currently receives its water from eight wells. Source water protection is regulated by the DOH. The City holds seven additive municipal purpose certificated water rights, and one non-additive water right permit that authorize a total annual quantity (Qa) of 2,265 acre-feet per year (AFY) (2.02 mgd) of groundwater and a maximum instantaneous quantity (Qi) of 3,115 gpm (4.48 mgd).

The City has sufficient water rights to meet projected demands over the next 10- and 20-year planning horizons. Consequently, there is no immediate need for the City to secure a new additive water right. However, the City is considering the development of Well 9 as a non-additive source that would provide greater redundancy to the City's water supply and more specifically, the pressure zone that would be served by Well 10.

The City is planning on maximizing its full use of water rights and pending water right applications. Further, the City will continue to work on their water use efficiency program and will move forward with attaining future water rights.

ES.8 Operations and Maintenance Program

The City is committed to ensuring that its water system is well managed and maintained to continue to supply quality water to its customers. To accomplish this, the City performs regular maintenance of all facilities and equipment, which are checked in accordance with manufacturers' recommendations.

The City's water system, operated under the Operations Branch of the City's Public Works Development Department, is managed by the Public Works Supervisor and a staff that works on water, as well as other division functions.

The City developed a 2005 Emergency Management Plan to identify, prepare, and respond to emergency situations. The Plan includes elements for direction and control, situation analysis, public information, support functions and response procedures. The Plan was developed to be compatible with the Washington State Comprehensive Emergency Management Plan, Pierce County Emergency Operations Plan, and the Federal Response Plan.

ES.9 Capital Improvements Program

The short-term and long-term costs of the City's CIP are summarized by project type in Tables ES.2 and ES.3. Table ES.2 presents all CIP costs in current dollars while Table ES.3 presents all CIP costs in future dollars. The total short-term CIP cost is $16,084,000 ($17,969,000 future dollars), or $1,608,000 per year ($1,797,000 future dollars). Long-term CIP project costs are $11,391,000 ($16,397,000 future dollars) or $1,139,000 per year ($1,640,000 future dollars).

Table ES.2 Gig Harbor CIP Summary (Current Dollars)

Type	Short-Term Costs	Long-Term Costs	Total Cost
New Water Main Projects	$593,000	$1,759,000	$2,352,000
Pipe Upsize Projects	$2,608,000	$84,000	$2,692,000
Storage Projects	$1,543,000	$0	$1,543,000
Supply Projects	$7,565,000	$2,408,000	$9,973,000
AC Replacement Projects	$1,603,000	$2,290,000	$3,893,000
General Projects	$2,172,000	$4,850,000	$7,022,000
Total	**$16,084,000**	**$11,391,000**	**$27,475,000**

Notes:
Abbreviations: AC - asbestos cement.

Table ES.3 Gig Harbor CIP Summary (Future Dollars)

Type	Short-Term Costs	Long-Term Costs	Total Cost
New Water Main Projects	$664,000	$2,446,000	$3,110,000
Pipe Upsize Projects	$2,784,000	$113,000	$2,897,000
Storage Projects	$1,800,000	$0	$1,800,000
Supply Projects	$8,483,000	$3,529,000	$12,012,000
AC Replacement Projects	$1,918,000	$3,528,000	$5,446,000
General Projects	$2,320,000	$6,781,000	$9,101,000
Total	**$17,969,000**	**$16,397,000**	**$34,366,000**

Figure ES.4 shows the City's water system and the locations of the proposed capital improvement projects.

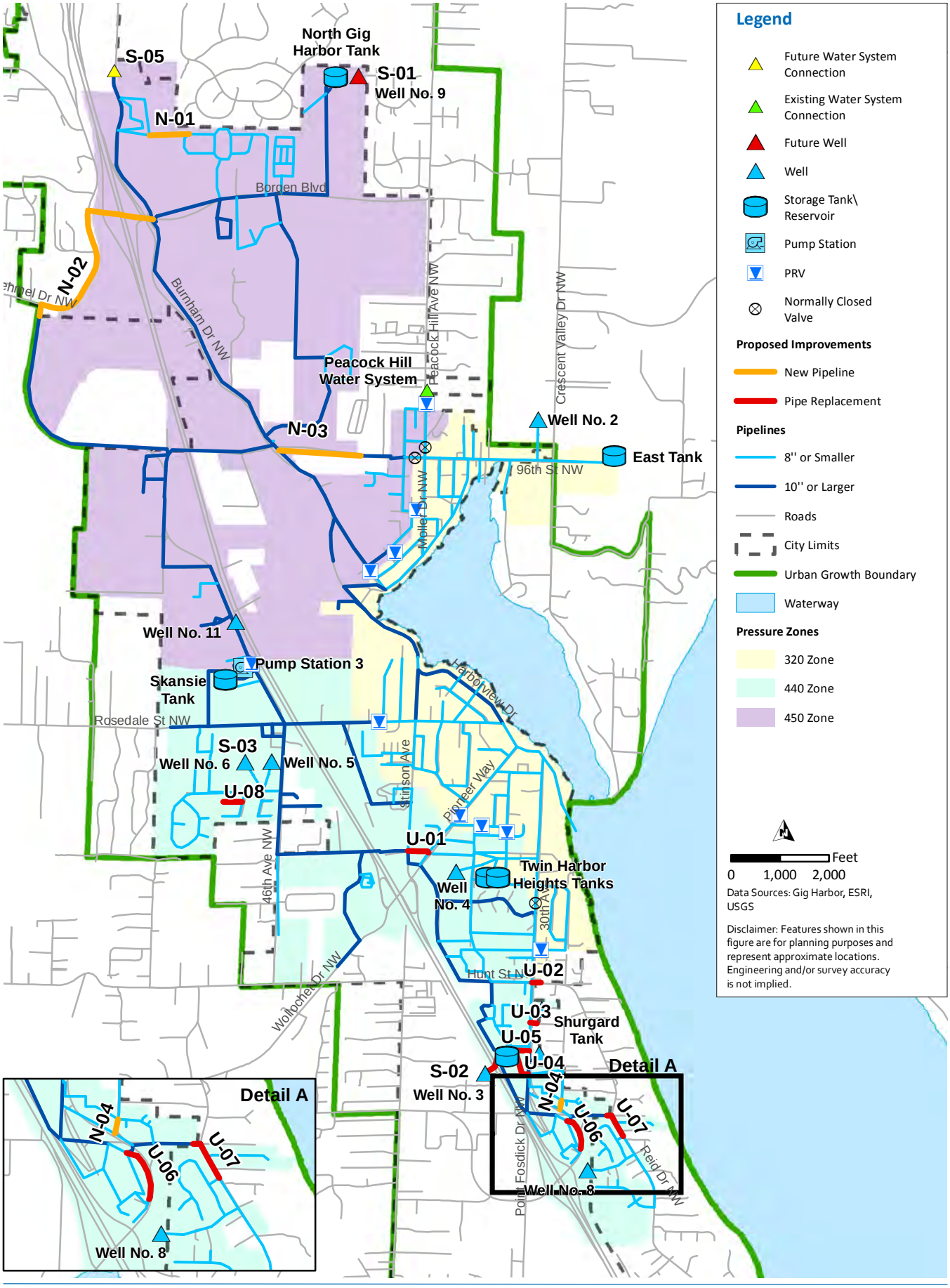


Figure ES.4 Proposed CIP Projects

ES.10 Financial Plan

The City water utility's primary function is to provide potable water services to its customers at the lowest reasonable price, assuring reliability of source, water quality, storage, and distribution. The purpose of the financial chapter is to provide a financial program that allows the water utility to remain financially viable during execution of the CIP identified herein. The analysis considers the historical financial condition of the utility, the sufficiency of utility revenues to meet current and future financial and policy obligation, and the financial impact of executing the CIP.

The water utility will be undergoing an extensive period of capital improvements and is expected to spend approximately $18 million in capital costs over the next ten years. As a result of the magnitude of capital costs, the water utility will be unable to fund planned capital without the issuance of new debt. Given the limited options available from Washington State to aid funding capital, the City will likely need to issue revenue bond debt. This analysis assumes two large revenue bond issues of approximately $1.4 million in 2019 / 2020 and another $4.5 million in 2025.

Chapter 1

DESCRIPTION OF WATER SERVICE

1.1 Introduction

This Water System Plan (Plan) updates the City of Gig Harbor's (City) 2008 Water System Plan. It was developed collaboratively by City Staff, Carollo Engineers, Inc. (Carollo), Pacific Groundwater Group (PGG), and Peninsula Financial Consulting Group (PFCG).

In accordance with the Washington State Administrative Code (WAC) 246-290 and Washington State Department of Health (DOH) requirements, this Plan:

- Defines the City's retail water service area (RWSA).
- Describes the existing water system.
- Establishes minimum performance criteria for the system.
- Projects future demands within the RWSA.
- Identifies system deficiencies.
- Presents a capital improvements plan.
- Offers a financing and implementation plan.

Throughout this Plan, where the word "should" is used, please consider that is what the City plans to complete.

1.2 Authorization and Adoption

In 2017, the City authorized Carollo to prepare this document in accordance with City policies and procedures and all applicable federal, Washington State, and Pierce County rules and regulations.

1.2.1 Comments and Responses from Agencies and Adjacent Purveyors

A consumer meeting was publicly advertised and conducted before the City Council meeting to adopt this Plan. The Adopting Resolution and Ordinance for this Plan are in Appendix A.

The draft Plan was sent to Pierce County, all adjacent purveyors (listed in Table 1.1), and the DOH for review. Comments and responses are included in Appendix B.

1.2.2 Environmental Assessment

A State Environmental Policy Act (SEPA) checklist was prepared for this Plan. Many of the projects this Plan proposes are expected to require additional project-specific environmental review and SEPA checklists during the preliminary and final design process.

Appendix C includes the SEPA checklist and the Determination of Non-Significance (DNS) documents.

1.3 Ownership and Management

The City owns and operates the Class A municipal water system, which serves the majority of the area within the Gig Harbor City limits and Urban Growth Area (UGA). The DOH water system identification number is 276009. Copies of the current Water Facility Inventory (WFI) Form are included in Appendix D.

The City is governed by an elected Mayor and a City Council. The City water system is managed within the Public Works Department by the Public Works Director and Engineering staff and the Public Works Superintendent.

1.4 Location and Service Area Characteristics

The City is located in northwest Pierce County on the Kitsap Peninsula, across the Tacoma Narrows from the City of Tacoma. The City and the water service area are bounded on the east by the Puget Sound and unincorporated Pierce County on all other sides. The unincorporated county is served by Class A and B systems, largely operated by Washington Water. The topography of the City consists of slopes upward from east to west. The lowest elevations are at sea level at the eastern edge of the City, with the maximum elevation towards the northwest of the City.

1.4.1 Water Service Area

1.4.1.1 Retail Water Service Area

The boundaries of the City's water system and RWSA are shown in Figure 1.1. The City's RWSA only serves a portion of residents within the City limits and the UGA boundary. Many residents within the City limits and the City's UGA receive water service from a variety of adjacent water purveyors. Adjacent water purveyors are discussed in more detail in Section 1.6 and are shown in Figure 1.3, listed in Table 1.1, or from private wells.

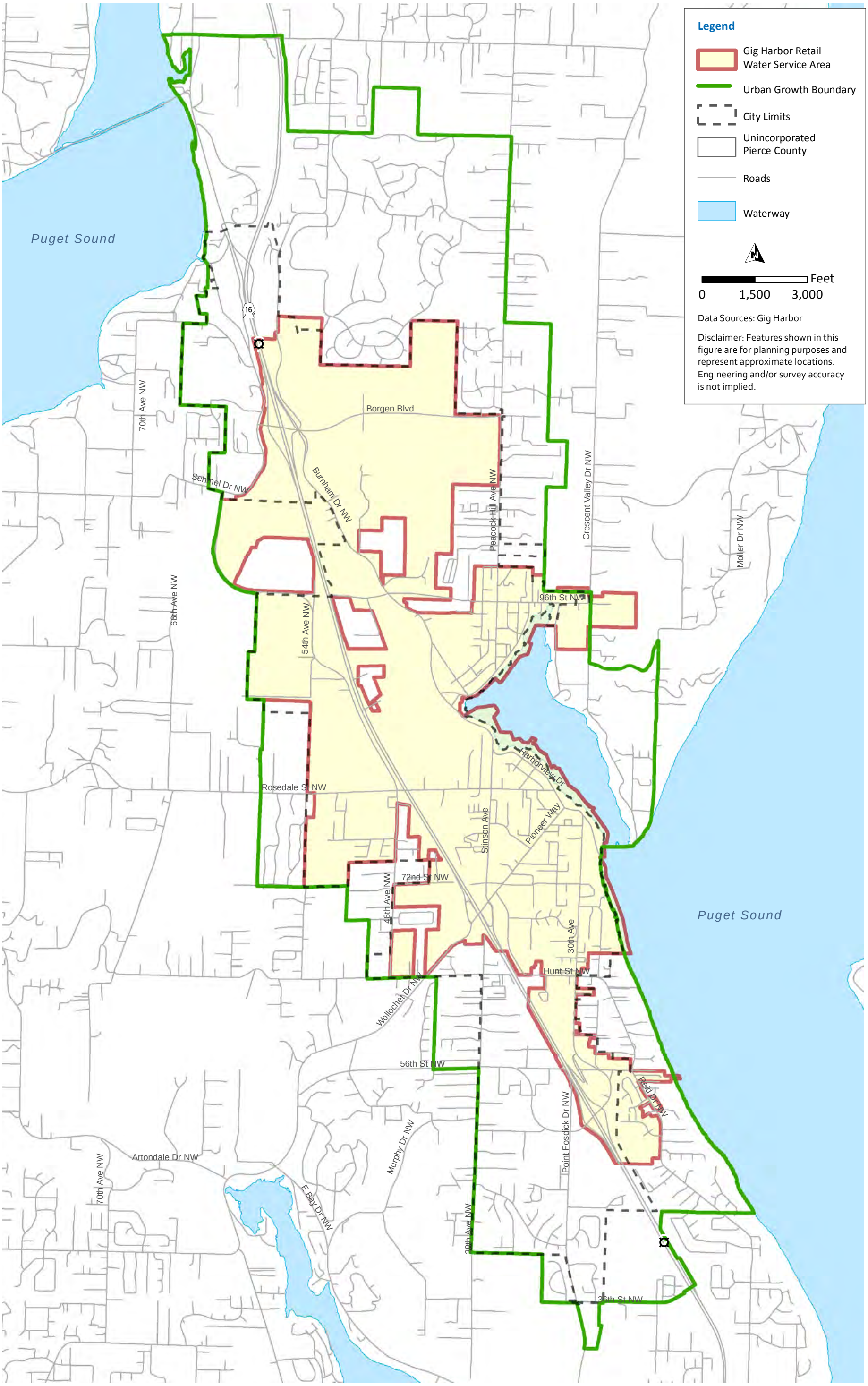
The City's RWSA encompasses 2,848 acres (approximately 4.45 square miles) and is shown in Figure 1.1. At the end of 2017, the City had 2,583 service connections.

1.4.1.2 Retail Water Service Area Boundary Adjustments

Since the date of the last Plan update, the City made an RWSA boundary line adjustment along Reid Road. The City may, over the next 10-year planning cycle, make further RWSA boundary adjustments in the vicinity of the Harbor Winds Plat and along Sehmel Drive. However, such boundary adjustments are still under consideration and yet to be formally approved.

1.4.1.3 Service Area

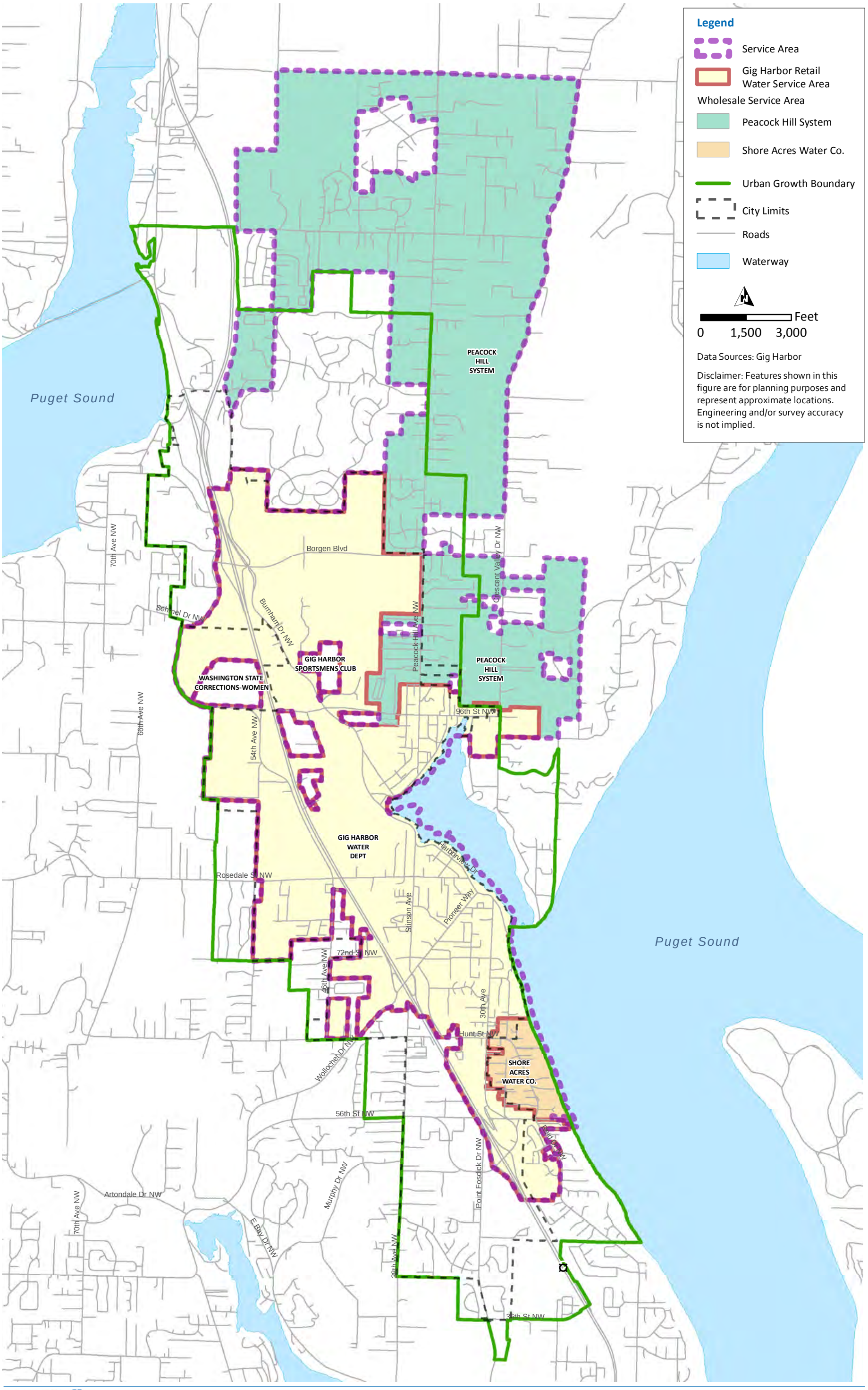
The City's service area includes areas that are served through wholesale water service outside the City's RWSA. The City currently provides wholesale water service to three customers outside of the RWSA: the Peacock Hill Water System, the Shore Acres Water System, and Washington State Department of Corrections (WSDOC) Washington Correctional Center for Women (WCCW) facility. The boundaries of these systems are shown in Figure 1.2. Per DOH requirements, the service area is the specific area a water system currently serves and areas where future water service is planned, which include areas where wholesale water is provided to other public water systems. See Appendix E for the City's standard service agreements.



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Figure 1.1 Retail Water Service Area



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Figure 1.2 Service Area

1.4.1.4 Future Service Area

The DOH defines the Future Service Area as the specific area to which a water system in a Critical Water Supply Service Area is to provide water service as provided in a written agreement between purveyors under chapter 70.116 in the Revised Code of Washington (RCW) and Chapter 246-293 WAC. The City is considering adding the following areas to their RWSA in the future:

- The City is amenable to supplying the Gig Harbor Sportsmen's Club, allowing them to continue to use their well for irrigation purposes, but using the City's water for potable supply.
- The City is looking into taking over a vacant parcel that is north of 64th Street NW and to the west of Hunt Highlands Loop.

The City is in talks with Pierce County for possible annexation of a parcel located north of Vernhardson Street, between Jacobsen Lane and Vernhardson Place. There are other water service "holes" within the City Limits that are not part of the RWSA that could become part of the City's system in the future. However, due to the higher elevation of some of these "holes," further studies are recommended to be completed to understand the implications and whether a new pressure zone would be required. New applications requesting service are responded in a reasonable timeline, within four weeks.

1.5 System Background

The City was incorporated in 1946 and had a census population of 803 residents in 1950. The City has developed as a residential community through the years, with some associated commercial and light industrial growth as well. City limit populations for 1970, 1980, 1990, 2000, and 2010, were approximately 1,611, 2,429, 3,236, 6,465, and 7,126 residents, respectively. The total 2030 Urban population growth target is approximately 10,500. Future increases in population are predicted due to the City's proximity to the City of Tacoma, which makes Gig Harbor an attractive region for development.

1.5.1 Adjacent Systems

There are numerous smaller water purveyors within and adjacent to the City's UGA. These adjacent systems are shown in Figure 1.3 along the City's service area and the UGA boundaries. Table 1.1 provides details for these water systems and indicates the relationship of their service area to City's UGA and service area boundaries.

Table 1.1 Other Water Systems Within or Adjacent to City's Service Area

ID Number	Group	Name	Within Service Area	Within UGA	Outside UGA
03160	A	Artondale Water System			
05859	A	Canterwood Water System		✓	✓
11887	A	Cedar Crest		✓	✓
11947	A	Cedars Mobile Manor			✓
15108	A	Cottesmore Nursing Home			
37654	A	Crescent Valley #333		✓	✓
71605	A	Dobler, John D Water System			✓
20265		Dunbar Cove			
31050	A	East Gig Harbor Water District		✓	✓
25900	A	Forest Beach Water System			
25943	A	Forest Park Water System			
15296	A	Four Corners			
53693	A	Gig Harbor Athletic Club			✓
03165	A	Gig Harbor Golf and Country Club			
27585	A	Gig Harbor RV Resort		✓	
52014	A	Gig Harbor Sportsmen's Club		✓	
29810	A	Greenwood Estates			
15314	A	Harbor Country Apartments		✓	
31075	A	Harborland Mobile Park		✓	
66727	A	Harold Pederson Well Water System		✓	
77147	A	Henderson Bay Water System		✓	
33140	A	Hillcrest Mobile Home Park		✓	
33695	A	Holly Tides Water System			✓
30878	A	Horsehead Bay Water Association			
06874	A	Impact Church Water System			✓
11514	A	Kooley's Harbor Estates		✓	✓
43065	A	Kopachuk			
28090	A	Kopachuk Ridge			
SP350	A	Kopachuk State Park			
56150	A	Mooreland Water Corporation			
09314	B	Mountain Park Water			
63479	A	Olympic Mall Water System		✓	
35357	A	One Point Fosdick Water Company			
64920	A	Our School			
04867	A	Pierce County Fire District 5			✓
66637	A	Peacock Hill System	✓	✓	✓

ID Number	Group	Name	Within Service Area	Within UGA	Outside UGA
66914	A	Peninsula Mobile Park			
68065	A	Point Evans Water System		✓	✓
43040	A	Point Fosdick Water Company			
72260	A	Point Richmond HOA			
70000	A	Purdy Acres Water System East			✓
66927	A	Purdy Campus System			
69940	A	Purdy Shopping Center			
70185	A	Quail Run Water System		✓	
70550	A	Quistorff		✓	✓
70760	A	Raft Island Water Company			
74364	A	Rosedale Community Club			
09490	A	Rosedale East		✓	
74371	A	Rosedale Heights Trailer Park			✓
75154	A	S & I Water System			✓
76880	A	Sea Cliff Estates			✓
20481	A	Sehmel Road Water System			
77957	A	Shawnee Hills Water System			
77960	A	Shaws Cove			
78455	A	Shore Acres Water Company	✓	✓	
78618	A	Shorecrest			✓
84670	A	Stroh's Water Company Inc.		✓	✓
85605	A	Sunnyview Terrace Association			
86789	A	Tacoma Narrows Airport			✓
03003	A	Turning Point Community Church		✓	
69945	A	Washington State Corrections - Women		✓	
93950	A	Weatherswood Vista Water District			
94930	A	West Wynd		✓	✓
59251	A	Wishing Well Water Company			
98075	A	Wollochet Harbor Club			

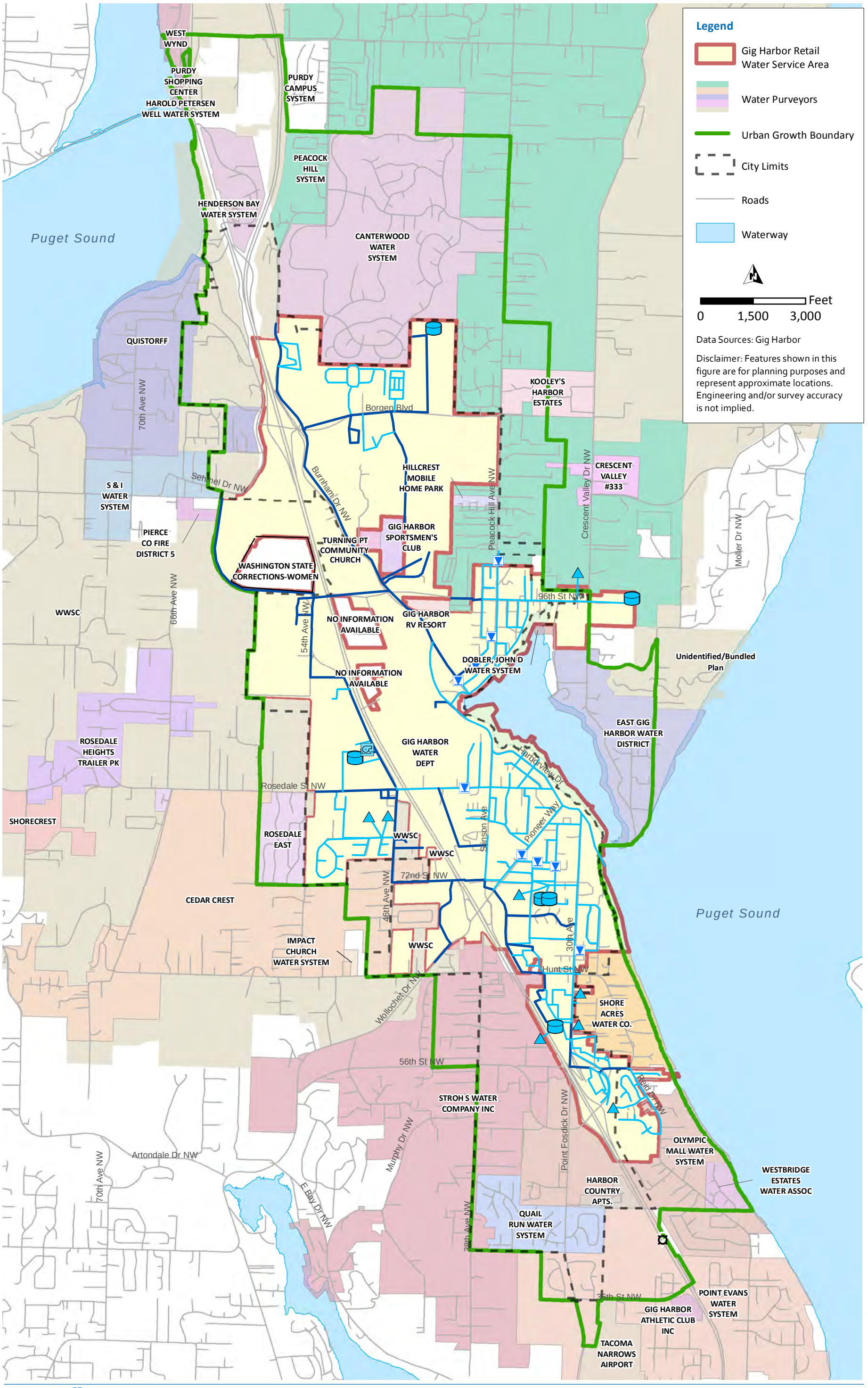
1.6 Previous Studies

The previous water system plan was developed for the City's water system in 2008. Other related plans and studies include:

- Pierce County Coordinated Water System Plan, 2001.
- Shore Acres Water System Plan Update, 2006.
- City of Gig Harbor Comprehensive Plan, 2008.
- City of Gig Harbor Wastewater Comprehensive Plan, 2009.
- Canterwood Water Company Water System Plan, 2015.
- Pierce County Comprehensive Plan, 2016.
- City of Gig Harbor Well 11 Technical Memorandum: Rezone Analysis, 2016.

1.7 Inventory of Existing Facilities

The City's water system consists of eight groundwater wells that supply six active reservoirs in the City's three pressure zones. The City has one booster pump station and nine pressure reducing valve (PRV) stations that allow water to be transferred between pressure zones. Figure 1.4 shows the approximate locations of these facilities.



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Figure 1.3 Adjacent Purveyors

1.7.1 Pressure Zones

The system is currently divided into three pressure zones: the 320 Zone, 440 Zone, and 450 Zone. The Pressure Zone configurations are summarized in Table 1.2. The system was previously broken into the lower 320 zone and upper 440 zone, until the 440 zone was split into the 440 and 450 zones in 2016. Figure 1.5 shows the City's current pressure zones and Figure 1.6 shows the updated hydraulic profile.

Table 1.2 Pressure Zones

Pressure Zone	HGL	Maximum Elevation Served (ft)	Minimum Elevation Served (ft)	Minimum Static Service Pressure (psi)	Maximum Static Service Pressure (psi)
320 Zone	320	230	13	39	133
440 Zone	440	335	165	45	119
450 Zone	450	336	74	49	163

Notes:
Abbreviations: ft - feet; HGL - hydraulic grade line; psi - pounds per square inch.

1.7.2 Supply Facilities

The City currently operates eight groundwater wells to supply their water service customers. These are Well Numbers 2, 3, 4, 5, 6, 8, 10, and 11. Well 11 was constructed in 2018. The construction of Well 11 allowed the former 440 Zone to be split in two and rezoned into the 440 and 450 Zones. Well 11 serves the 450 Zone, with the remaining wells supplying the 320 and 440 Zones. Wells 1 and 10 are currently inactive.

Information for all of the City's existing wells is summarized in Table 1.3. Further discussion of the City's wells is discussed in Chapter 4 - System Analysis.

Table 1.3 Inventory of City Wells

Well Number	Source Number	Pressure Zone Served	Date Well Drilled	Well Depth (ft)	Maximum Instantaneous Flow Rate (gpm)(1)	Well Pumping Capacity (gpm)(1)
1(4)	S01	320	1951	375	400	0
2	S02	320	1963	121	330	272
3	S03	440	1978	907	625	626
4	S04	320	1988	446	230	159
5	S05	440	1990	899	500	524
6	S06	440	1991	592	1,000	1,019
8	S08	440	1965	555	30	12
10(4)	-	320			330(2)	0(2)
11	S09	450	2013	957	(3)	1,000
Total gpm					**3,115**	**3,612**

Notes:
(1) Maximum instantaneous flow rate is instantaneous quantity (Qi).
(2) Well 10 is a test well and supplemental to Well 2.
(3) Well 11 is supplemental to system wells.
(4) Wells 1 and 10 are inactive. Well 10 to be included in 2019 WFI.
Abbreviations: gpm: gallons per minute

1.7.3 Pump Station Facilities

The City operates and maintains one booster pump station, Pump Station 3. Pump Station 3 pumps water from the Skansie Tank to the distribution system in the 450 Zone. Details for Pump Station 3 are provided in Table 1.4. The City regularly operates Pump Station 3 to draw down the 440 pressure zone reservoirs (Skansie and Shurgard) when demands are low for water quality reasons. Pump Station 3 does not have auxiliary power.

Table 1.4 Pump Stations

Booster Pump Station	Location	Zone Pumping From	Zone Pumping To	No. of Pumps	Design Flow (gpm)	Firm Capacity (gpm)
3	Skansie Tank	440	450	2	4,100	2,050

1.7.4 Storage Facilities

The City's water system contains six reservoirs, with a total capacity of 4.6 million gallons (MG). The locations of the existing reservoirs are shown in Figure 1.4.

The 320 Zone is served by the East Tank and the Twin Harbor Heights Tanks, all of which are supplied by Wells 2 and 4. The 440 Zone is served by the Shurgard Tank and the Skansie Tank, which are supplied by Wells 3, 5, 6, and 8. The 450 Zone is served by the new Well 11 and Pump Station 3. Overflow elevations were updated from the Well 11 Final Design Technical Memorandum: Rezone Analysis.

Detailed information for each of the reservoirs is presented in Table 1.5 and further discussed in Chapter 4 - System Analysis.

Table 1.5 Storage Reservoirs

Name	Zone Served	Nominal Volume (MG)	Base Elevation (ft)	Diameter (ft)	Height (ft)	Overflow Elevation (ft)	Year Constructed
East Tank	320	0.23	304	52.0	14.5	318.5	1963
Twin Harbor Heights Tank No. 1	320	0.25	290	38.0	29.7	317.2	1962
Twin Harbor Heights Tank No. 2	320	0.23	290	38.0	27.2	317.2	1973
Shurgard Tank	440	0.53	339.7	30.0	100.6	440.3	1979
Skansie Tank	440	1.13	335.8	43.0	105.6	441.4	1989
North Gig Harbor Tank	450	2.23	301.2	50.5	148.8	450	2006
Total Storage (MG)		**4.60**					

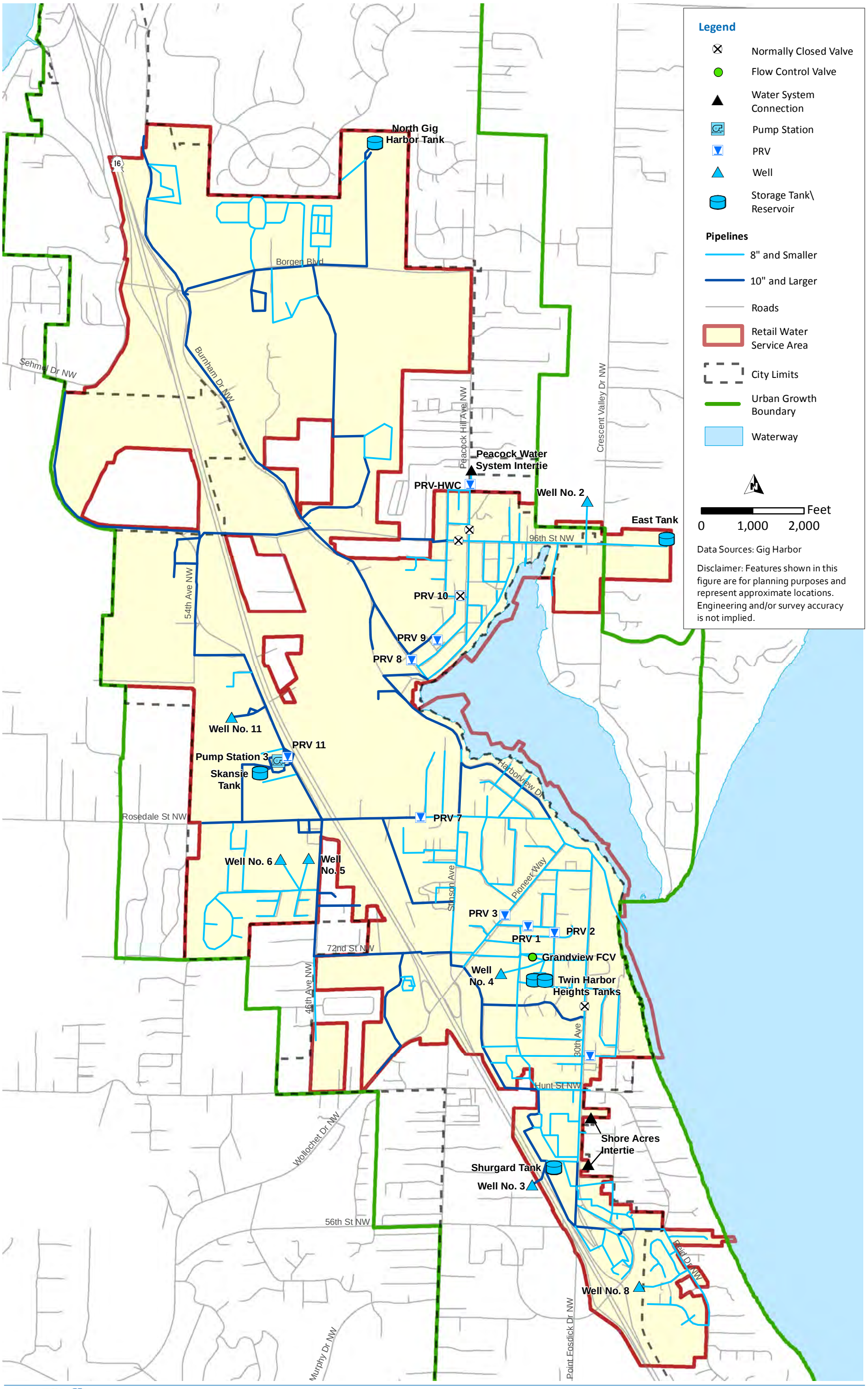


Figure 1.4 Existing Water System Facilities

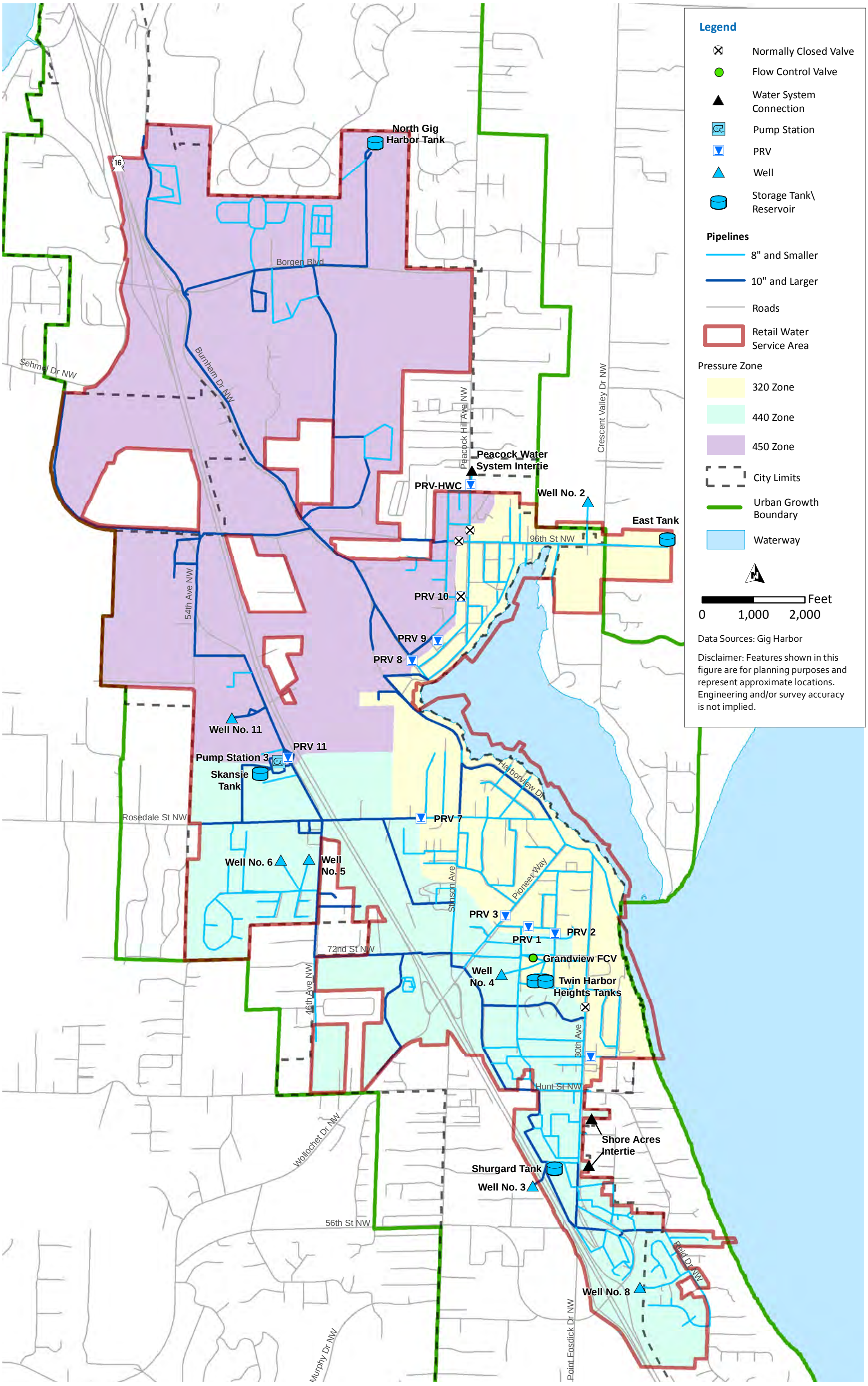


Figure 1.5 Pressure Zones

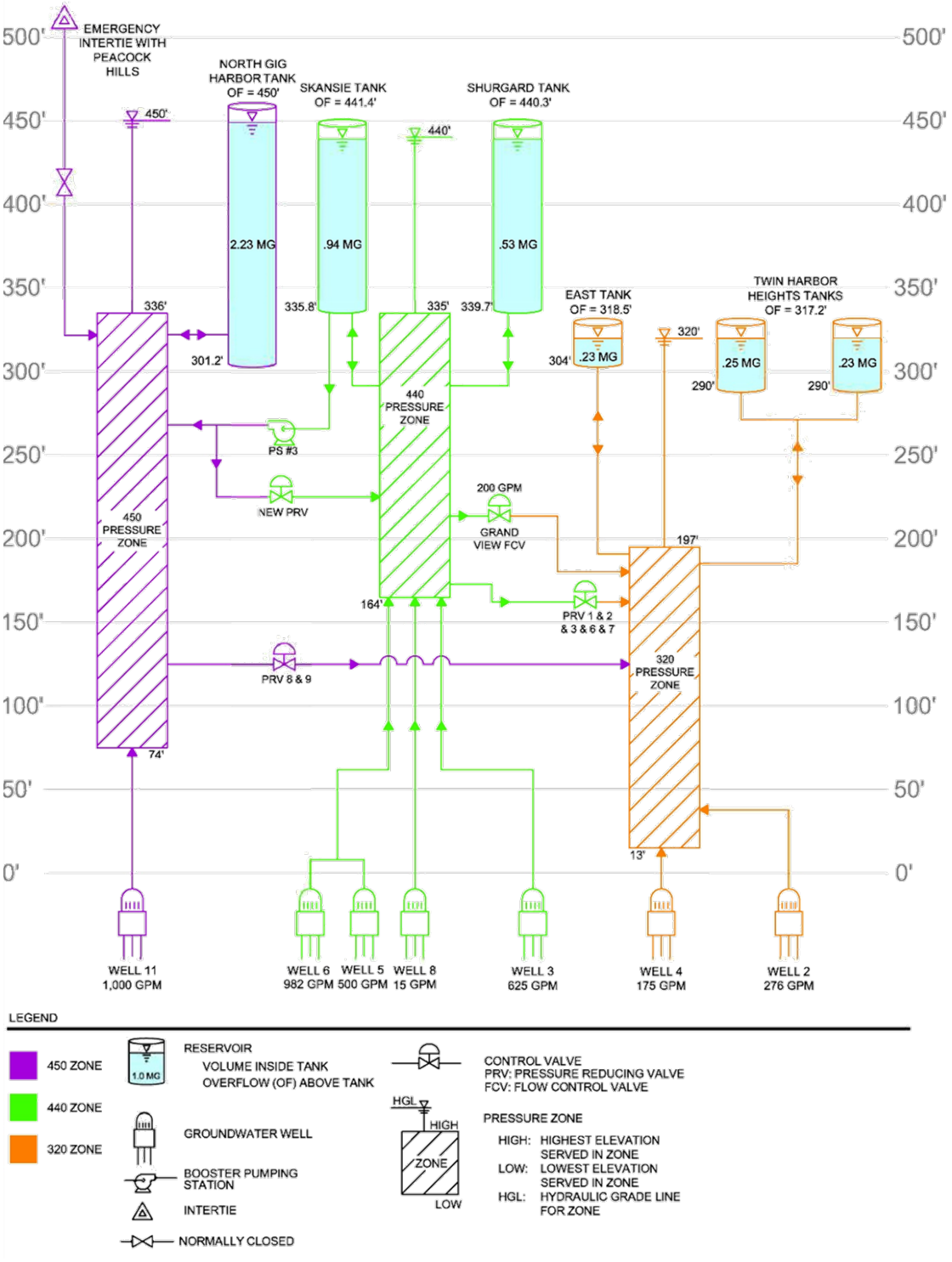


Figure 1.6 Hydraulic Profile

1.7.5 Distribution System

The City's distribution system contains more than 43 miles of pipe. Approximately 3.6 percent of the City's distribution system consists of two-inch and four-inch pipe and approximately 17 percent consists of older asbestos cement (AC) water main. The City is systematically replacing the undersized four-inch lines and the older AC mains as budget allows. A summary of the distribution system is provided in Table 1.6.

Table 1.6 Summary of Distribution System

Size	Pipe Length (ft)	Percent of System (%)
16-inch	21,590	9.5
12-inch	39,414	17.4
10-inch	15,250	6.7
8-inch	110,434	48.6
6-inch	32,226	14.2
4-inch	7,090	3.1
2-inch	1,064	0.5
Total	**227,068**	**100**
AC Main	38,469	16.9

1.7.6 PRV Stations

The City has eight PRV stations used to maintain adequate pressures in the water system and allow water to flow from the 440 and 450 Zones to the lower 320 Zone. The eighth PRV station was installed as part of the 450 rezone and allows water to flow from the 450 Zone to the 440 Zone. The City also has one additional PRV station that serves the Peacock Hill Water System through an emergency intertie. The City also has a flow control valve (FCV) going from 440 to 320 at 200 gpm.

The City attempts to maintain system pressures below 130 psi wherever feasible. Due to the varying terrain in some areas of the City, some customers receive their water at slightly higher or lower pressures than the stated preferred range. Table 1.7 includes a list of the City's PRVs and their settings.

Table 1.7 Pressure Reducing Valves

PRV Number	Location	Pressure Zone (HGL)	Elevation (ft)	Valve Setting Large (ft)	Valve Size Large (inches)	Design Max. Flow (gpm)
1	McDonald Avenue (between Shyleen Street and Lewis Street)	440 to 320	220	261.6	6	700
2	Stanich Avenue (between Shyleen Street and Lewis Street)	440 to 320	160	275.5	6	700
3	Pioneer Way (between Shyleen Street and Lewis Street)	440 to 320	200	257.8	6	700
6	Snug Harbor (east of Soundview Road)	440 to 320	185	250.8	6	700
7	Rosedale Drive (west of Shirly Avenue)	440 to 320	165	269.0	6	700
8	Burnham Drive (between Prentice Avenue and Franklin Avenue)	450 to 320	85	108.1	8	1,250
9	Fuller Street (between Prentice Avenue and Franklin Avenue)	450 to 320	132	23.1	8	1,250
10	Skansie Tank Site	440 to 450	280	60	12	

1.7.7 Interties

The City maintains one emergency intertie with Peacock Hill Water System. The intertie is not physical and requires two pipes to be manually connected to join the two systems.

Chapter 2

POLICIES AND CRITERIA

2.1 Introduction

The City of Gig Harbor (City) manages and operates its water system in accordance with all known federal, state and local regulations. The City guides the development and financing of the infrastructure required for water services and ensures consistency in service levels and customer relations. While the City has discretion in setting the performance, design criteria, and standards for its water system, these must meet or exceed the minimum standards for public water supplies set by the Washington State Department of Health (DOH) through Washington Administrative Code (WAC) 246-290. Together, policies and criteria provide the desired level of services to utility customers.

The policies described in this chapter are established by the City to provide the framework for planning, designing, operating, and managing its system. In addition, the City has a compilation of substantial rules of general applicability and statements of general policy or interpretations adopted by the City Council, that are not included in this Water System Plan (Plan). The goal of the policies in this Plan is to provide uniform treatment to all City customers and to provide documentation of the commitments to existing and potential water system customers.

Other publications, such as the City's Standard Utility Extension Agreement and the Water Distribution - Construction Standards and the Municipal Code, document the design standards and procedures for development of the water system. The Developer Extension Agreement and the City's Public Works Standards Chapter 4 - Water are included in Appendices F and G, respectively.

The City's Plan establishes the following goals for water service:

- **Goal 1:** Provide an adequate supply of high-quality potable water in a timely and reasonable manner, with a focus on system reliability and source redundancy.
- **Goal 2:** Ensure that water service is available to support development that is consistent with the City's policies and criteria, as well as current land use plans and development regulations of the State of Washington, Pierce County and the City.
- **Goal 3:** Protect the natural environment with design, construction, operational, and conservation procedures.

The City's policies are grouped by major categories. These categories are:

1. Service Area, Extension and Service Ownership.
2. System Reliability and Emergency Management Plan.
3. Fire Protection.
4. Coordination and Cooperation with Other Agencies.
5. Water System Planning, Design, and Construction.
6. Environmental Stewardship.
7. Water Use Efficiency.
8. Operational.
9. Financial.

2.2 Service Area, Extension, and Service Ownership

2.2.1 Service Area

The City will serve within its retail water service area (RWSA) as defined herein pursuant to its duty to serve and will evaluate requested revisions to the RWSA outside its current boundary on a case-by-case basis.

2.2.2 Local Government Consistency

The City's Plan will be consistent with local, county, and state land use authorities.

2.2.3 Duty to Serve

The City will plan to provide water service to all customers within the City's RWSA in accordance with the duty to serve criteria found in Revised Code of Washington (RCW) 43.20.260. The duty to serve existing and potential future connections falling within a retail service area occurs if the following criteria are met:

- Sufficient capacity exists to serve water in a safe and reliable manner.
- Service can be provided in a manner consistent with provisions of adopted land use plan(s) and development regulation(s) that reasonably relate to water service.
- Sufficient water rights exist to provide the service.
- Service can be provided in a timely and reasonable manner.

The City, at its discretion, may accommodate minor changes and/or voluntary boundary line adjustments to its defined RWSA upon request from adjacent purveyors, subject to approval by the City Council, and Pierce County. The goal is to respond within four weeks The Washington State Department of Health (DOH) shall review such changes in the course of reviewing a Water System Plan update. Any such revisions to the City's RWSA shall require a written interlocal agreement with the adjacent purveyor in accordance with local, county, and state regulations, textual and mapping amendments to each water system's respective Water System Plan and the submittal of such Water System Plan amendments to Pierce County to review for consistency with the Pierce County Coordinated Water System Plan. Any amendment must be performed as described later in this Chapter.

2.2.4 Service Availability

Customers interested in connecting their property to the City water system shall submit the required application materials to the City's billing Clerk. Service to connections may be shut off

without notice for repairs and maintenance as needed. The City is not responsible for damages resulting from necessary shutoffs.

2.2.5 Timely and Reasonable Service

Water service will be provided to an applicant/developer subject to the following basic steps. A flow chart of the process to obtain water service can also be found in the Public Works Standard's Chapter 4 - Water, Figure 4-1:

- Completion of a land use application by the applicant/developer.
- Completion of a water hydraulic analysis by the applicant/developer.
- Determination by the City of land use and water supply concurrency.
- City issuance of a water Capacity Reservation Certification (CRC) pursuant to a concurrency determination.
- Completion of City Land Use Approval.
- City approval of applicant/developer's engineering plan.
- Connection to the City water system by applicant/developer.

Except for residential, commercial, or industrial property developments involving main extensions, water service is generally provided by the City within 30 days of application and related payment by a water service applicant.

2.2.5.1 Customer Complaints

In the event an individual water service applicant or party seeking a developer extension has a grievance regarding the "timely and reasonable" response of the City to his/her water permit application, the applicant is directed to submit in writing to the City Public Works Director, a request for said grievance to be heard before the City Council. Prior to such a hearing, the Public Works Director shall consult with and make a recommendation to the City Council Public Works Committee. The Public Works Committee shall then submit its recommendation to the City Council for its consideration in the course of a Council hearing.

The applicant may attend and present their position at the hearing. Once a request for hearing is submitted, a hearing before the City Council shall occur within 60 days. A decision by the City Council shall occur no later than 21 business days after the hearing.

2.2.6 Service Extension

2.2.6.1 Extensions within City Limits

Approval for extensions of water lines must be obtained from the City. The applicant is responsible for obtaining necessary permits and documents for construction. Watermains must be extended to and through the extreme limits of the property being developed for looping or future development as determined by the City. Watermains must be located within City rights-of-way or in an easement granted to the City.

2.2.6.2 Extensions Outside City Limits

Extensions of City watermains outside City limits are possible and contingent upon City approval. The applicant is responsible for obtaining all necessary permits, documents, and authorizations for proposed work. Standard Utility Extension Agreement forms are available in the City's Public Works Standards. Development must adhere to all City Public Works design requirements for all public works improvements.

2.2.7 Water Service by Other Purveyors

It is the City's intent to provide service to its future customers within the RWSA. It is possible however, under limited circumstances, that future water service may be provided within the City RWSA by a purveyor other than the City. Such service shall occur by written agreement with such purveyor and be reflected in the respective Plans of the City and the purveyor providing the water service. Future non-City water systems that operate within the City's RWSA shall meet applicable City water system design standards.

2.2.8 Wholesaling of Water

The City may, at its discretion, execute agreements to provide wholesale water supply for continuous and/or interruptible non-emergency water use, or for emergency fire flow purposes to adjacent purveyors, subject to limitations of the City's water rights, water system capacity, and retail service area obligations. The provision of wholesale water service shall be addressed when requested by an adjacent purveyor, subject to the above limitations, and pursuant to the City and the adjacent purveyor making appropriate amendments to their respective Plans. The City may require that the legal and engineering consulting costs it incurs by preparing such amendments shall be funded by the requesting purveyor.

2.2.9 Satellite System

It is the City's policy to provide direct service to its future customers. At the City's discretion, the City may enter into a satellite system written agreement with a private or publicly owned water system to provide satellite system services within such system's water service area. At this time, the City requests to operate satellite water systems.

2.2.10 System Ownership

2.2.10.1 Annexation

Owners of property lying outside of the current City limits, but within the City's Urban Growth Area (UGA), must legally commit their property to eventual annexation prior to being served by the City water system and meet all City water system design standards. Additionally, applicants must obtain water and traffic concurrency certificates prior to being served by the City Water System. Applicants should contact the Planning Department for specific information. The provision of water pursuant to annexation shall occur in a timely and reasonable manner in accordance with the Municipal Water Law (MWL) and consistent with the City's related water system policies.

Conditions of providing water service in return for annexation may be challenged pursuant to Section 19D.140.090 of the Pierce County Code which provides for a dispute resolution process regarding the provision of water service in a timely and reasonable manner. The issue of committing annexation prior to water service is the subject of specific and ongoing litigation.

2.2.11 Permit Exempt Wells

For non-commercial uses, the City shall allow permit-exempt wells to be drilled within its corporate boundaries. The county allows permit-exempt wells in areas of the City's RWSA that fall outside the City's corporate boundaries.

In 2016, the Washington State Supreme Court issued its decision in the case of Whatcom County v. Western Washington Growth Management Hearings Board, 186 Wn.2d 648 (2016) (often referred to as the "Hirst" decision). In the Hirst case, the court determined that counties and cities could not issue building permits reliant on permit exempt wells in 15 Puget Sound basins if beneficial use of the proposed well could impact senior minimum flows and/or closed surface waters - irrespective of whether an adopted instream flow rule allows such use. The City falls within Water Resource Inventory Area (WRIA) 15, which is an affected basin.

As a consequence of the Hirst decision, local governments, including the City, were compelled to advise building permit applicants that the use of an exempt well to serve as a domestic water source may be subject to seasonal variations, curtailment, or other restrictions by the Washington State Department of Ecology (Ecology), other agencies, or a court of law.

In 2018, the Washington State Legislature passed Engrossed Substitute Senate Bill (ESSB) 6091 which allows permit exempt wells constructed in Hirst affected basins prior to the Act's effective date (January 19, 2018) to serve as proof of adequate domestic supply for a building permit. Such prior-Act wells constructed in these basins, including WRIA 15, in compliance with Chapter 18.04 RCW, are not subject to the new restrictions, limitations, and fees imposed by the Act. This is regardless of whether the well was put to beneficial use prior to January 19, 2018. Projects using permit exempt wells for non-domestic purposes are also not affected by the Act.

Under the new law, those applicants within WRIA 15 without constructed wells, and submitting building permits reliant on use of a permit exempt well (RCW 90.44.050) after January 19, 2018, are subject to its terms and limitations. Such applicants shall be limited to a maximum annual average withdrawal of 950 gallons per day (gpd) per connection. This amount may be reduced to 350 gpd for indoor use only during drought conditions. The quantitative and other limitations associated with ESSB 6091 shall remain in effect until a watershed restoration and enhancement plan is approved by Ecology and implementing rules are adopted.

In order to secure building permits, applicants located within the City's corporate boundaries shall be required to pay the City a fee of $500, $350 of which is to be transmitted to Ecology. The City is required to record relevant water use restrictions with the property title.

2.3 System Reliability and Emergency Management Planning

2.3.1 Emergency Management Command Structure

The City's basic structure for emergency response will be a Unified Command System (UCS) which can be directed either from the Emergency Operations Center (EOC) or onsite. The lead of the UCS is an Incident Commander who can be based in any of the involved departments or agencies. For more information on the City's emergency management command structure and control center see Chapter 2 of the City's 2005 Water and Sewer Emergency Response Plan. Specific water system description and information may be found in Chapter 1 of this Plan.

2.3.2 Public Notification Procedure

The public notification procedure is based on the potential health impact of the violation or event. Three tiers of violations or events have been established based on potential health impact. These three tiers include "Immediate Notice (Tier 1)", Notice as Soon as Possible (Tier 2)", and "Annual Notice (Tier 3)". For more information on the City's public notification procedures see Chapter 3 of the City's 2005 Water and Sewer Emergency Response Plan.

2.3.3 Security

The City shall make reasonable attempts to protect the security of its water system. The City shall determine what information about the system should remain unavailable to the public.

2.3.4 Water Quality Responsibility

Cross-connections between the Water Systems of the City and any other source of water supply are prohibited.

2.3.5 Emergency Response Plan

On a regular basis, the City shall update its Emergency Response Plan that focuses on problems created by major disasters (such as earthquakes, floods or windstorms) as part of the City's operations program. The Plan should ensure that adequate emergency provisions and procedures are in place to operate the water system. This Plan will be available as required by existing federal, state and local regulations.

2.3.6 Vulnerability Assessment

The City shall update as necessary a Vulnerability Assessment. This plan shall include all hazards, including man-made hazards and identify how people and property may be damaged when a hazardous situation occurs. Some items in the Vulnerability Assessment will be included in the City's Comprehensive Emergency Management Plan. The Vulnerability Assessment will not be made available to the public.

2.3.7 Cross Connection Control Program

The City shall provide water that meets federal and state water quality standards to all water system customers. The City shall take any necessary action to ensure that all water quality standards are met, which includes the implementation of its Cross-Connection Control Program. It will be updated on an as needed basis. Cross connections between the water systems of the City and any other source of water supply are prohibited.

2.4 Fire Protection

2.4.1 Fire Flow Requirements

Fire flow requirements for the City have been adopted from the City's 1993 Water Comprehensive Plan and from the International Fire Code (IFC) and modified as necessary.

The quantity or flow rate of water available for fire protection establishes an important level of service for a water system. The City's Director of Building and Fire Safety is authorized to establish fire protection measures based on the fire hazard potential of a proponent's project. Under fire flow rate conditions, there must be a system wide minimum residual pressure of 20 pounds per square inch (psi). The City's standard system wide fire flows shall be as follows:

- **Classification A:** Single-family and duplex residential fire protection: 1,000 gallons per minute (gpm) for two hours for single-family detached and duplex dwellings in residential zones.
- **Classification B**: Commercial and multi-family fire protection: 3,000 gallons per minute (gpm) for three hours for industrial, multi-family and commercial zones.

Redevelopment/infill development consistent with the adjacent water system classification AND proposed in areas where the standard system wide fire flows are not met by the existing system are not required to meet the standard system wide fire flows. Instead, such redevelopment/infill development shall provide sprinkler system for the proposed redevelopment/infill development. In addition, such redevelopment/infill development shall also pay as direct mitigation a pro-rata share of the capital improvement necessary to provide the standard water supply if that capital improvement has not been identified as part of the City's Water System General Facility Charge project list.

Except as provided above for redevelopment/infill development, the standard system-wide fire flow rates shall be provided for all conveyance systems in the public right of way and on private property serving multiple commercial/multi-family sites even where the Fire Code provides for lesser fire flow requirements of individual buildings or building sites. All other private conveyance systems may be sized to meet the minimum Fire Code fire flow requirements.

Should a proposed development require fire protection beyond those provided for by the City, additional fire suppression storage may be required. In this situation, the developer shall be required to provide additional storage facilities to meet the fire flow storage deficiencies resulting from the proposed development.

Individual fire flow requirements for a specific building or building sites will be determined by the City Fire Marshall where located in city limits or by the Pierce County Fire Marshall where located outside city limits.

2.5 Coordination and Cooperation with Other Agencies

2.5.1 Coordination with Other Agencies

The City will work with existing purveyors within the City's UGA to develop and enforce water system development standards that are acceptable to all involved parties. This will ensure an adequate level of water service in the City's planning areas.

2.5.2 Emergency Interties

The City will typically consider emergency interties with adjacent water systems where there is a mutual benefit to the water systems and/or in circumstances where such interties are consistent with the City's Comprehensive Plan and Policies.

The City is interested in creating a future intertie for the Canterwood Water System near St. Anthony's Hospital with Peninsula Light Company, which is approximately one parcel away. The City is currently the only system that can provide emergency water to the hospital. With an agreement between the City and Peninsula Light Company, the hospital would have a secondary emergency supply. Further analysis of this intertie can be found in Chapter 5 of this Plan.

2.6 Water System Planning, Design, and Construction

2.6.1 Planning Objectives

The City will plan and design water system facilities that can deliver continuous, safe water supply to meet customer demand and be consistent with all applicable federal, state and local plans and regulations. These include the City of Gig Harbor Comprehensive Plan, the City of Gig Harbor Comprehensive Water System Plan, the Pierce County Comprehensive Plan (where RWSA is located outside city limits), Pierce County Coordinated Water System Plan, Chapter 19D.130 Pierce County Code, and the City's Public Works Standards. Where conflicts occur the most restrictive plan or regulation will apply.

The above planning objectives will be accomplished through the development and review of the City's Comprehensive Water System Plan that will be updated a minimum of every ten years, per state regulations. The City, at its discretion, may update its water portion of the City-wide Comprehensive Plan Utilities Element more frequently.

2.6.2 Water System Plan Amendments

Amendments to policies or growth projections contained within this plan, or future proposed amendments which may adversely affect water system capacity shall be processed through the City's Comprehensive Plan amendment procedures (Chapter 19.09.GHMC) All other amendments, to be known as technical amendments, must be made through application to the City's Public Works Department. Decisions on technical amendments will be made by the City Council and will, where accepted by the City Council, be adopted by resolution and be forwarded on to the DOH and Pierce County for additional review or approval. The requisite fee for proposed amendment to the Plan must accompany the proposed application. Additionally, all costs incurred by the City will be reimbursed by the applicant proposing the amendment. These costs may include, but are not limited to, consultant fees, legal fees, and review fees required by the City or other jurisdictions.

All proposed amendment applications must include a completed Water Hydraulics Report in City format.

2.6.3 Water System Design

Developer engineers must determine the scope of work required for connecting to existing mains. All extensions to the water system must be designed and constructed according to the City's standards and be approved by the City. Developers must pay a City Water Concurrency Review Fee to the City to complete a water system evaluation that includes a hydraulic analysis to verify required water system improvements and adequacy of existing water infrastructure.

2.6.4 Minimum Water System Construction Standards

Minimum standards are established for construction of water system projects and include specifications for pipe and valve types, depth of cover on new watermains, and installation of fire hydrants. All construction within the City's water system shall conform to the City's Public Works Standards and the Washington State Department of Transportation (WSDOT) / American Public Works Association (APWA) Standard Specifications most current version.

2.6.5 Water Supply

The City's goal is to have sufficient supply facilities available to meet its maximum day demand (MDD). It is the City's goal to make its system both redundant and reliable. These terms are defined as such:

1. **Redundant Supply Capacity:** Corresponds to the total wells' ability to serve with the largest source out-of-service.
2. **Reliable Supply Capacity:** Corresponds to the wells' ability to serve considering whether each source has back-up power or the capability to be hooked up to an appropriately-sized emergency generator.

2.6.6 Storage

In addition to the Water System Standards, the City has established the following System Storage Standards:

1. The City will plan to provide equalizing storage in the amount needed to offset the difference between the peak hour demand (PHD) and the sum of all the installed active sources of supply capacities for a duration of 2 1/2 hours.
2. Emergency/standby volume is required to supply reasonable system demands during a foreseeable system emergency or outage, such as a power outage. Emergency and reserve volume requirements are based upon average system demands and source of supply redundancy:
    a. The City had established the following minimum standby storage volume criterion:
        i. Provide sufficient storage to maintain service for two days of average day demand (ADD), with the largest supply source off-line, but not less than the DOH minimum requirement of 200 gallons per equivalent residential unit (ERU).
    b. The City is updating the criteria based on the system evaluation detailed in Chapter 4. The recommended criteria is as follows:
        i. Provide a flow-based emergency criteria of two days of ADD in excess of supply with largest source off-line.
3. Design criteria established by WAC 246-290-230 and DOH require that new or expanding water systems have the capacity to provide design fire flows during MDD conditions. Fire protection volume requirements are computed based on the size and duration of the largest required fire flow within the service area of the storage facility. The City plans to provide fire flow volumes as described earlier in the "Fire Flow Requirements" section of this chapter.
4. The City has established its storage as stacked, which establishes separate storage volumes for Standby Storage and Fire Suppression Storage.

2.6.7 System Pressure

The City is required to maintain a minimum of 30 psi throughout the distributions system during PHD and 20 psi at the flowing hydrant(s) during MDD with fire flow. The City's system pressures are generally predicted to range between 30 psi and 130 psi. Recognizing the complexity in restricting maximum system pressures to 150 psi given the terrain and a wide variety of operating conditions, higher pressures may exist within the system. Wherever feasible, the maximum system pressures shall be limited to 100 psi. Individual pressure reducing valves (PRVs) are required on service lines where pressures at the water meter exceed 80 psi as required by the plumbing code that has been adopted by the City's Building and Fire Safety Department.

2.6.8 Pipe Sizes

From the City's Public Work Standards most current version, the minimum distribution system line size shall not be less than eight inches, provided fire flow requirements can be achieved. Dead-end mains shall be eight-inch diameter at a minimum. It is the requirement of the City that all distribution mains be sized by a hydraulic analysis.

2.6.9 Velocity Criteria

The City has established a system wide velocity criterion that pipe velocities shall not exceed 10 feet per second during peak hourly demand conditions and also during MDD conditions with a fire flow.

2.6.10 Looping

The City has established the following criteria with regards to looping:

- Wherever feasible, new mains shall be designed to promote looping.
- Dead-end lines on smaller distribution mains will be looped if development patterns dictate replacement of these lines with larger pipe.

2.6.11 Backup Power

Backup power is provided by the City as required by the DOH.

2.6.12 Valve and Hydrant Standards

Valve and hydrant standards are outlined in the City's Public Works Standards and are consistent with the DOH.

Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall there be less than one valve every 1,000 feet. Generally, there shall be three valves on each tee and four valves on each cross. See the City's Public Works Standards for more specific valve details.

Fire hydrant spacing shall be measured to the pathway required for the Pierce County Fire District 5 to lay the fire hose. At least one fire hydrant shall be installed at all intersections and at the end of all 6-inch or larger mains. In general, the required spacing between fire hydrants shall be between 200 feet and 500 feet, dependent upon the required fire flow. See the City's Public Works Standards and Section 508 of the IFC for more specific fire hydrant details and spacing.

2.6.13 Materials of Construction

All construction of watermains and related appurtenances shall conform to the City's Public Works Standards and the WSDOT/APWA Standard Specifications most current version. All watermains shall be cement-lined ductile iron pipe, standard thickness Class 52, or C-900 Class 200 for mains eight through ten inches in diameter, conforming to American Water Works Association (AWWA) standards. Gate valves shall be resilient wedge, non-rising stem with O-ring seals conforming to AWWA C515 Standard.

2.6.14 Source Meters

All active water sources shall be metered and will be calibrated when required.

2.6.15 Wholesale Meters

All wholesale water customer connections to the City's Water System shall be metered. These meters will be calibrated annually.

2.6.16 Service Meters

All connections to the City's system shall be metered. Meters shall be acquired by the City from the supplier. Such meters shall be installed by the City and the ownership of such meters shall remain with the City. The City will perform the ordinary and usual maintenance on such meters and may replace them from time to time. All meters shall be in accordance with the applicable sections of the City's Municipal Code, 13.02.

The City shall install all meters as approved and supplied by the superintendent of the water system for each premises at the time connection is made to the City water system.

2.6.17 Connection Responsibility

The superintendent shall cause to be installed a service pipe from the main to the property line, including a stopcock, meter, and meter box, which shall be maintained by, and kept within, the exclusive control of the City.

2.6.18 Latecomers

Late-Comer Agreements are allowed for watermain extensions and must be approved by the City. The Developer is responsible for initiating, executing, and filing the agreement and shall include all necessary information for collecting late-comer fees and must do so within 90 days after City acceptance of the watermain. The City Council may execute a latecomer agreement for water facilities with a maximum recovery period of 15 years.

2.7 Environmental Stewardship

2.7.1 Wastewater Reuse and Rainwater Reclamation

The City is committed to wastewater reuse and rainwater reclamation. These can serve as cost-effective and environmentally beneficial sources of water for industrial processes, sanitation and irrigation thereby increasing the security and reliability of the drinking water supply.

2.7.2 Water Resource Protection

Since the City owns and operates its own groundwater sources, it must protect groundwater sources within its service area from degradation related to its actions, facilities or programs. This will be completed through the City's Wellhead Protection Program. The Program will include a description of relevant groundwater aquifers, land ownership, land use, watershed control and water quality trends. It will also identify potential sources of contamination within the City's wellhead areas, determine groundwater flow characteristics, and eliminate wellhead protection areas around each well based on groundwater flow parameters. The Program will be updated as required by applicable regulations.

2.8 Water Use Efficiency

2.8.1 Water Efficiency

In the previous Plan, the City established a goal to reduce the consumption per ERU by 10 percent by 2028.

The City's new water use efficiency goal will be to decrease residential consumption by 0.25 percent for each year for the next six years. Water use efficiency measures shall be consistent with, and strive to exceed, all local, State, and Federal laws and regulations.

2.8.2 Distribution Leakage Standard

The City will continue to maintain levels of water leakage for its distribution system at less than 10 percent on a three-year rolling average.

2.8.3 Reclaimed Water

The City has been very active in reusing treated wastewater at its Wastewater Treatment Plant site for over 20 years. The City completed a Phase 1 study, Water Reclamation and Reuse Site Evaluations and Study (HDR, 2012), to evaluate the feasibility of a reclaimed water program. A Phase 2 study is planned to be completed in 2020 to further evaluate reclaimed water opportunities.

2.9 Operational

2.9.1 Customer Complaints

The City is committed to resolving customer complaints. All complaints are recorded and forwarded to the maintenance crew for resolution.

2.9.2 Employee Drug Testing

The City is committed to providing a safe work environment for its employees, its customers, and the public at large that is free from the harmful effects of substance abuse.

2.9.3 Employee Certification

The City may pay fees and employee's time for the required certification testing as well as required annual renewal fees.

2.10 Financial

2.10.1 Fiscal Stewardship and Self-Sufficient Funding

The City shall manage its income and expenses in a self-supporting manner in compliance with applicable laws, regulations and its own financial policies.

2.10.2 Rate Structures

The City shall establish rates, charges and fees to maintain sufficient funds to operate, maintain, and upgrade its water system as necessary to provide safe reliable water service to its customers. These rates should be evaluated at a minimum annually. This will ensure that forecasted expenses and impacts for regulations are reflected in the rate structure.

2.10.3 Development Fees and Charges

2.10.3.1 Connection Fee

The charges for domestic water service shall be based upon the size of meter installation and the water delivered through the service meter. Determination of the meter size shall be subject to the City's approval.

2.10.3.2 Surcharge

Connection to the City's water system for customers who are outside of the City limits shall be charged at 1.5 times the rate for customers who are located within the City limits and/or private water systems.

2.10.4 Capital Facility Plan

The City shall establish 10-year and 20-year Capital Facility Plans that describe the anticipated improvements or modifications to the water system during each of these times frames. The Plan should address required repairs to the water system, planned replacement of aging facilities, upgrades to the existing facilities to provide additional capacity for projected growth and construction of general facilities to aid growth.

Chapter 3

PLANNING DATA AND WATER DEMAND FORECASTING

3.1 Introduction

This chapter presents the water demand forecast (projections) for the retail water service area (RWSA) for the 10-, and 20-year planning periods. Historical water production and consumption trends for the Gig Harbor Water System are summarized. Projecting a realistic future water demand is necessary for evaluating the capability of the water systems in meeting future water service requirements, planning for infrastructure projects, and securing adequate water supply. Future water demands are used as input conditions for the analyses of the water systems that are used to develop the Capital Improvement Program (CIP).

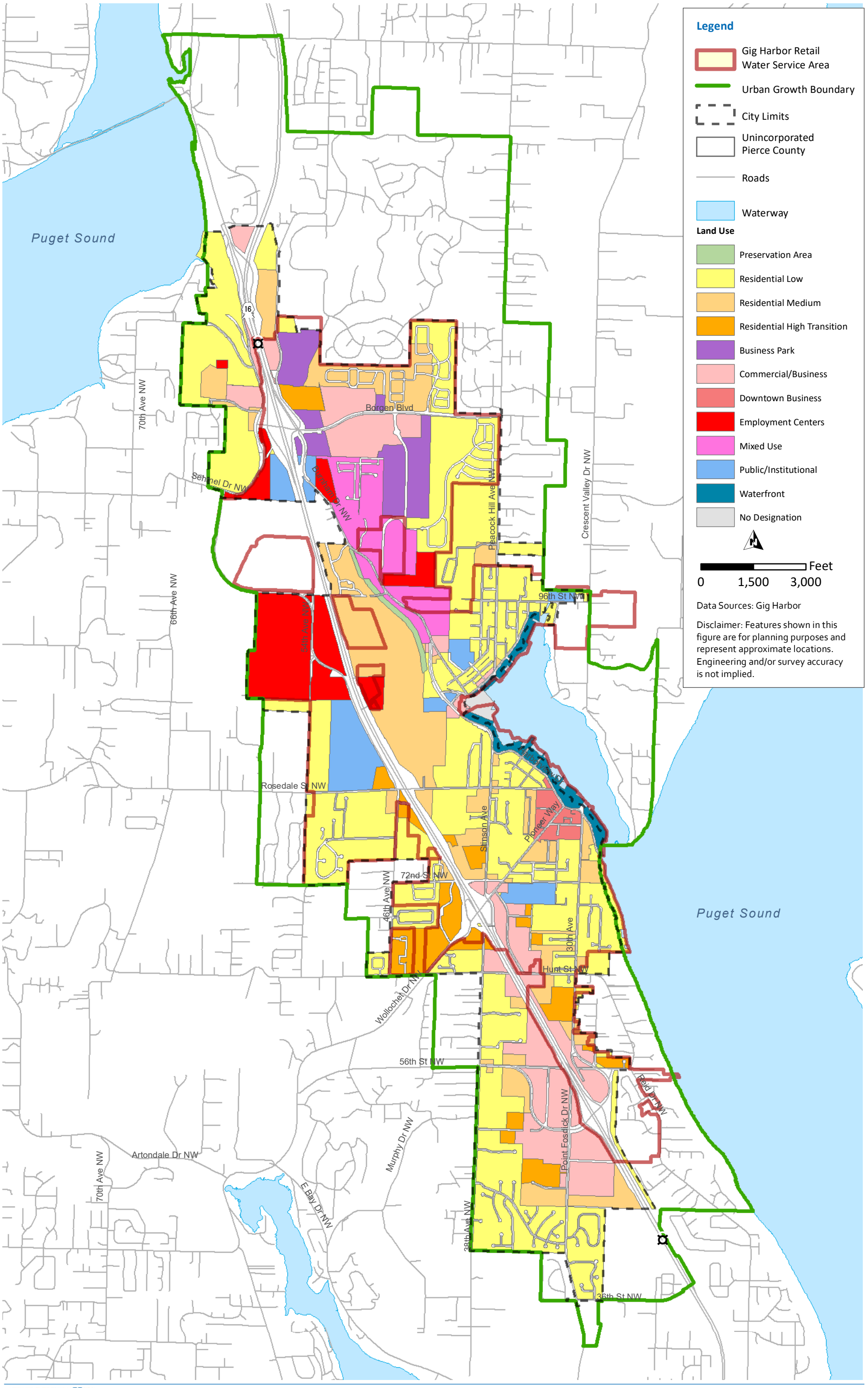
3.2 Land Use

Figure 3.1 shows the City's land use, which was used as the baseline for the analysis presented in this Plan. For this Plan, the City's land use data, provided by the City, was compiled into 10 land-use designations as follows:

- Residential Low.
- Residential Medium.
- Residential High Transition.
- Business Park.
- Commercial/Business.
- Downtown Business.
- Employment Centers.
- Mixed Use.
- Public/Institutional.
- Waterfront.

3.3 Demographic Analysis

Pierce County's Planning and Land Services Department publishes a Buildable Lands (BL) report, which reports household, employee, and population growth forecasts for jurisdictions within its regional boundary and includes all the City of Gig Harbor's (City) service area.



carollo

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Figure 3.1 Land Use Map

A demographic analysis of the City's retail and future water service area was performed using data from the most recent 2014 BL Report and can be found in Appendix H. The BL Report provides the City's 2010 Census data and a targeted 2030 dataset, which was used at the time the demographic analysis was performed. For years 2011 through 2017, the City provided updated population and housing data as reported in their Water Facilities Inventory (WFI) Statistics. The City's 2030 employment statistics were used for this Water System Plan (Plan) as the BL Report has not been updated with the City's new projections. For projections beyond 2030, it was assumed to use the average annual growth rates.

Table 3.1 and Figure 3.2 summarize the City's population, household, and employment projections. Population is expected to grow at an average annual growth rate of 0.72 percent. Household and employment is expected to grow at an average annual growth rate of 1.18 and 0.54 percent, respectively.

Table 3.1 Projections for Gig Harbor

	2018	2027	2030	2037	Average Annual Growth
Population	9,632	10,283	10,500	11,069	0.72%
Household	4,724	5,254	5,431	5,930	1.18%
Employment	9,569	10,034	10,189	10,583	0.54%

To predict the City's future water demand, the existing number of water connections was grown by the annual growth rates to predict the future number of water connections in the 10-, and 20-year planning periods.

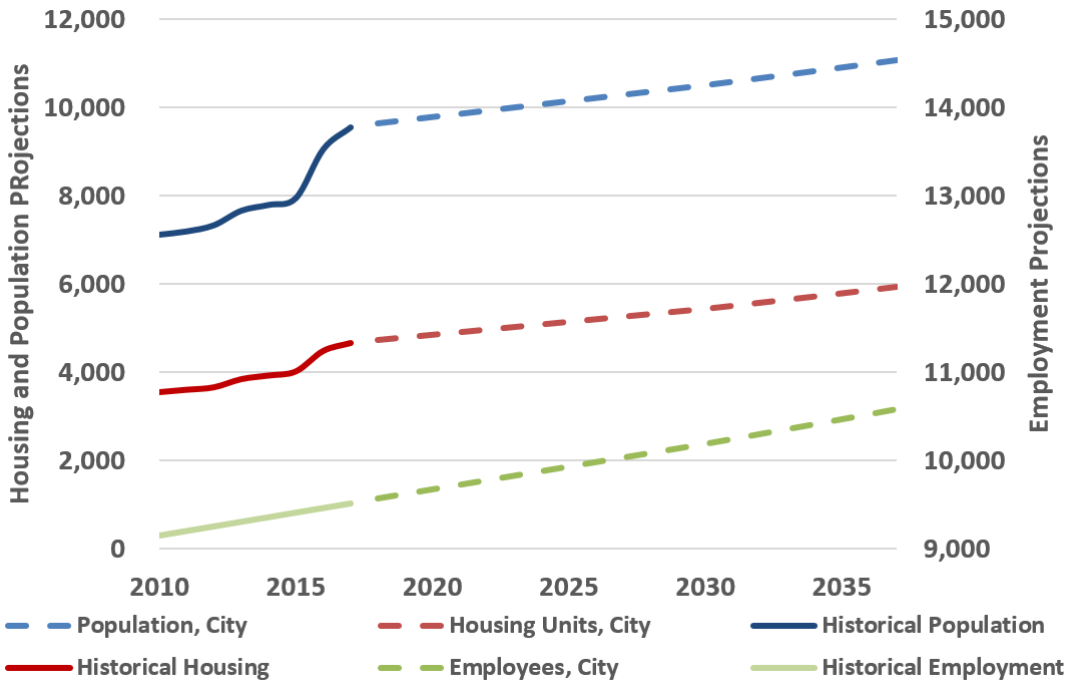


Figure 3.2 Demographic Projections

3.4 Historical Water Demand

To establish historical demand, the City provided historical water production records, the number of accounts, and consumption data. Data were then evaluated to characterize the unique water use of the City's customers. From the data, several key demand parameters were generated and used to project future demand.

3.4.1 Historical Water Production

The City produces all of their water from seven active well sources, as described further in Chapter 4. Figure 3.3 shows the historical water production from 2007 to 2017. Annual production has been increasing steadily since 2014, from 300 million gallons (MG) to 400 MG.

Water consumption typically peaks in the months of June, July, and August due to summer irrigation. Figure 3.4 shows the 11-year average water production by month for all well sources. Monthly demands by customer class were not available for this analysis.

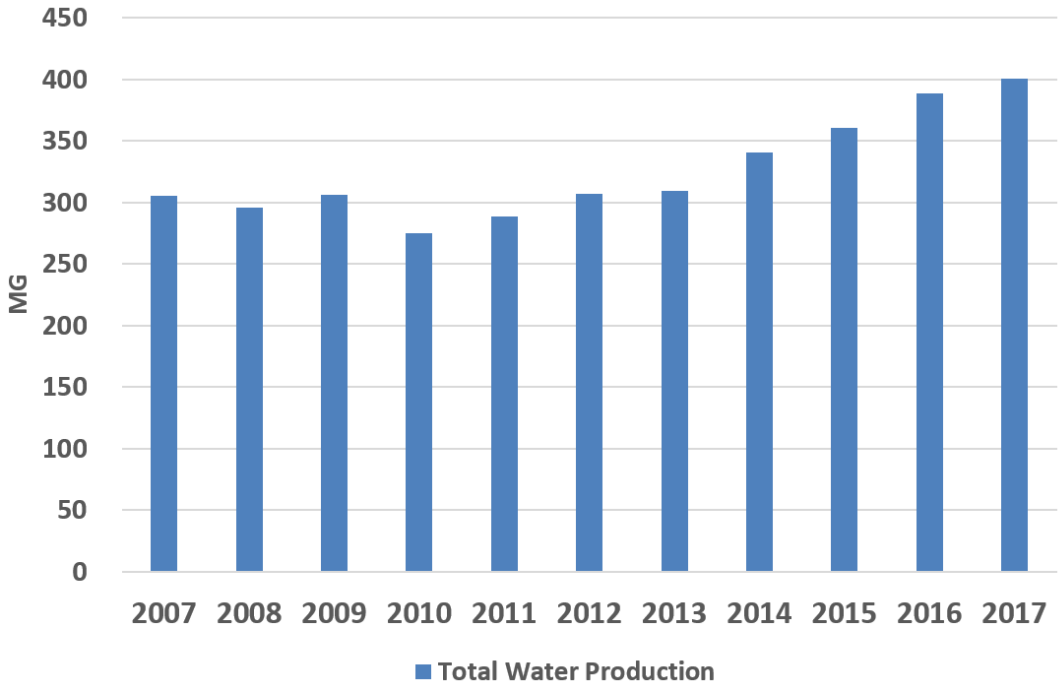


Figure 3.3 Historical Water Production

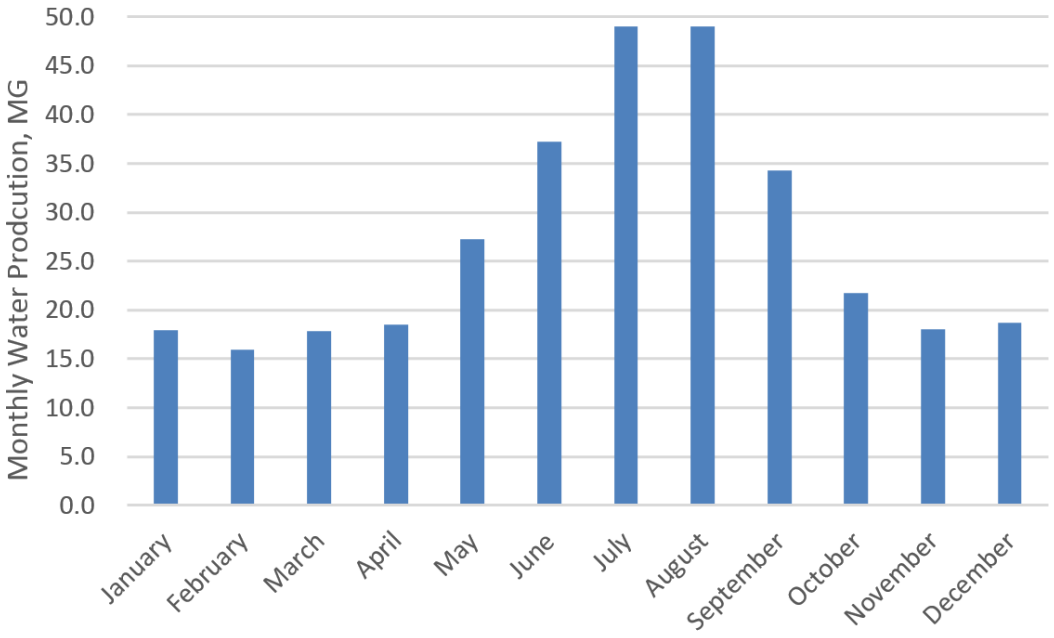


Figure 3.4 Historical Average Monthly Water Production

3.4.1.1 Average Day Demand

The average day demand (ADD) represents a water system's average daily demand for a year. To calculate ADD, the total water produced by the City in a year is divided by the number of days in a year, which is shown in Table 3.2. From 2007 to 2016, the City's ADD has increased from 0.75 million gallons per day (mgd) to 1.10 mgd.

3.4.1.2 Maximum Day Demand

Historical maximum day demand (MDD) values are the highest water production in a single day in a given year, usually occurring during the summer when irrigation use is highest. MDD is a common system requirement for supply capacity, pump station discharge rates, and reservoir capacity.

Table 3.2 shows the recorded MDD and date of occurrence for each year. As the table shows, the MDD fluctuated, and in the last five years the MDD has averaged approximately 2.20 mgd. Figure 3.4 also shows the MDD in comparison with ADD, with the average over the past 11 years as 2.00 mgd and 0.89 mgd, respectively.

3.4.1.3 Peaking Factor

The historical MDD to ADD peaking factor (PF) is a key parameter used to determine future MDD projections. The PF is defined as the ratio of MDD to ADD and represents how much water is used for summer flows (mainly irrigation) compared to average flows. It is important to note that this PF is not a comparison of summer peak flows to winter base flows; a PF of that type is used more widely for conservation planning. Peaking factors fluctuate due to climate, economics, and other behavioral patterns. Figure 3.5 shows the historical PF (measured on the right side of the chart) in comparison with the City's ADD and MDD (measured on the left side of chart).

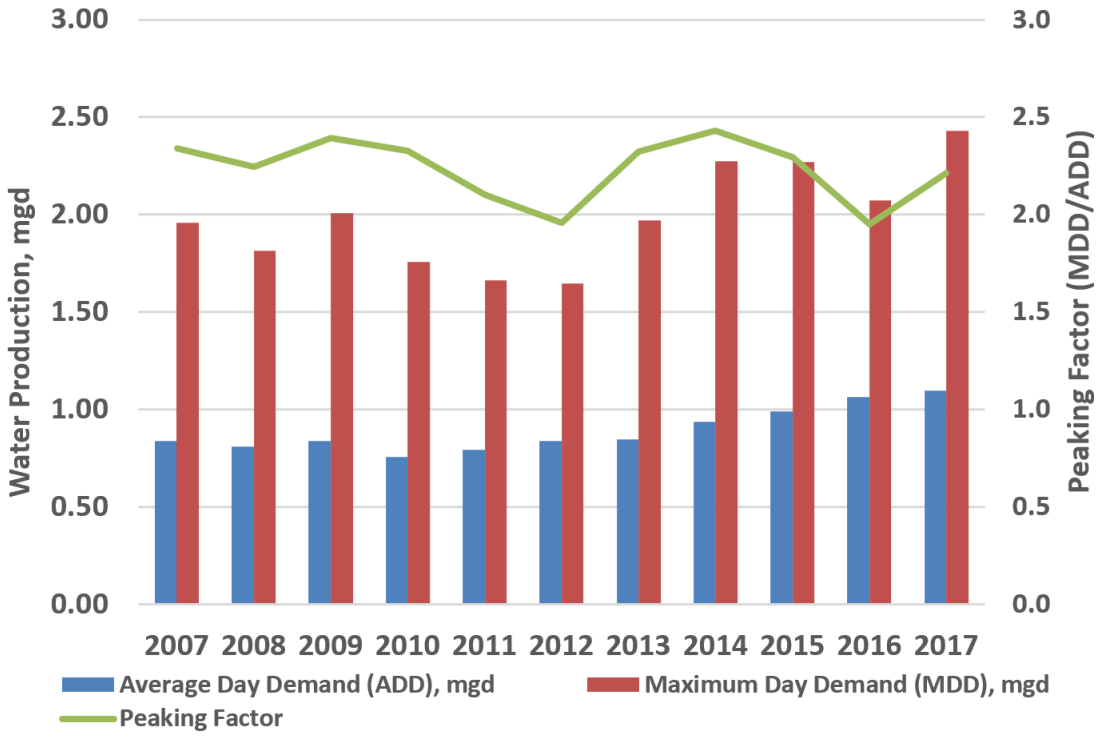


Figure 3.5 Historical ADD, MDD, and PF

Table 3.2 shows the historical annual water production, as well as the average day demand, maximum day demand, and the historical MDD/ADD peaking factor.

Table 3.2 Historical Water Production[1]

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Annual Production (MG)	305.8	295.7	306.3	275.3	288.8	307.4	309.5	341.1	361.0	389.0	400.9
Average Day Demand (mgd)	0.84	0.81	0.84	0.75	0.79	0.84	0.85	0.93	0.99	1.06	1.10
Maximum Day Demand (mgd)	1.96	1.82	2.01	1.76	1.66	1.64	1.97	2.27	2.27	2.07	2.43
Date of Maximum Day Demand	7/11	8/28	7/29	8/16	8/26	8/17	7/26	6/16	7/6	8/24	8/4
Peaking Factor	2.34	2.25	2.39	2.33	2.10	1.96	2.32	2.43	2.29	1.95	2.21

Notes:
(1) Source: Gig Harbor Well Report Summary 2013-2017.xlsx (From SCADA Data).

3.4.2 Historical Customer Connections

The City of Gig Harbor's customers are divided into the following categories:

- Single-Family Residential (SFR).
- Multi-Family Residential (MFR).
- Commercial/School.
- Government.

The City provided historical customer data for the past three years. Table 3.3 summarizes the total number of connections in each customer category from 2015 to 2017. Connections correlating with large customers are shown in the "Largest Customers" row and is explained later in this Chapter.

Table 3.3 Historical Customer Connections

Customer Class	2015	2016	2017
SFR	1,875	1,984	2,135
MFR	85	85	85
Commercial/School	281	286	289
Government	68	68	70
Largest Customers(1)	4	4	4
Total	**2,313**	**2,427**	**2,583**

Notes:
(1) Largest Customers include hour Commercial/School customers, including wholesale.

3.4.3 Historical Consumption

3.4.3.1 Historical Consumption by Customer Type

Table 3.4 and Figure 3.6 show the historical consumption by customer type from 2013 to 2017. Water consumption over the past five years has averaged approximately 0.90 mgd. The commercial/schools customer type, which do not include the largest customers in that category, have had an annual average consumption growth of approximately 30 percent over the last five years, from 0.06 mgd to 0.18 mgd. By comparison, residential, multi-family, and government customer types are each below 10 percent annual average growth. The largest customers make up an annual average of approximately 0.18 mgd, or 20 percent of the total consumption. Consumption data shown in 2017 for the largest customers is for 11 months.

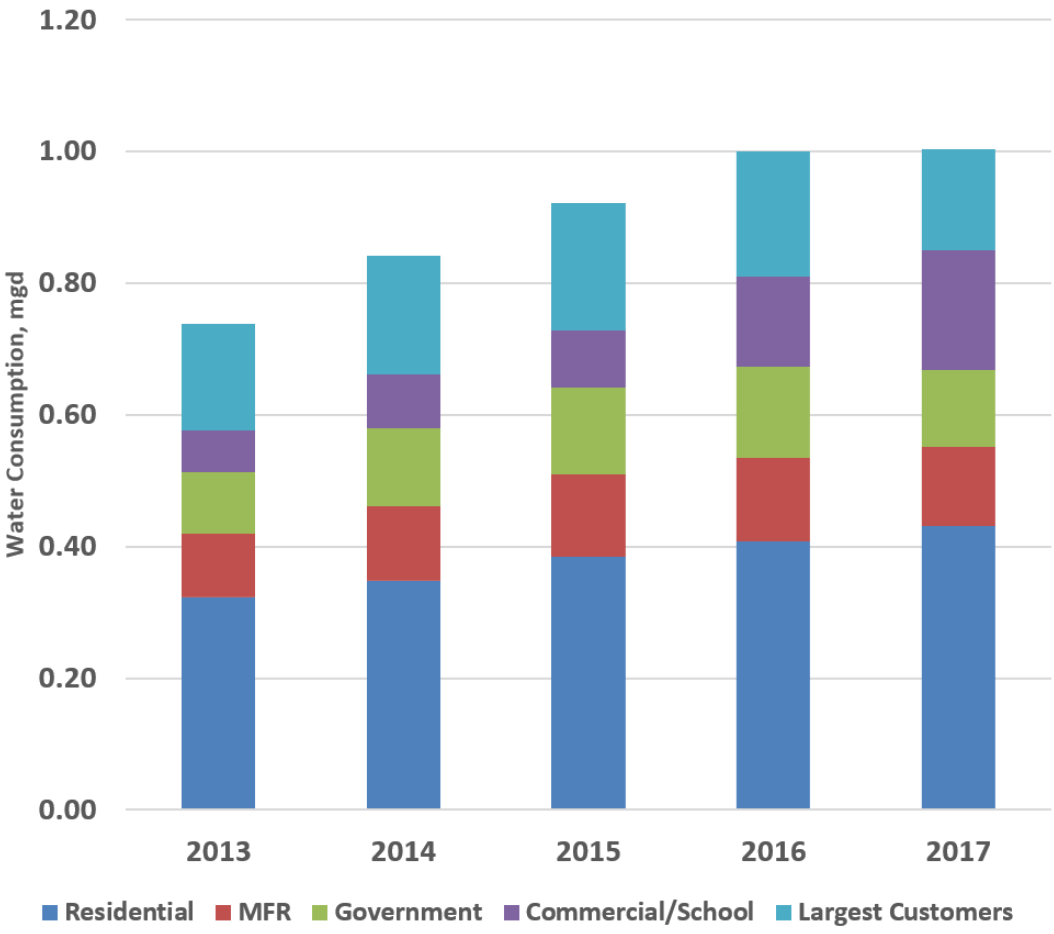


Figure 3.6 Historical Consumption by Customer Type

Table 3.4 Historical Consumption (mgd) by Customer Type

Customer Class	2013	2014	2015	2016	2017	5-Year Average
SFR	0.32	0.35	0.38	0.41	0.43	0.38
MFR	0.10	0.11	0.13	0.13	0.12	0.12
Commercial/School	0.06	0.08	0.09	0.14	0.18	0.11
Government	0.09	0.12	0.13	0.14	0.12	0.12
Largest Customers[1]	0.16	0.18	0.19	0.19	0.15	0.18
Total	**0.738**	**0.842**	**0.921**	**1.000**	**1.004**	**0.90**
Total Production (mgd)[2]	0.81	0.90	1.01	1.04		0.94
Distribution System Leakage (mgd)[2]	0.06	0.04	0.03	0.02		0.04
Percent Distribution System Leakage (DSL)[2]	6.6%	4.5%	3.2%	1.8%		6.0%

Notes:
(1) Largest Customer consumption for 2017 is from 1/1/2017 to 11/30/2017.
(2) Source: Water Use Efficiency (WUE) reports.

3.4.3.2 Largest Customers

Consumption of the City's largest customers was evaluated apart from other customer categories and therefore appears in a separate row in Table 3.4. For these customers, consumption is separated from the other type of accounts as they have different growth characteristics. Additionally, large users are allocated at their specific location in the hydraulic model to find their unique future demands. For example, one of the largest customers is the Catholic Health Initiative, who recently increased their building with an additional floor. It was assumed that their water demand will increase from their historical numbers.

The City's wholesale customer is the Washington State Department of Corrections (WSDOC) Washington Correction Center for Women (WCCW). The City currently provides 87,000 gallons per day (gpd) average use, or approximately eight percent of the City's total water consumption. Water is supplied through two-inch and eight-inch compound water meters owned by WSDOC.

Table 3.5 shows the water consumption of the largest customers from 2013 to 2017 and a four-year average (2013 to 2016) for each customer.

Table 3.5 Water Consumption by Largest Customers, gpd

Customer	2013	2014	2015	2016	2017(1)	4-Yr Average
WCCW	72,000	86,000	88,000	87,000	57,000	83,250
Peninsula Light Water Dept.	47,000	51,000	52,000	51,000	51,000	50,250
Catholic Health Initiative	26,000	27,000	34,000	32,000	29,000	29,750
Tacoma/Pierce County YMCA	17,000	17,000	19,000	20,000	18,000	18,250
Total	**162,000**	**181,000**	**193,000**	**190,000**	**155,000**	**176,200**

Notes:
(1) 2017 data from January 1 to November 30, 2017.

3.4.3.3 Distribution System Leakage

DSL is the total water produced minus the total authorized consumption. This value includes both authorized metered consumption and the authorized, tracked, and estimated consumption for the Other Authorized Use category.

All water not authorized for consumption is considered DSL, which includes both apparent and real losses. Apparent losses include water theft, meter inaccuracies, and data collection errors. Real losses are physical losses from the distribution system, such as reservoir overflows, water main breaks, and water main leaks. Historical data of DSL was provided by the City's Water Use Efficiency reports and is shown in Table 3.4.

3.4.3.4 Equivalent Residential Unit

An Equivalent Residential Unit (ERU) is the amount of water consumed by a typical full-time single-family residence, regardless of meter size. It can be used to express water use by non-residential customers as a multiple of the demand of a typical SFR customer.

To calculate ADD water use per ERU, also called the "ERU value," the total annual volume of water consumed in the SFR customer class is divided by the total number of active SFR connections. This value defines the average annual SFR water use per connection. To determine the number of ERUs used by other customer classes, the volume of water used by other customer classes is divided by the ERU value.

Table 3.6 shows the average daily consumption per connection for each customer class between 2015 and 2017. The average SFR daily consumption volume was 204 gallons. This means the District's ERU value is 204 gpd/ERU.

The last column in Table 3.6 shows the average number of ERUs per connection for each customer category the City serves. The typical MFR account consumes 7.1 ERUs, while commercial/school connections equal 2.3 ERUs and government connections equal 9.1 on average. The City's ERU value is lower than typical water systems.

Table 3.6 Historical Consumption (gpd) per Connection

Customer Class	2015	2016	2017	Average	ERUs per Connection(1)
SFR	205	206	202	204	1.0
MFR	1,471	1,497	1,416	1,462	7.1
Commercial/School	311	482	626	473	2.3
Government	1,937	2,019	1,664	1,874	9.1
Largest Customers	48,098	47,539	38,554	44,730	218.2

Notes:
(1) ERUs per connection are calculated by dividing the customer class average gpd/connection by the SFR ERU value.

3.5 Projected Water Demands

Projecting future water demand is a key part of the water system planning process. Demand projections are used to identify system improvements such as supply, pumping, storage, and piping requirements.

This section summarizes the ADD and MDD projections developed for the City's water system from historical water demand trends and future demographic growth assumptions. Demand projections are presented as a range in demands that may be experienced in the future.

Low, medium, and high-water demand projection scenarios were developed by adjusting various demand projection parameters. The medium demand projection scenario was used for the system analysis described in Chapter 4, which determined future pumping storage and distribution system deficiencies and identified potential improvements to achieve the City's established capacity criteria. The low and high projection scenarios give a sense of the possible range of future demands.

3.5.1 Demand Projection Methodology

For this analysis, the water demand projections were developed in the following steps, which are also summarized in Figure 3.7:

1. Grow historical water connection numbers for each pressure zone by the zone-specific residential and non-residential growth rates from the demographic analysis.
2. Convert account projections into ERU projections and then ADD projections using demand projection parameters derived from historical data consisting of the City's starting ERU value, ERU reduction, MDD/ADD peaking factor, DSL, percent of Other Authorized Use, large customer demand and reserves.
3. Apply the MDD to ADD peaking factor to convert ADD to MDD.

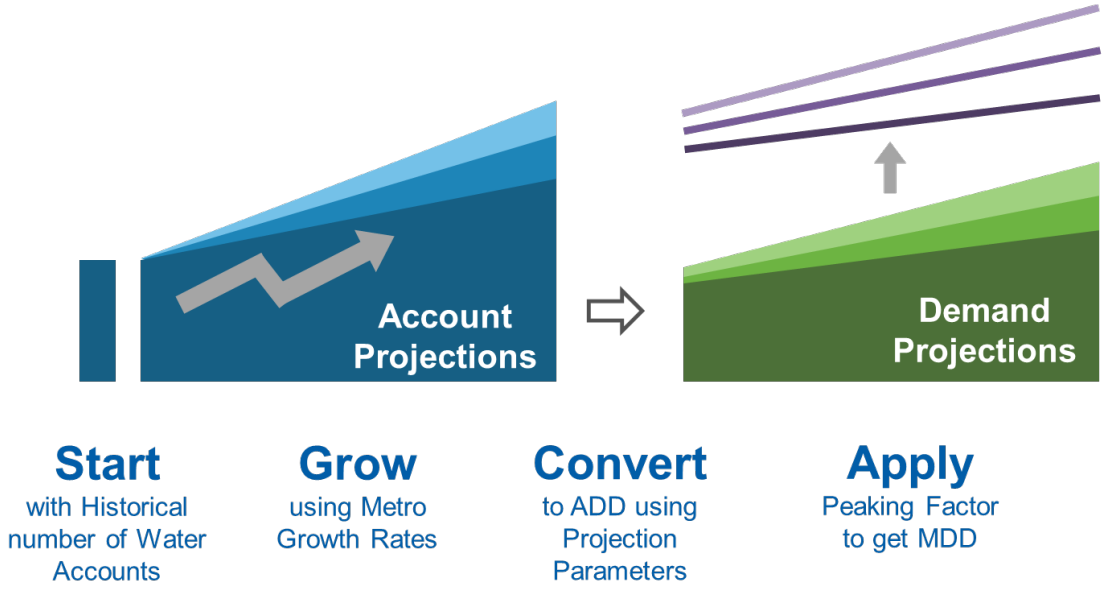


Figure 3.7 Demand Projection Methodology

3.5.2 Demand Projection Parameters

Numerous factors and assumptions affect the accuracy of projected future water demands. To project the City's future ADD and MDD, several key parameters are listed in Table 3.7. These parameters include the starting ERU value, peaking factor (MDD/ADD), DSL percentage, and Other Authorized Use.

Table 3.7 Projected Parameters

Projected Scenario	Low		Medium		High	
Parameter	Parameter	Notes	Parameter	Notes	Parameter	Notes
Starting ERU Value (gpd/ERU)	205	75th %	205	75th %	205	75th %
ERU Annual Reduction 2017-2038	0.25%		0.00%		0.00%	
Peaking Factor (MDD/ADD)	2.23	Avg.	2.33	75th %	2.43	Max
DSL (Percent of Production)	4.7%	Hist. Avg.	4.7%	Hist. Avg.	6.6	Max
Other Authorized Use (Percent of Production)	0.32%		0.32%		0.32%	

Notes:
Abbreviations: Avg. - Average; Hist. Avg. - Historic Average.

For each demand projection parameter, low, medium, and high values were established for the future using historical data and assumptions, as described below.

3.5.2.1 ERU Value

The ERU value is equal to the 75th percentile of the historic consumption per connection for the SFR customer class, which is 205 gpd/ERU from 2015 to 2017. All three demand scenarios in the plan use this value, as there is little variation when looking at the historical average (204), maximum (206), and minimum (202) values.

For future planning purposes, the commercial/school ERUs per connection was increased to 5.0, as shown in Table 3.6. This customer type typically falls between 4 - 8 ERUs per connection. Possible reasons for the low number are the limited historical data and that all the largest customers fall in the commercial/school customer type. The City anticipates an increase in commercial customers and therefore justifies an increase in the ERU per connection.

3.5.2.2 ERU Annual Reduction

The City's goal for an ERU annual reduction is 0.25 percent. Because this parameter is driven heavily on customer behavior, for planning purposes, conservation was not considered for the medium and high demand scenarios. The low demand scenario was set to 0.25 percent to represent the WUE scenario.

3.5.2.3 Peaking Factor

The low demand scenario was set to 2.23, which is defined as the historical average of MDD/ADD. The medium demand scenario is based off of the 75th percentile of the City's historical PF, which is 2.33. The high demand scenario uses the historical maximum PF of 2.43.

3.5.2.4 Distribution System Leakage

For DSL, the low and medium demand scenarios used 4.7 percent of the total metered water consumption and correspond to the historical average of the WUE reports. The high demand scenario uses the maximum historical DSL.

3.5.2.5 Other Authorized Use

Historical records helped select future Other Authorized Use estimations. The City agreed to set all demand scenarios to 0.30 percent of the total metered consumption.

3.5.2.6 Largest Customers

For each scenario, it was recommended by the City that the largest customers would not have any assumed growth in consumption. However, the Catholic Health Initiative's 2018 demand was increased by 25 percent due to the construction of a fourth floor in the building.

3.5.2.7 Reserves

A water reserve for the City was included in the demand projection scenarios in anticipation of any unforeseen future water demand. Increments of 50,000 gpd were included in the analysis as a separate "reserve" category, beginning in 2018. The reserve total increases by 50,000 gpd in 2023 and then an additional 50,000 gpd in 2027.

3.5.3 ERU, ADD, and MDD Projections

When converting account projections to ADD projections, the first step is to convert the number of connections into the number of ERUs. To calculate the projected number of ERUs for the RWSA, the projected number of connections were multiplied by the number of ERUs per connection for each customer category.

To calculate the ADD projections for each customer class, the ERU projections were multiplied by the ERU values unique to each demand projection scenario, as presented in Table 3.6. Non-revenue water consumption, including Other Authorized Use, DSL, and reserves was then added based on the low, medium, and high assumptions to establish total ADD projections. Finally, MDD projections were established by multiplying ADD projections by the appropriate MDD to ADD peaking factor for each demand projection scenario.

Table 3.8 shows the ERU, ADD, and MDD projections for all pressure zones for the low, medium, and high demand projection scenarios. Projections are presented for 10- and 20-year planning periods.

Table 3.8 Demand Projection Summary

	ERUs			ADD (mgd)			MDD (mgd)		
Scenario	**2018**	**2027**	**2037**	**2018**	**2027**	**2037**	**2018**	**2027**	**2037**
Low[(1)]	5,207	6,170	6,761	1.1	1.3	1.4	2.5	2.9	3.1
Medium	5,207	6,149	6,721	1.1	1.3	1.5	2.7	3.1	3.4
High	5,207	6,149	6,721	1.2	1.4	1.5	2.8	3.3	3.6

Notes:
(1) ERUs for Low scenario are higher than Medium and High due to ERU annual reduction parameter, which results in a higher ERU for reserves.

Figure 3.8 shows a graph of the City's historical ADD and MDD demands and the projected demands of the medium scenario, with a low-to-high range for both ADD and MDD. The large increases in the projected demands at certain years are due to the water reserves being increased by 50,000 gpd. The City's ADD was approximately 1.1 mgd in 2018. In 2037, it is estimated to be between 1.4 mgd and 1.5 mgd. The medium demand scenario predicts 1.5 mgd. In 2037, MDD is estimated to be between 3.1 mgd and 3.6 mgd. The medium demand scenario predicts an MDD of 3.4 mgd in 2038.

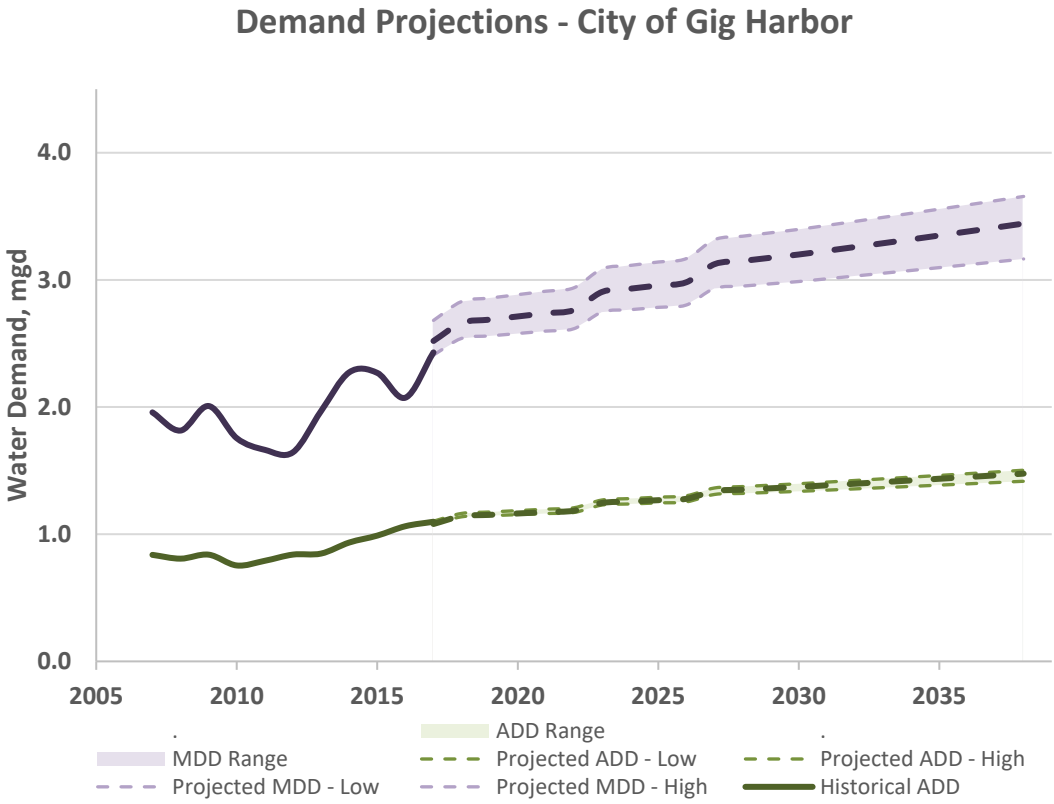


Figure 3.8 Demand Projections

Chapter 4

SYSTEM ANALYSIS

4.1 Introduction

Carollo Engineers, Inc. (Carollo) evaluated the City of Gig Harbor's (City) water distribution system for its ability to meet the City's criteria under 2027 and 2037 conditions using the medium demand projection scenario. The system analysis considered supply capacity, adequacy of storage facilities, and adequate pressures and fire flow capability using the City's updated hydraulic model. Carollo also assessed the City's water quality of its wells and reviewed the City's current and anticipated water quality regulations and compliance history.

This chapter discusses the City's water quality testing, monitoring, and compliance with regulations while providing recommendations to eliminate each of the deficiencies identified as part of the system analysis. These recommendations form the basis of the City's Capital Improvement Program (CIP) outlined in Chapter 8. New pipeline upsize and new pipe installation projects are recommended to meet level of service goals in the service area.

4.2 Water Quality Testing and Monitoring

The City's water system is defined as Group A - Public community Water System and must comply with the drinking water standards of the federal Safe Drinking Water Act (SDWA) and its amendments as regulated by the United States Environmental Protection Agency (USEPA) and adopted by the Washington State Department of Health (DOH) under Washington State Administrative Code (WAC) 246-290.

This section provides the following information:

- Description of current drinking water quality regulations.
- Review of the City's compliance with water quality regulations.
- Summary of anticipated future regulations.
- Recommendations.

4.2.1 Applicable Drinking Water Quality Regulations

The existing WAC contains water quality monitoring regulations the City is required to conduct for its distribution system. These regulations are for bacteriological contaminants, inorganic chemicals (IOC) and inorganic physical parameters, volatile organic compounds (VOC), synthetic organic chemicals (SOC), radionuclides, disinfectants and disinfection by-products (D/DBP). Additional drinking water regulations will become effective in the next few years, and these new regulations may define new regulatory requirements for radon, additional IOCs and SOCs, and bacteriological contaminants. Table 4.1 lists the existing drinking water regulations applicable to water utilities using groundwater as the source of supply.

4.2.2 Existing Drinking Water Quality Standards

The SDWA and its 1986 and 1996 amendments established specific legislation for regulation of public water systems (PWS) by federal and state governments. The federal government, specifically the USEPA, is authorized to develop national drinking water regulations and oversee implementation of the SDWA. Once federal regulations are promulgated, states with primacy (such as Washington) must adopt regulations at least as stringent as the federal regulations and accept the primary responsibility for implementing and enforcing the regulations, according to a given schedule.

The State of Washington typically has two years to adopt a SDWA regulation after its promulgation by the USEPA. The State has delegated the authority to oversee drinking water regulations to the DOH. State drinking water regulations for Group A Public Water Systems are published in WAC 246 290, which establishes monitoring requirements, maximum contaminant levels (MCL), and requirements for follow-up actions.

Primary MCLs are based on chronic and/or acute human health effects. Secondary MCLs are based on factors other than health effects, such as the aesthetic quality of the water. Public water purveyors must meet the requirements of the regulations on a day-to-day basis. Monitoring requirements are often established for regulated contaminants to verify that water systems demonstrate compliance with MCLs or treatment technique requirements. Public water suppliers are also required to retain certain records and submit reports to the DOH.

On August 6, 1996, the most recent amendments to the SDWA were signed into law as Public Law 104 182. The 1996 amendments updated the development of regulations concerning arsenic, radon, groundwater disinfection and filtration.

Table 4.1 Summary of Existing Drinking Water Quality Regulations Relevant to Gig Harbor

Rule	Target Constituents	Monitoring Required by City of Gig Harbor	Effective Date
Total Coliform Rule	Total Coliform, E. coli, Fecal Coliform.	Yes	In Effect
Revised Total Coliform Rule	Total Coliform, E. coli, Fecal Coliform.	Yes	In Effect
Primary Inorganics	Antimony. asbestos, barium, beryllium, cadmium, chromium, cyanide, mercury, nickel, nitrate, nitrite selenium, sodium, thallium.	Yes	In Effect
Arsenic Rule	Arsenic.	Yes	In Effect
Lead and Copper Rule	Lead and copper.	Yes	In Effect
Fluoride Rule	Fluoride.	Yes	In Effect
Radionuclide Rule	Alpha particles, beta particles and photon emitters, radium-226 and 228, uranium.	Yes	In Effect
Volatile Organic Chemicals	21 VOCs.	Yes	In Effect
Synthetic Organic Chemicals	33 SOCs.	Yes	In Effect

Rule	Target Constituents	Monitoring Required by City of Gig Harbor	Effective Date
Disinfectants Disinfection By-Products Rule, Stage 1	Disinfectant residuals, total trihalomethanes, five haloacetic acids.	Yes	In Effect
Disinfectants Disinfection By-Products Rule, Stage 2	Same as Stage 1 but using locational running annual average.	Yes	In Effect
Groundwater Rule	Virus.	Yes	In Effect
Secondary Chemical and Physical Substances	Chloride, color, hardness, iron, manganese, specific conductivity, silver, sulfate, total dissolved solids, and zinc.	Yes	In Effect

4.2.2.1 Bacteriological

Many serious diseases are caused by bacteria, a group of single-celled organisms. Indicator organisms are often used to monitor the bacteriological quality of drinking water. Indicator organisms tend to be present when pathogenic bacteria are found, have well established analytical methods, and are typically more resistant to inactivation by disinfectants than most waterborne pathogenic bacteria. Total coliform, which includes fecal coliform and E. coli bacteria, are used as indicator organisms in drinking water systems. The Total Coliform Rule (TCR) was developed with the purpose of improving public health protection by reducing fecal pathogens to low levels by control of total coliform bacteria. The TCR established an MCL based on the presence or absence of total coliforms.

Water samples collected for coliform monitoring must be obtained from sites that are representative of water quality in the distribution system. Each water purveyor is required to prepare a coliform monitoring plan, which must be approved by DOH and available for inspection upon request. The City's Coliform Monitoring Plan is included in the Appendix. The City currently collects nine coliform samples per month, except in June, July and August, when seven samples are collected per month.

Violations of bacteriological MCLs are categorized as follows (WAC 246-290):

- Non-acute Violation: During routine sampling, coliform is detected in more than one sample in a single month (for systems such as Gig Harbor, collecting less than 40 samples per month).
- Acute Violation: Fecal coliform is present in a repeat sample, which is a sample collected to confirm the presence of total coliform detected in the routine sample.
- Acute Violation: E. coli is present in a repeat sample.
- Acute Violation: Coliform is present in a set of repeat samples collected as a follow-up to a sample containing fecal coliform or E. coli present.

4.2.2.2 Revised Total Coliform Rule

The Revised Total Coliform Rule (RTCR) is the revision of the 1989 TCR and is intended to improve public health protection. It was published on February 13, 2013 and became effective on April 28, 2014. All PWSs were to comply with the RTCR by April 1, 2016. The USEPA's provisions of the RTCR, cited from their website, include the following:

- Setting a maximum contaminant level goal (MCLG) and MCL for E. coli for protection against potential fecal contamination.
- Setting a total coliform treatment technique (TT) requirement.
- Requirements for monitoring total coliforms and E. coli according to a sample siting plan and schedule specific to the PWS.
- Provisions allowing PWSs to transition to the RTCR using their existing TCR monitoring frequency, including PWSs on reduced monitoring under the existing TCR.
- Requirements for seasonal systems (such as, Non-Community Water Systems not operated on a year-round basis) to monitor and certify the completion of a state-approved start-up procedure.
- Requirements for assessments and corrective action when monitoring results show that PWSs may be vulnerable to contamination.
- Public notification (PN) requirements for violations.
- Specific language for CWSs to include in their Consumer Confidence Reports (CCR) when they must conduct an assessment or if they incur an E. coli MCL violation.

The RTCR requires PWSs that have an indication of coliform contamination (e.g., as a result of TC+ samples, E. coli MCL violations, performance failure) to assess the problem and take corrective action. There are two levels of assessments (i.e., Level 1 and Level 2) based on the severity or frequency of the problem. Refer to the DOH guidance on the RTCR to find more information on the level assessments and when they are to be performed.

4.2.2.3 Disinfection By-Products

Trihalomethanes (THM) and haloacetic acids (HAA) are disinfection by-products (DBP) formed when organics in the water react with chlorine. The Stage 1 D/DBP Rule established MCLs for THMs and the sum of five of HAAs on a system-wide running annual average basis.

The Stage 2 D/DBP Rule created more stringent standards for THMs and HAAs, by requiring systems to meet MCLs at each sampling location in the distribution system, as opposed to a system-wide average.

The City adds chlorine (hypochlorite) to the water at Well Numbers 2, 3, 4, 5, and 6 to control taste and odor.

Disinfectants Disinfection By-Products Rule, Stage 2

The Stage 2 D/DBP Rule requires each location in the distribution system to comply with the existing MCLs for THMs and HAAs. The Stage 2 sampling sites may differ from the Stage 1 sampling sites, and an initial distribution system evaluation (IDSE) is required for most utilities in order to establish the new sampling sites.

Because the City's population served is less than 10,000 people and historical DBP levels are very low (typically less than the detection limits), the City may qualify for 40/30 certification. This certification demonstrates that total THMs and HAAs are less than 40 and 30 micrograms per liter (µg/L), respectively, based on sampling at the existing Stage 1 sites. Under this certification, a formal IDSE report is not required.

The City is required to collect two annual DBP samples from two different sites. One site is intended to have the highest levels of THMs and the other the highest levels of HAAs.

4.2.2.4 Disinfectant Residual

If chlorine products are used for disinfection, water entering the distribution system must contain a residual disinfectant concentration of free chlorine of at least 0.2 milligrams per liter (mg/L). Distribution system residual disinfectant concentrations measured as free chlorine must be detectable in at least 95 percent of the samples taken each calendar month. Groundwater systems are required to provide a CT (concentration of chlorine in mg/L multiplied by disinfectant contact time in minutes) of six, in accordance with WAC 246-260-451. Residual disinfectant concentration within the distribution system is measured at the same time and location that routine coliform samples are collected. The City uses chlorine mainly for taste and odor control and performs reduced monitoring for chlorine residual, according to WAC 246-290.

4.2.2.5 Asbestos

Because the City distribution system contains asbestos cement (AC) water lines, it must monitor for asbestos in accordance with 40 CFR 141.23(b). One sample in an area with AC pipe is required every nine years. The MCL for asbestos is 7 million fibers/liter for fibers longer than 10 microns.

4.2.2.6 Lead and Copper

The purpose of the Lead and Copper Rule (LCR) is to protect public water system consumers from exposure to lead and copper in drinking water. Elevated levels of lead and copper are usually due to corrosion of copper or brass plumbing lines and fixtures. The City has no known lead service lines.

In 2007 revisions to the LCR were completed to enhance implementation of the LCR in the areas of monitoring, treatment, customer awareness, lead service line replacement, and to improve compliance with the public education requirements of the LCR.

The LCR has four basic requirements for water suppliers:

1. To optimize their treatment systems by controlling corrosion in customers' plumbing.
2. To determine tap water levels of lead and copper for customers who have lead service lines or lead-based solder in their plumbing systems.
3. To rule out the source water as a source of significant lead levels; and
4. If lead action levels are exceeded, to implement public notices and public education programs to educate customers about lead and suggest actions they can take to reduce their exposure to lead.

If a water system continues to fail to meet the lead action level after installing and optimizing corrosion control treatment, it must begin replacing the lead service lines under its ownership.

4.2.2.7 IOCs, VOCs, and SOCs

The State of Washington has adopted federal MCLs and monitoring regulations for IOCs and physical parameters, VOCs, and SOCs. The federal standards were originally promulgated in the Phase I Rule and updated in the Phase II and Phase V Rules. These regulations apply to the City.

4.2.2.8 Radionuclides

According to WAC 246-290-300(9), community water systems must monitor for radium 226 and 228 every 48 months unless the gross alpha particle activity is less than five picocuries per liter (pCi/L). Monitoring of artificial radioactivity is not required for community water systems serving less than 100,000 persons.

4.2.2.9 Arsenic Rule

The Arsenic Rule was promulgated on 22 January 2001 with an effective date of March 23, 2001. The Arsenic Rule set an MCLG of zero and lowered the enforceable MCL from 0.05 mg/L to 0.01 mg/L (10 µg/L). All community water systems were required to comply with the new MCL by January 23, 2006.

4.2.2.10 Groundwater Rule

The Groundwater Rule (GWR) was promulgated November 22, 2006 and became effective on January 8, 2007. The SDWA required the USEPA to develop the GWR to improve disinfection of groundwater systems to protect public health. Occurrence studies have shown that pathogenic virus and bacteria have occurred in groundwater systems. The USEPA developed a risk-targeting approach with the following major components:

- Periodic sanitary surveys of groundwater systems. States must complete the initial survey by December 31, 2012, for most community water systems.
- Source water monitoring to test for the presence of E. coli, enterococci, or coliphage. There are two monitoring provisions:
  - Triggered monitoring for systems that do not provide a minimum of 99.99 percent (4-log) inactivation or removal of viruses and that have a positive total coliform sample as part of the TCR distribution system sampling.
  - Assessment monitoring, which may be required by the State at any time to identify high-risk systems.
- Corrective actions for any system with a significant deficiency or source fecal contamination. The water purveyor must implement one or more of the following corrective actions:
  - Correct all significant deficiencies.
  - Eliminate the source of contamination.
  - Provide an alternative source of water.
  - Provide treatment to reliably achieve 4-log virus inactivation or removal.
- Compliance monitoring for systems that already treat groundwater to verify 4-log virus inactivation or removal.

4.2.3 Anticipated Future Drinking Water Regulations

The following regulatory actions are anticipated for the near future:

- Final Third Unregulated Contaminant Monitoring Rule (UCMR3) Regulatory Determinations.
- Final Fourth Unregulated Contaminant Monitoring Rule.
- Regulatory changes resulting from National Drinking Water Advisory Council (NDWAC) LCR Working Group's final report and recommendations.

4.2.3.1 Unregulated Contaminant Monitoring (UCM)

The USEPA manages the UCM program directly, using it to collect data on contaminants that are suspected in drinking water but have no health-based standards under the SDWA. The UCM program has been altered and updated several times throughout its history. Milestones in its development are described below:

- UCM - State Rounds 1 and 2 (1988-1997) - State drinking water programs managed the original program, which required PWS serving more than 500 people to monitor contaminants.
- Unregulated Contaminant Monitoring Rule (UCMR1) (2001-2005) - The SDWA Amendments of 1996 redesigned the UCM program to incorporate a tiered monitoring approach and required monitoring for 25 contaminants (24 chemicals and one bacterial genus) between 2001 and 2003.
- Final Second Unregulated Contaminant Monitoring Rule (UCMR2) (2007-2011) - The USEPA managed UCMR 2 monitoring, which established a new set of 25 chemical contaminants sampled between 2008 and 2010.
- UCMR3 (2012-2016) - The City was not required to participate in UCMR3.
- UCMR4 - The City was not required to participate in UCMR4.

4.2.3.2 Lead and Copper Rule Revisions

The USEPA is proposing further revisions to identify additional actions that will equitably reduce the public's exposure to lead and copper when corrosion control treatment alone is not effective. These revisions may require all public utilities to review and update their sampling site locations and protocols.

The USEPA's revisions will include requirements for optimal corrosion control treatment. As a result, the City should wait to evaluate its corrosion control treatment needs after the regulatory requirements are published. However, no capital improvements to ensure continued compliance are currently anticipated.

4.2.3.3 Fluoride

In 2008, the County had pushed for fluoridation for all purveyors with 1,000 connections or more; however, that effort stalled in the courts. Washington State does not require public water systems to add fluoride to drinking water, and the City currently does not add fluoride to the City wells.

4.2.3.4 Consumer Confidence Reports

The primary purpose of the CCR is to inform consumers about their drinking water. The CCR lists the contaminants, if any, that are in the drinking water and explains how these contaminants may affect their health. The CCR lists all regulated contaminants that have been detected in any amount, not just those concentrations that exceed state or federal standards. All "Group A" community water systems are required to produce and distribute an annual CCR to customers by July 1 each year to present information pertaining to the previous calendar year. A "customer" is anyone who regularly drinks water from the system. Water systems are also required to provide a copy of their CCRs to the DOH Office of Drinking Water (ODW) by July 1, and a completed CCR certification form no later than October 1st, every year.

4.3 Water Quality Monitoring and Analysis

This section provides an analysis of the water quality testing performed by the City. The City is required to perform bacteriological, lead and copper, chlorine residual, DBP, IOCs, radionuclides, VOC/SOC and asbestos testing.

DOH performed a sanitary survey with the City in 2005, and the report resulting from the survey is included in the Appendices. The City's water quality monitoring report for the year 2017 is also included in the Appendices.

4.3.1 Water Quality Monitoring Results

The results of the water quality monitoring completed by the City are discussed in the following sections. The actual data is available on the DOH website.

4.3.1.1 Bacteriological

The City monitors for bacteriological contaminants in accordance with its Coliform Monitoring Plan, which is included in the Appendices. The City collects nine samples monthly, except for the summer months when seven samples are collected. The reduced sampling reflects the lower non-community school population during the summer months. The City also collects two source samples per month. Repeat sample sites have also been identified. The City obtains two extra coliform samples per month for its own review. The City has three sampling schedules through which it rotates four times a year in order to obtain diverse and representative sampling data.

The City has had no coliform violations for over 20 years and has remained in compliance with DOH monitoring and reporting requirements.

4.3.1.2 Lead and Copper

Since completion of the last Plan, lead and copper testing was completed in September 2008, September 2011, September and October 2014, and July 2017. All results were below the action levels of 0.015 mg/L and 1.3 mg/L for lead and copper, respectively.

4.3.1.3 DBPs

The City has collected annual DBP samples from four locations in the distribution system since 2004. In 2004 the samples were collected in December, and in subsequent years the samples were collected in August. Collecting samples in August is consistent with the DOH requirement to obtain samples when the water temperature is warmest.

Analytical results for all DBP samples have been below the detection limit, with the exception of a measured value of 5 µg/L for HAA-5 in 2005.

4.3.1.4 IOCs

The City tests for the presence of IOCs, as required by DOH. The City collects annual nitrate samples from each well. A complete inorganics analysis was completed on Well 8 in 2012; Well Numbers 2, 3, 4, 5, and 6 in 2015; Well Number. 5 and 6 in 2017; and Well 4 in 2018.

With respect to inorganics of potential health concern, nitrate, arsenic, heavy metals, and fluoride were not present at significant concentrations in any of the operational wells.

With respect to aesthetic parameters, chloride levels are low (i.e., within a range of 2 to 5 mg/L) in all wells. Sulfate levels are also low in all wells and are not of concern at this time.

4.3.1.5 Iron and Manganese

Iron and manganese levels have been near or exceeded the secondary MCL in all the City's active wells since the last water plan, with the exception of Well 8. The March 2018 sample of manganese for Well 4 tested 0.29 mg/L, exceeding the MCL of 0.05 mg/L. Iron levels from the same test sample measured 0.30 mg/L, equaling the MCL of 0.30 mg/L. The 2015 complete inorganics analysis showed Well Numbers 2, 3, 4, 5, and 6 with manganese levels exceeding the MCL and iron levels near or exceeding the MCL.

If the purveyor suspects that iron at customers' taps is the result of corrosion of iron pipes in the distribution system and not due to iron in the source water, DOH requires completion of a report identifying the cause and remedial actions. Normally, the required step involves adjusting the corrosivity of the water in the distribution system.

Based upon this rule, the City may be required to provide treatment, particularly at Well 11, a new well recently installed. It is recommended that the City review water quality data for this new well, particularly for iron and manganese.

It is recommended that the City also review its flushing requirements in terms of the volume of water required and the labor effort involved. The potential to reduce flushing costs upon installation of iron and manganese removal should be considered in the treatment cost analysis.

The USEPA has found sufficient evidence of health impacts (neurotoxicity) from manganese to support regulations. UCMR4 requires all utilities to sample for manganese and will make a regulatory determination in the future. Beginning regular sampling for manganese in raw and treated groundwater and surface water is recommended to better anticipate potential implications of these pending rules on the City's treatment infrastructure.

4.3.2 Water Treatment for Iron and Manganese

The DOH has published secondary contaminant treatment requirements that specifically address iron and manganese control. For existing and new sources that exceed the MCL, treatment is required such that the existing distribution system water quality is not further impaired. Treatment can consist of sequestering if the combined iron and manganese are below 1 mg/L and manganese is below 0.1 mg/L. Otherwise, iron and manganese removal is required.

The DOH may determine that a significant problem with respect to iron and manganese exists and require the purveyor to take action if the purveyor receives five individual complaints or a petition signed by at least five people in the service area. Actions include preparing an engineering report that includes recommended corrective actions, reasonable alternatives, and estimated costs.

The purveyor is then required to survey its customers to determine their willingness to pay for the most cost-effective alternative to address iron and manganese. Treatment is not required if a majority of customers do not wish to pay the treatment costs. There is no requirement for the engineering study and survey if the sources meet the requirements for standby or emergency use.

If removal of iron and manganese is required, the most common treatment is an oxidation/filtration system. Treatment wastes must be disposed as required by the Department of Ecology.

Well 6 is the City's largest capacity well (approximately 1,000 gallons per minute [gpm]). However, it contains iron at levels close to the Secondary MCL of 0.3 mg/L and a September 2015 sample showed manganese at approximately 0.1 mg/L, which is above the secondary standard of 0.05 mg/L.

Treatment is recommended to remove iron and manganese from Well 6 water to levels below the respective secondary MCLs. The following treatment goals are recommended:

- Iron less than 0.10 mg/L.
- Manganese less than 0.02 mg/L.

Several different treatment options are available for iron and manganese removal, including sequestering, removal in oxidation followed by downstream greensand or other media filtration. For the purposes of developing a preliminary planning level cost estimate for Well 6, a granular media filtration system is considered for iron and manganese treatment. Such a system would include a number of pressure filters operated in parallel. Each unit would contain an appropriate medium. Pyrolusite, or manganese dioxide (MnO_2), is recommended for a system of this size (i.e., 1,000 gpm), and is included for this preliminary cost estimate. The medium is formed by crushing pyrolusite ore and sieving it to specific size ranges. The size ranges of the medium specified for a given application are selected based upon the filtration rate and desired filter run length.

Continuous chlorine feed is required upstream of the pyrolusite medium, so that the iron and manganese become completely oxidized to a precipitate that can be removed from the filter by backwashing. The chlorine dose should be sufficient to maintain a residual in the filter effluent entering the distribution system.

Corrosion control may also be required for this treatment method. Corrosion can be controlled by adding chemicals to the treated water to increase the filtered water pH.

Each pressure filter would require backwashing approximately once per day to remove accumulated solids from the bed. The backwash wastewater can be settled, and the supernatant returned to the filter influent to increase process efficiency. Alternatively, the backwash waste can be disposed of in the sanitary sewer.

A budgetary planning level cost estimate for iron and manganese treatment was prepared for Well 6 in the 2008 Water System Plan. The project (S-03) has been updated to 2018 dollars and included in the long-term CIP, as it is not required for treatment but would benefit the City should future funds become available. Further details on assumptions and costs can be found in Chapter 8.

4.3.2.1 Radionuclides

Radionuclide samples are collected from each well twice every three years, the most recent being in 2015 and 2016. Gross alpha and radium 228 levels were below the MCL.

4.3.2.2 VOC/SOCs

The City has obtained a waiver for most SOC sampling, and the last sample collection took place in August 2012. The waiver includes regulated herbicides, insecticides, and pesticides.

The City collects one VOC sample from each source every 3 years based upon a State waiver for Well Numbers 2, 3, 4 and 5. The last samples taken for these wells were in August 2012 with no exceedances. Two samples are required every three years from Well 6 based upon a waiver, and one sample is required every three years from Well 8.

No VOCs were detected in any samples collected in November 2016 for Well Numbers 6 or 8 that were near the MCLs.

4.3.2.3 Asbestos

Because the City's distribution system contains AC pipes, it must monitor asbestos levels in the distribution system once every nine years. The most recent sampling and testing was completed in May 2015, and results did not exceed the maximum fibers per liter (MFL) specified by DOH. The City's next asbestos test is required in 2024.

4.3.3 Future Regulatory Requirements

Anticipated future regulatory requirements are summarized in Table 4.2. This table includes ongoing programs to introduce new regulatory requirements, under the UCMR and the Contaminant Candidate List (CCL), as well as specific rules and regulations currently under consideration. The City does not anticipate issues with meeting future regulatory requirements based on the limited available information. The City will revisit each proposed rule when specific requirements are published. A brief description of anticipated requirements under each rule is provided herein.

Table 4.2 Future Regulatory Requirements

Proposed Rule	Affected Contaminants	Proposed Publication Date(1)
Unregulated Contaminant Monitoring Regulations	Unregulated Contaminants	UCMR4 - Unknown
Contaminant Candidate List	Unregulated Contaminants	CCL4 - Unknown
Radon Rule	Radon	Unknown
Perchlorate	Perchlorate	Unknown
Lead and Copper Rule Revisions	Lead Copper	Unknown
Carcinogenic VOC Rule	cVOCs	Unknown

Notes:
(1) Effective and compliance dates were obtained from the Federal Register and USEPA's Drinking Water Hotline and represent the best information available as of the date of this report.
Abbreviations: CCL4 - Fourth Contaminant Candidate List; cVOC - Carcinogenic Volatile Organic Chemicals.

4.3.3.1 Unregulated Contaminant Monitoring Rule

The USEPA UCMR is used to collect occurrence data for contaminants suspected to be present in drinking water, but do not yet have health-based standards. The UCMR is updated every five years; however, no issue date for UCMR4 has been published by the USEPA at this time.

4.3.3.2 Contaminant Candidate List

The CCL aids in priority setting for the drinking water program. The USEPA conducts research on the following for CCL contaminants: health effects; analytical methods; treatment technologies, effectiveness, and costs; and occurrence. The third CCL (CCL3) was published in October 2009 and includes 104 chemicals or chemical groups and 12 microbiological contaminants that are known or anticipated to occur in PWS. The list includes chemicals used in industry, pesticides, waterborne pathogens, DBPs, and biological toxins. The USEPA is currently requesting nominations for chemical and microbial contaminants for possible inclusion in CCL4.

4.3.3.3 Radon Rule

Radon is a naturally occurring radioactive gas that may cause cancer and may be found in drinking water and indoor air. The first proposed radon MCL of 300 pCi/L was proposed in August 2000. An alternative MCL of 4,000 pCi/L with implementation of a Multimedia Mitigation (MMM) Program targeted at reducing indoor-air risks has also been proposed. Final determination on a regulatory requirement for radon is still underway.

4.3.3.4 Revisions to the Lead and Copper Rule

The USEPA is proposing revisions to identify additional actions that will equitably reduce the public's exposure to lead and copper when corrosion control treatment alone is not effective. These revisions may require all public utilities to review and update their sampling site locations and protocols.

The USEPA's revisions will include requirements for optimal corrosion control treatment. As a result, the City should wait to evaluate its corrosion control treatment needs after the regulatory requirements are published. However, no capital improvements to ensure continued compliance are currently anticipated.

4.3.4 Carcinogenic Volatile Organic Compounds Rule

The USEPA announced in February 2011 that it plans to develop one national primary drinking water regulation covering up to 16 carcinogenic volatile organic compounds. The following eight compounds are already regulated: benzene, carbon tetrachloride, trichloroethylene (TCE), vinyl chloride, 1,2-dichloroethane, tetrachloroethylene (PCE), 1,2-dichloropropane, and dichloromethane. The following eight potential contaminants are on CCL3: 1,1-dichloroethane, 1,2-butadiene, aniline, benzyl chloride, nitrobenzene, oxirane methyl, 1,2,3-trichloropropane, and urethane. The USEPA may add, drop, or substitute other contaminants into the rule as additional information becomes available. The USEPA website provides little information on this rule, but does project publication of the rule in February 2018.

4.3.5 Summary

Finished supply water quality meets and/or exceeds all applicable current and future anticipated regulatory requirements, with the exception of its iron and manganese levels. It is recommended to implement a treatment system for Well No. 6 and closely monitor the iron and manganese levels in the other wells, especially the newly constructed Well 11.

The City should also closely monitor several water quality parameters, and the fate of future regulation of these parameters, as these parameters may require future improvements, including:

- Revisions to the LCR may require changes to the sampling location and protocols. The City should reevaluate corrosion control treatment requirements once proposed revisions are published.
- The USEPA has found sufficient evidence of health impacts (neurotoxicity) from manganese to support regulations. UCMR4 requires all utilities to sample for manganese and will make a regulatory determination in the future. Beginning regular sampling for manganese in raw and treated groundwater and surface water is recommended to better anticipate potential implications of these pending rules on the City's treatment infrastructure.

4.4 Supply Capacity Analysis

The City currently serves its customers using seven wells: Wells 2, 3, 4, 5, 6, 8, and the recently constructed Well 11.

4.4.1 Supply Criteria

The City's supply capacities were evaluated against the following three criteria:

1. **Standard:** All sources shall be able to supply maximum day demand (MDD) for the water system.
2. **Redundancy:** MDD Supply with Largest Source Off-line. With the largest source out of service, remaining sources shall be able to supply MDD for the water system.
3. **Reliability and Redundancy:** MDD Supply considering well reliability (i.e., capability for back-up power) and largest Source Off-line. With the largest source out of service and non-reliable wells offline, remaining sources shall be able to supply MDD for the water system.

4.4.2 Existing Ability to Pump

The City's water system currently serves its customers using seven sources: Wells 2, 3, 4, 5, 6, 8, and the recently constructed Well 11. The source water rights, current capacity, reliable capacity, and ability to pump are summarized in Table 4.3. The columns of Table 4.3 are explained further in the following sub-sections.

4.4.2.1 Instantaneous Water Right (Qi)

The capacities of the City's supply sources during the MDD and throughout the year are set by water rights, as well as the constraints such as pumping capacity, discussed further in the Ability to Pump analysis. The City's water rights were evaluated to determine if they are sufficient to supply the future demands.

As shown in Table 4.3, the City holds eight certificated groundwater rights, and two non-additive groundwater rights. The overall system instantaneous quantity (Qi) is equal to 3,115 gpm. Note, the primary water right have been with DOE since 2000.

4.4.2.2 Maximum Average Withdrawal Rate (Qa)

The annual quantity (Qa) corresponds to the maximum average annual volume each well can withdraw. Total Qa is estimated at 1,404 gpm. Qa will be compared with average day demand (ADD) throughout the planning years to determine if the City's wells are sufficient to supply future demands.

4.4.2.3 Well Pumping Capacity

The well supply capacity corresponds to the pump or physical capacities at each source and is based on City staff's knowledge and well data logs. The total pumping capacities for all wells is estimated at 3,612 gpm, which is higher than the authorized water rights. None of the City's wells have known operational deficiencies.

4.4.2.4 Standard Ability to Pump

The City's actual supply capacity or "Ability to Pump" for each source was considered. The Standard MDD Ability to Pump is the maximum capacity of a source based on Qi and well pumping capacity, both defined above, while the Standard ADD Ability to Pump is the maximum capacity of a source based on Qa and well pumping capacity.

This provides a comprehensive approach that includes operational, physical, and regulatory limitations. The resulting Ability to Pump was compared to both 2027 and 2037 projected demands to determine the supply excess or deficiencies. Note, that the supply analysis uses the high demand projection scenario from Chapter 3.

4.4.2.5 Redundant Ability to Pump

It is the City's goal to have sufficient system-wide supply facilities to meet MDD with the largest water supply source out-of-service. The redundant scenario represents the City's ability to meet MDD with the largest active source out-of-service (Well 11).

4.4.2.6 Reliable and Redundant Ability to Pump

The reliable and redundant pumping capacity corresponds to the total well supply capacity minus the largest source and all non-reliable supplies. This scenario includes Well 11 (largest source) out of service. The non-reliable wells are Well 4 and Well 6. Well 4 does not have the capability to hook up a back-up generator. The City's emergency generator is not large enough to run Well 6; therefore, Well 6 is considered non-reliable.

Table 4.3 Existing Water Supply Summary

Well	Instantaneous Water Right (Qi) (gpm)[1]	Maximum Average Withdrawal Rate (Qa) (gpm)[1]	Well Pumping Capacity (gpm)[1]	Standard ADD Ability to Pump (gpm)	Standard MDD Ability to Pump (gpm)	Redundant MDD Ability to Pump (gpm)	Reliable and Redundant MDD Ability to Pump (gpm)
Well 1	400	148	0	0	0	0	0
Well 2	330	130	272	130	272	272	272
Well 3	625	334	626	334	625	625	626
Well 4	230	417[3]	159	159	159	159	0
Well 5	500	208	524	208	500	500	500
Well 6	1,000	556	1,019	556	1,000	1,000	0
Well 8	30	30	12	12	12	12	12
Well 10[5]	330	130	-	130	-	-	-
Well 11[2]	1,000	620[3]	1,000[4]	[2]	[2]	0[3]	0
Total (gpm)	**3,115**	**1,404**	**3,612**	**1,398**	**3,115**	**2,568**	**1,409**

Notes:
(1) Water Right and Well Pumping Capacity data from the City.
(2) Well 11 is non-additive to all City's wells.
(3) Well 4 and Well 11 have non-additive water rights.
(4) Expected Pumping Capacity for Well 11 is 1,000 gpm.
(5) Well 10 serves as a replacement/additional point of withdrawal for Well 2. The City cannot operate both Well 2 and 10 simultaneously. Therefore, Well 10 will be ignored for the rest of this analysis.

4.4.3 Ability to Pump Analysis

The City's water rights were compared to 2027 and 2037 future demands. The analysis was run for both ADD and MDD projections.

Demands above the MDD (such as peak hour or fire flows) are met from storage and are evaluated in Section 4.3.

4.4.3.1 ADD Ability to Pump

The ADD Ability to Pump evaluation confirms the ability of the City to supply its demand throughout the years. The ADD was used to represent the average conditions expected to occur. The City's existing Ability to Pump is tabulated for the standard scenario in Table 4.4.

The ADD Ability to Pump was compared with the projected ADD for the planning period to evaluate if the City has sufficient supply, as shown in Figure 4.1. The solid yellow line represents the maximum instantaneous supply allowed by the City's water rights. The solid black line represents the existing ADD ability to pump for the standard scenario. The projected ADD demands are represented by the green line.

The City currently has sufficient supplies to meet the projected ADD demands throughout the planning period for the standard (black line) scenario. The City will have an excess in supply of 375 gpm for the redundant scenario by 2037.

Table 4.4 Ability to Pump - ADD

Source	2027 Demands (gpm)	2037 Demands (gpm)
ADD Demand (gpm)	942	1,030
Pumping Capacity		
Total	3,612	3,612
Maximum Average Withdrawal Rate (Qa)		
Total	1,404	1,404
ADD Ability to Pump		
Standard Scenario	1,398	1,398
Surplus / (Deficit)		
Total Standard Scenario	456	369

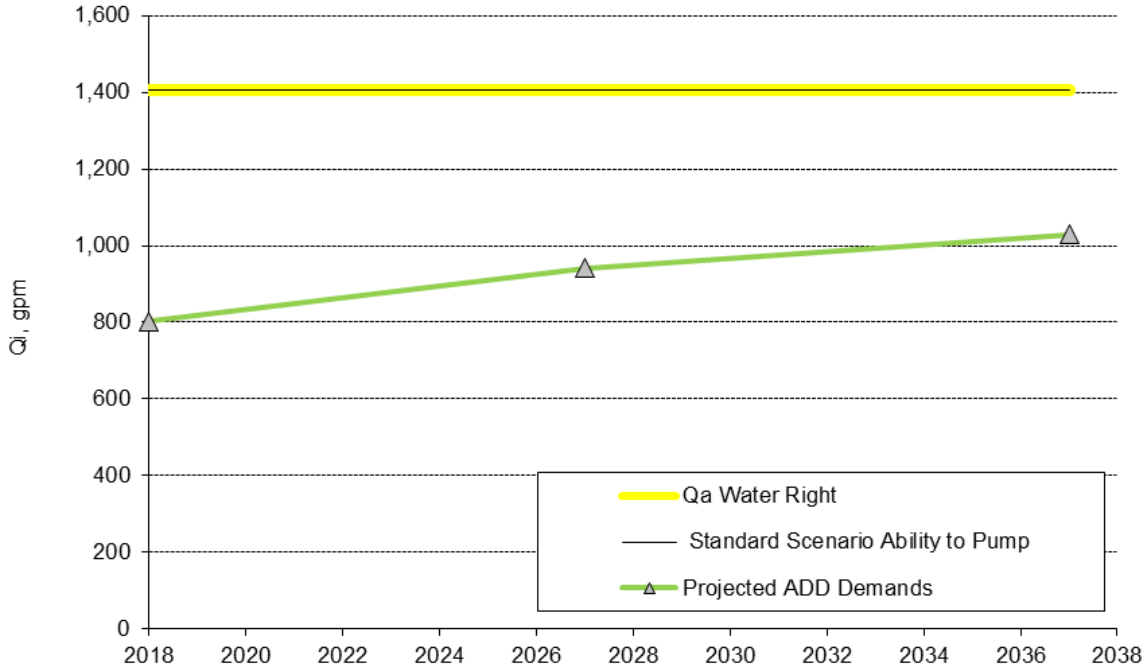


Figure 4.1 Ability to Pump - ADD Conditions

4.4.3.2 MDD Ability to Pump

The MDD Ability to Pump was compared to the projected MDD demand under the three scenarios: standard, redundant, and redundant and reliable. The City's current Ability to Pump is summarized for all scenarios in Table 4.5. The redundant scenario considers the new Well 11 the largest source and out-of-service. The reliable scenario considers both Well 4 and Well 6 as non-reliable. The standard scenario represents the City's ability to meet ADD and MDD with all sources pumping continuously (24 hours per day), with respect to the authorized water rights. This represents the maximum quantity of water that can be produced.

The City's existing Ability to Pump is 3,115 gpm in the standard scenario, 2,568 gpm in the redundant scenario, and 1,409 gpm in Scenario 3.

The MDD Ability to Pump was plotted with the projected MDD for the current planning period in Figure 4.2. The solid yellow line represents the maximum instantaneous supply allowed by the City's water rights. The solid black and red lines represent the existing MDD Ability to Pump for the standard and redundant scenarios, respectively. The projected demands are represented by the blue line. The dashed purple line corresponds to the system under the reliable and redundant.

The City currently has sufficient supplies to meet the projected MDD demands throughout the planning period for the standard (black line) scenario and for the redundant (red line) scenario. The City will have an excess in supply of 66 gpm for the redundant scenario by 2037. Note that this excess capacity is within the range of accuracy of demand projections, and it is anticipated that the City will need a new well with water rights around the 20-year planning period. The reliable and redundant scenario shows deficiencies starting in 2027. It is recommended that the City install back-up hookups to all supplies and make sure that its back-up generator is large enough for all facilities to make its system reliable.

Table 4.5 Ability to Pump - MDD

Source	2027 Demands (gpm)	2037 Demands (gpm)
MDD Demand (gpm)	2,288	2,502
Well Supply Capacity		
Total	3,612	3,612
Instantaneous Water Right (Qi)		
Total	3,115	3,115
Ability to Pump		
Standard Scenario	3,115	3,115
Redundant Scenario(1)	2,568	2,568
Reliable and Redundant Scenario(2)	1,409	1,409
Surplus / (Deficit)		
Standard Scenario	827	613
Redundant Scenario(1)	280	66
Reliable and Redundant Scenario(2)	-879	-1,093

Notes:
(1) Minus largest well source out of service.
(2) Minus largest well out of service and non-reliable wells offline.

Well 9 is a pending water right (G2-29937-A) for the City. Further detail about this pending water right can be found in Section 6.6.1. Additionally, Section 6.9 describes the impacts of alternative sources of supply beyond the City's existing wells and pending water right applications.

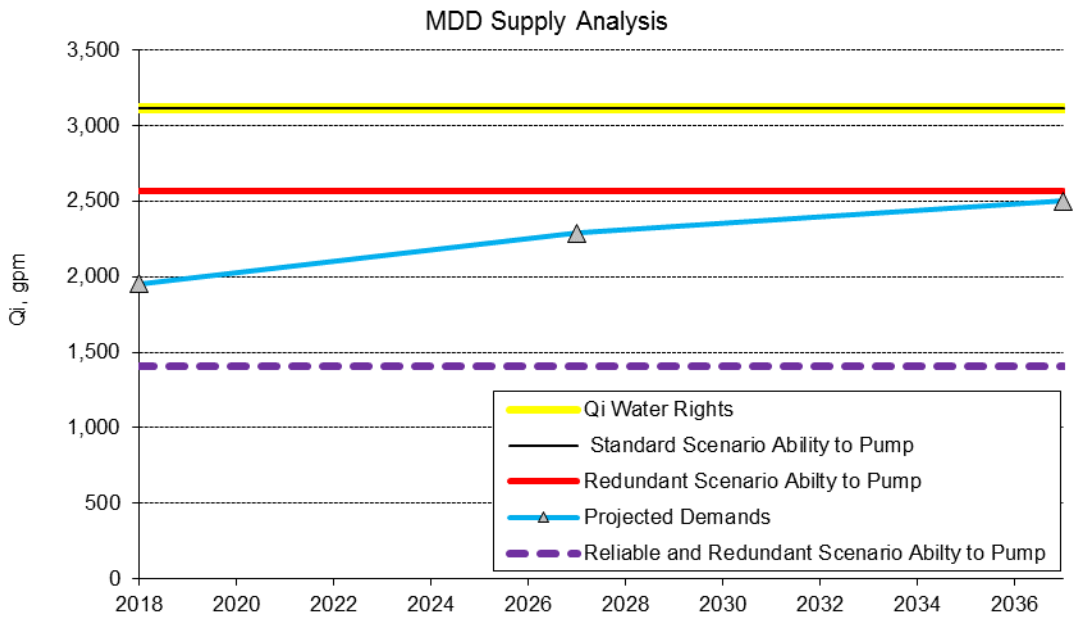


Figure 4.2 Ability to Pump - MDD Conditions

4.4.4 Supply Recommendations

The City's water system meets all of its supply criteria except for Criterion 3. The City cannot supply MDD to its customers when Well 11 (largest source offline) and Wells 4 and 6 (non-reliable wells) are offline. It is recommended that the City makes these wells reliable with adding the capability for generator hook-up and make sure that portable generator is large enough for the wells it needs to power.

It is also to be noted that the City only has an excess of 66 gpm by 2037 under its redundant scenario, which can be considered minimal and within the range of accuracy of demand projection. The City should consider an additional well with water rights in 20 years.

4.5 Storage Analysis

The City's storage requirements are a function of the City's water demands, supply capacity, and fire flow requirements. The following sections summarize the available storage of the water system, describe the required storage components, and present recommendations to address identified storage deficits.

4.5.1 Storage Components and Governing Criteria

Following the DOH storage volume requirements (WAC 246-290-235(3)) and the Water System Design Manual, Chapter 9, the five components of storage listed below and illustrated in Figure 4.3 must be considered for any water system:

1. Operational storage.
2. Equalizing storage.
3. Standby storage.
4. Fire Suppression storage.
5. Dead storage.

It is the City's goal to provide sufficient storage in its water system to ensure the system functions adequately during normal operations and has emergency supplies available when needed.

Operational and equalizing storage must be available to all customers at a residual pressure of at least 30 pounds per square inch (psi) under peak hour demand (PHD) flow conditions. Standby and fire suppression storage must be available to all customers at a residual pressure of at least 20 psi under MDD.

Figure 4.3 shows the components of storage required by DOH as well as the hydraulic grade lines (HGL) in a tank that represent the minimum water surface elevations that can supply water at 20 psi or 30 psi to all customers. All tank volumes above the HGL are available storage. Thus there are two blocks of available storage: the volume of storage available to all customers with a pressure of at least 20 psi, and the volume of storage available to all customers at a pressure of at least 30 psi. Dead storage is the volume in the tank that cannot be used to serve the highest customer in the water system with a pressure of at least 20 psi.

The City currently maintains a total of 4.6 million gallons (MG) of water storage in six water reservoirs located throughout the service area. The following sections describe the required categories of storage; summarize the storage needs of each pressure zone relative to currently available storage, and present recommendations to address identified storage deficiencies.

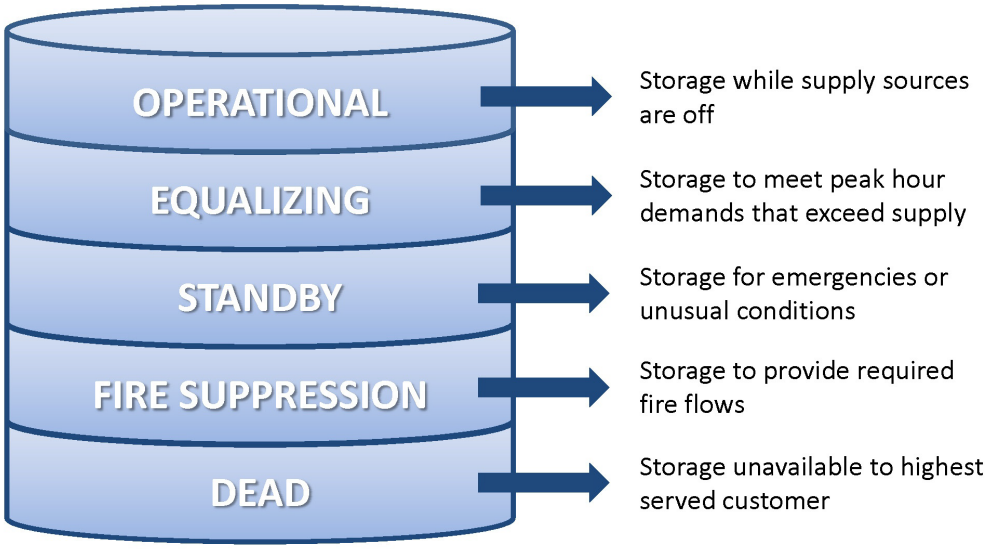


Figure 4.3 Storage Components

4.5.1.1 Operational Storage

The operational storage consists of the volume in each tank between the level at which the well pumps are turned on and valves are opened to fill the tanks and the level at which these pumps are turned off and valves are closed to stop filling the tanks.

4.5.1.2 Equalizing Storage

The equalizing volume, as defined by DOH, is the total volume required to satisfy peak system demands that exceed the capacity of the supply and pumping facilities. The required equalizing storage was computed as the PHD flow rate for the system, less the sum of the sources for 150 minutes (equation from DOH). Equalizing volume requirements are greatest on the day of MDD and are typically equal to 20 - 30 percent of the MDD.

Equalizing storage volume requirements can be calculated using the following equation from the DOH Water System Design Manual:

ES = (PHD - Qs)*150 minutes, but in no case less than zero

Where:

- *ES* = Equalizing Storage component, in gallons.
- *PHD* = Peak hourly demand, in gpm.
- *Qs* =Sum of all installed and active source of supply capacities, except emergency sources of supply, in gpm.

For the storage analysis, PHD is calculated using the following equation from the DOH Water System Design Manual:

PHD = (MDD /1440)(C*N + F) + 18

Where:

- *MDD* = Maximum Day Demand, gallons per day (gpd) per Equivalent Residential Unit (ERU) (gpd/ERU).
- *C* = Coefficient Associated with Ranges of ERUs.
- *N* = Number of ERUs.
- *F* = Factor Associated with Ranges of ERUs.

Table 4.6 identifies the appropriate coefficients and factors for use with the above equation.

Table 4.6 Coefficients and Factors for PHD Equation

Number of ERUs (N)	C	F
15-50	3.0	0
51-100	2.5	25
101-250	2.0	75
251-500	1.8	125
> 500	1.6	225

4.5.1.3 Standby Storage

Emergency/standby volume is required to supply reasonable system demands during a foreseeable system emergency or outage, such as a major pipeline failure, power outage, valve failure, or another system outage. Emergency and reserve volume requirements are dependent upon average system demands and source of supply redundancy. The City's standby storage policy is that the water system should have enough standby storage to supply ADD for two days with the largest well site off-line.

The following equation is used to calculate required standby storage volumes:

$$SB = 2 \text{ days} * (ADD - Q_F)$$

Where:

- *SB* = Standby storage volume, in gallons.
- *ADD* = Average day demand, in gpd.
- Q_F =Sum of all supply capacities to the water system, with the largest well site out of service, in gpd.

4.5.1.4 Fire Suppression Storage

Design criteria established by WAC 246-290-230 and DOH require that new or expanding water systems have the capacity to provide design fire flows during MDD conditions. Fire protection volume requirements are computed based on the size and duration of the largest required fire flow within the service area of the storage facility.

The City provides for a system-wide fire flow of 1,000 gpm for two hours (0.12 MG) for single-family detached dwellings in residential zones or a fire flow of 3,000 gpm for three hours (0.54 MG) for multi-family dwellings in residential zones and commercial buildings in commercial zones, with a minimum of 20 psi at all customers in the system while hydrants are flowing. The City has one specific fire flow customer (Home Depot) located within Gig Harbor North, at 5120 Borgen Boulevard, that requires 2,000 gpm for four hours (0.48 MG). Note, the City only plans for one fire in the whole system at a time.

Fire protection volumes in excess of the above criteria may be required by the Fire Marshal to provide fire protection for specific types of building construction and use. Development proposals that require fire protection volumes exceeding the criteria above will be required to provide the additional reservoir storage for the system at the developer's expense.

Standby storage volumes and fire suppression storage volumes are stacked in the City's system. Operational, equalizing, and standby storage volumes are assumed to be expended before fire suppression storage.

4.5.1.5 Dead Storage

The dead storage corresponds to the volume of the tank that is effectively unusable. The storage volume is considered dead if it is located below the outlet pipe and cannot be withdrawn, due to dynamic losses in the distribution system, or if it is located below the lowest water surface elevation that meets the minimum design pressure (20 psi of pressure during the MDD and a fire flow event) for all customers.

The main reason for dead storage is the City's distribution system is in the presence of high service elevations within the service area, which limits the minimum level in the tanks. Since the last plan, the City surveyed the current 450 Zone tank elevations to verify base and overflow levels, and the latest data is presented in the table below. Note, the dead storage in the existing reservoirs is summarized in Table 4.7.

Table 4.7 Reservoir Dead Storage

Reservoir	Zone HGL (ft)	Base Elevation (ft)	Height (ft)	Diameter (ft)	Nominal Volume (MG)	Reason for Dead Storage	Maximum Served Elevation (ft)(1)	Dead Storage Volume (MG)(2)	Dead Storage (%)
East	320	304.00	14.50	52.00	0.23	Highest Customer	230.00	0.00	0%
Harbor Heights 1	320	290.00	29.70	38.00	0.25	Highest Customer	230.00	0.08	8%
Harbor Heights 2	320	290.00	27.20	38.00	0.23	Highest Customer	230.00	0.00	0%
Shurgard	440	339.70	100.60	30.00	0.53	Highest Customer	335.00	0.35	65%
Skansie	440	335.80	105.60	43.00	1.13	Highest Customer	335.00	0.74	65%
North Gig Harbor	450	301.20	148.80	50.50	2.23	Highest Customer	336.00	1.26	56%

Notes:
(1) Highest customer is determined using the hydraulic model.
(2) Dead Storage Volume includes dynamic headloss in the distribution system during a fire event.
Abbreviations: ft - feet.

4.5.2 Available Storage

The available storage in each operating area is controlled by the elevation of the highest customer in the system and the HGL required to serve that customer with a pressure of at least 20 psi in the case of a fire or other emergency, or 30 psi under normal conditions. Table 4.8 shows the highest service elevation and the amount of available storage meeting the 30 psi and 20 psi requirements in each tank and pressure zone.

Table 4.8 Available Storage

Operating Area	450 Zone	440 Zone		320 Zone			Total
Facility	North Gig Harbor	Shurgard	Skansie	Harbor Heights 1	Harbor Heights 2	East	
Storage Tank Size (MG)	2.23	0.53	1.13	0.25	0.23	0.23	4.60
Available Storage Above 30 psi (MG)	0.62 (28%)	0.06 (12%)	0.14 (13%)	0.23 (92%)	0.23 (100%)	0.23 (100%)	1.52 (33%)
Available Storage Above 20 psi (MG)	0.97 (44%)	0.19 (35%)	0.39 (35%)	0.23 (92%)	0.23 (100%)	0.23 (100%)	2.24 (49%)

4.5.3 Required Storage

Operational storage volumes for each pressure zone are shown in Table 4.9. The City uses approximately three feet of their reservoir depth as its operational storage. This equates to approximately 8.5 percent of its total available storage volume.

Required equalizing storage volumes were calculated for each pressure zone as shown in Table 4.9. By 2037, the City will be using approximately 12.9 percent, or 0.29 MG, of their total available storage for equalizing storage.

The calculations for standby storage requirements are shown in Table 4.9. The 200 gal/ERU criteria is not dependent of the supplies in the pressure zones. By 2037, the City will use approximately 1.44 MG, or approximately 64 percent, of its total available storage volume.

The operational, equalizing, fire suppression, and standby storage requirements are summarized in Table 4.9 for each pressure zone in the long-term planning period. Note, that the fire suppression volume of 0.54 MG is assumed to be stored in the 450-pressure zone, so it can be shared to the rest of the pressure zones without relying on mechanical features (i.e.; booster pump station (BPS) 3).

Under total required storage in Table 4.9, volumes are listed for both the 30 psi and 20 psi requirements. The volume required above the 30 psi HGL is the sum of operational and equalizing storage. The volume required above the 20 psi HGL is the sum of operational storage, equalizing storage, standby storage, and fire suppression. Available vs required storage volumes comparison can be found for each pressure zone in the following sections.

Table 4.9 Required Storage

Operating Area	450 Zone	440 Zone	320 Zone	Total
Facility	North Gig Harbor	Shurgard / Skansie	Harbor Heights 1, Harbor Heights 2, and East	
Storage Tank Size (MG)	2.23	1.66	0.71	4.60
Available Storage Above30 psi HGL (MG)	0.62	0.21	0.69	1.52
Available Storage Above 20 psi HGL (MG)	0.97	0.58	0.69	2.24
2037 Operational (MG)	0.05	0.05	0.10	0.19
2037 Equalizing (MG)	0.11	0.08	0.10	0.29
2037 Standby (MG)	1.19	0.00	0.46	1.65
2037 Fire Suppression (MG)	0.54	Supplied from 450	Supplied from 450	0.54
2037 Total Required Storage Above 30 psi (MG)	0.16	0.13	0.20	0.49
2037 Total Required Storage Above 20 psi (MG)	1.89	0.13	0.66	2.67

4.5.4 Available versus Required Storage Comparison

The three pressure zones were evaluated to consider whether each zone has the required usable operational, equalizing, fire suppression, and standby storage volumes available. The storage requirements were compared to the existing storage volume to identify projected storage excesses or deficiencies. Storage analyses consider each pressure zone in detail for the planning years 2027 and 2037 and are discussed in the following sections.

4.5.4.1 320 Pressure Zone

Storage for the 320 Zone is contained within the East Tanks and the two Twin Harbor Heights reservoirs, which have a total nominal storage volume of 0.71 MG (including 0.02 MG of dead volume). The required storage volume for the pressure zone is calculated using the methodology presented in the previous sections and is summarized in Table 4.10. The 320-pressure zone has enough storage until planning year 2037.

Table 4.10 320 Zone Storage Evaluation

Evaluation	2027	2037
Demand		
ERU	2,215	2,382
ADD	315	339
MDD	728	783
PHD	1327	1419
Available Sources (gpm)		
Well 2	272	272
Well 4	159	159
Grandview FCV[(1)]	200	200
Total Source Capacity (gpm)	**631**	**631**
Largest Source (gpm)	272	272
Required Storage (MG)		
Operational	0.10	0.10
Equalizing	0.09	0.10
Standby	0.39	0.46
Fire Suppression	0.00	0.00
Dead	0.00	0.00
Total Required Storage	**0.60**	**0.67**
Existing Storage (MG)		
East	0.23	0.23
Twin Harbor Heights	0.48	0.48
Total Existing Storage	**0.71**	**0.71**
Excess (Deficit) Existing Storage (MG)	**0.11**	**0.04**

Notes:
Abbreviations: FCV - flow control valve.

4.5.4.2 440 Pressure Zone

There is currently 1.66 MG of nominal storage volume in the two reservoirs Shurgard and Skansie. Approximately 1.08 MG, or 65 percent, of the reservoirs is dead due to high service elevations in the pressure zone. The required storage volume for the pressure zone is calculated using the methodology presented in the previous sections and is summarized in Table 4.11. The 440 Zone has enough storage volume until planning year 2037, and shows an excess in storage of approximately 0.45 MG by 2037.

Table 4.11 440 Zone Storage Evaluation

Evaluation	2027	2037
Demand		
ERU	1,782	1,898
ADD	254	270
MDD	586	624
PHD	1,086	1,151
Available Sources (gpm)		
Well 3	625	625
Well 5	500	500
Well 6	1,000	1,000
Well 8	12	12
Grandview FCV	(-200)	(-200)
Total Source Capacity (gpm)	**1,937**	**1,937**
Largest Source (gpm)	1,000	1,000
Required Storage (MG)		
Operational	0.05	0.05
Equalizing	0.08	0.08
Standby	0.00	0.00
Fire Suppression	0.00	0.00
Dead	1.08	1.08
Total Required Storage	**1.21**	**1.21**
Existing Storage (MG)		
Shurgard	0.53	0.53
Skansie	1.13	1.13
Total Existing Storage	**1.66**	**1.66**
Excess (Deficit) Existing Storage (MG)	**0.45**	**0.45**

4.5.4.3 450 Pressure Zone

The North Gig Harbor reservoir has 2.23 MG of total storage volume. Of the total storage volume, approximately 1.26 MG, or 56 percent, of the reservoir is dead due to high service elevations in the pressure zone. Table 4.12 details the storage evaluation for the new 450 Zone.

Table 4.12 450 Zone Storage Evaluation

Evaluation	2027	2037
Demand		
ERU	2,585	2,904
ADD	368	413
MDD	850	955
PHD	1,532	1,709
Available Sources (gpm)		
Well 11	1,000	1,000
Total Source Capacity (gpm)	**1,000**	**1,000**
Largest Source (gpm)	1,000	1,000
Required Storage (MG)		
Operational	0.05	0.05
Equalizing	0.10	0.11
Standby	1.06	1.19
Fire Suppression	0.54	0.54
Dead	1.26	1.26
Total Required Storage	**3.01**	**3.15**
Existing Storage (MG)		
North Gig Harbor	2.23	2.23
Total Existing Storage	**2.23**	**2.23**
Excess (Deficit) Existing Storage (MG)	**(0.78)**	**(0.92)**

By 2027, the storage volume is deficient by 0.78 MG, and by 0.92 MG in 2037. Increasing deficiencies are due to increased equalizing and standby storage requirements that are driven by the projected demand growth. The 450 Zone does not have sufficient available storage volume in the North Gig Harbor tank to meet storage volume requirements through planning year 2037.

4.5.5 Storage Summary

Table 4.13 summarizes the storage results for the entire system at both short-term and long-term planning periods, and Figure 4.4 is a graphic illustrating storage requirements in planning year 2037. As illustrated in Table 4.13, the existing system does not have sufficient available volume to meet the storage requirements through the planning period. Overall, the system shows as deficient both in the short-term (2027) and the long-term (2037).

Table 4.13 Storage Evaluation Summary - Before Improvements

Storage	320 Zone	440 Zone	450 Zone
Storage Size (MG)	0.71	1.66	2.23
Available Storage Above 20 psi HGL	0.69	0.58	0.97
Total Required Storage in 2027 (MG)	0.58	0.12	1.75
Excess (Deficit) Storage in 2027 (MG)	0.11	0.45	(0.78)
Total Required Storage in 2037 (MG)	0.65	0.13	1.89
Excess (Deficit) Storage in 2037 (MG)	0.04	0.46	(0.92)

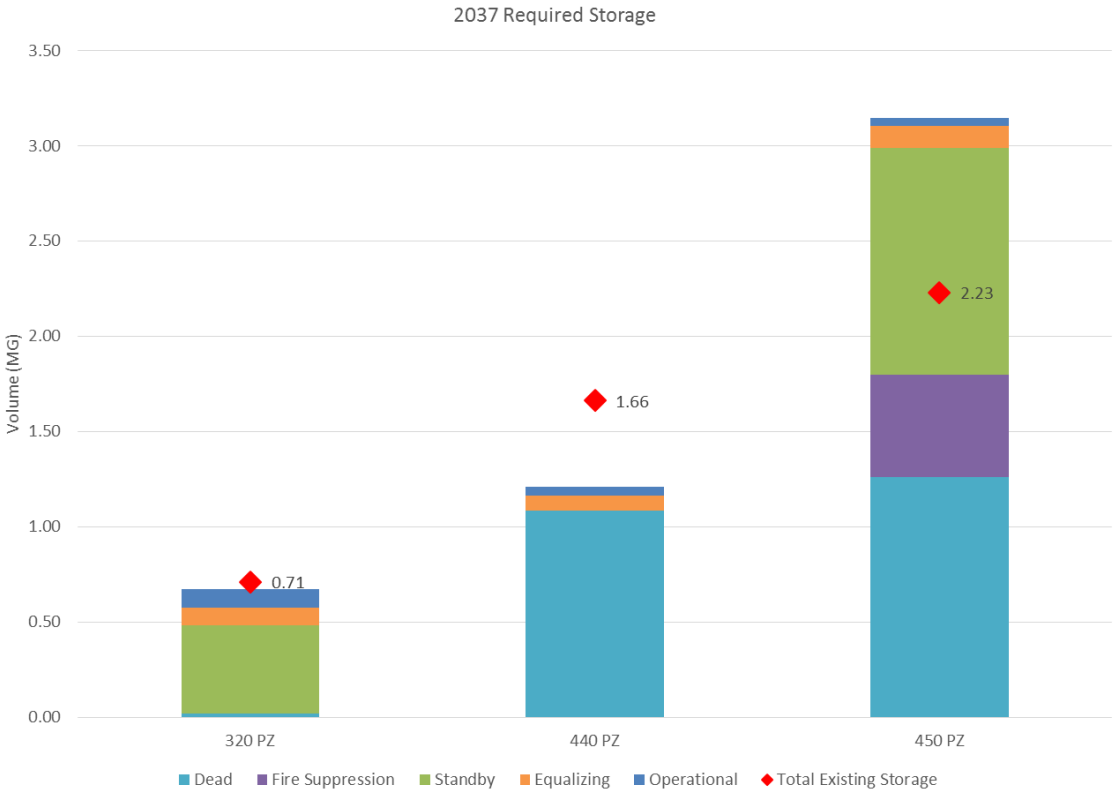


Figure 4.4 Storage Requirements vs. Total Existing Storage

4.5.6 Storage Recommendations

Several options were discussed with the City to mitigate future storage deficiencies in the 450 Zone and are described below:

- **Option 1** - Use pumps to access dead storage in existing reservoirs and supply fire flow to the distribution system:
  - Build a new BPS at the North tank in the 450 Zone;
  - Expand BPS 3 with adequate configuration and pumps to access dead storage in the Skansie tank. However, Skansie by itself does not have enough dead storage volume to offset the 450 Zone deficiency and would need to be combined with another project.
- **Option 2** - Construct a new primary Well 9 in the 450 Zone to decrease required emergency volume.

Tables 4.14 and 4.15 show the impact of implementing Option 1 and Option 2, respectively, to the 450 Zone that was shown as deficient.

After discussion with City staff, Option 2 was recommended to be implemented by 2027. This option follows the City's operation philosophy of investing in its supply sources to make for a more redundant and reliable system. Project S-01 in the CIP addresses Option 2 and is discussed further in Chapter 8.

Table 4.14 450 Zone Storage Evaluation - With Option 1 Recommendations (New BPS at North Tank)

Evaluation	2027	2037
Demand		
ERU	2,585	2,904
ADD	368	413
MDD	850	955
PHD	1,532	1,709
Available Sources (gpm)		
Well 11	1,000	1,000
Total Source Capacity (gpm)	**1,000**	**1,000**
Largest Source (gpm)	1,000	1,000
Required Storage (MG)		
Operational	0.05	0.05
Equalizing	0.10	0.11
Standby	1.06	1.19
Fire Suppression	0.54	0.54
Dead(1)	0.00	0.00
Total Required Storage	**1.75**	**1.89**
Existing Storage (MG)		
North Gig Harbor	2.23	2.23
Total Existing Storage	**2.23**	**2.23**
Excess (Deficit) Existing Storage (MG)	**0.48**	**0.34**

Notes:
(1) New BPS will access North Tank dead storage and utilize its volume for emergency and fire suppression.

Table 4.15 450 Zone Storage Evaluation - With Option 2 Recommendations (New Well 9)

Evaluation	2027	2037
Demand		
ERU	2,585	2,904
ADD	368	413
MDD	850	955
PHD	1,532	1,709
Available Sources (gpm)		
Well 11	1,000	1,000
New Well 9(1)	1,000	1,000
Total Source Capacity (gpm)	**2,000**	**2,000**
Largest Source (gpm)	1,000	1,000
Required Storage (MG)		
Operational	0.05	0.05
Equalizing	0.10	0.11
Standby	0.00	0.00
Fire Suppression	0.54	0.54
Dead	1.26	1.26
Total Required Storage	**1.95**	**1.96**
Existing Storage (MG)		
North Gig Harbor	2.23	2.23
Total Existing Storage	**2.23**	**2.23**
Excess (Deficit) Existing Storage (MG)	**0.28**	**0.27**

Notes:
(1) New Well 9 is recommended by North Tank and would pump approximately 1,000 gpm.

4.5.7 Storage Limiting Capacity Analysis

DOH requires the available equalizing and standby storage of the City to be expressed in terms of the number of ERUs that can be served. The available equalizing storage is the amount of storage available above the 30 psi HGL minus operational storage. Rearranging the equations in Section 4.3.1.2 yields the following equation for number of ERUs that can be served with the available equalizing storage:

$$N = \frac{1}{C}\left[\frac{1}{MDD}\left(\frac{ES}{150} + Q_S - 18\right) - F\right]$$

Where:

- N = Number of ERUs.
- MDD = Maximum day demand per ERU, in gpm/ERU.
- ES = Available Equalizing Storage, in gallons.
- Q_S = Total Source Capacity, in gpm.
- C = Coefficient associated with ranges of ERUs.
- F = Factor associated with ranges of ERUs.

Table 4.16 shows that the City has about 1.32 MG of available equalizing storage that is capable of serving 22,980 customers. This is more than the number of ERUs forecasted to be served by the water system in 2027 by 16,398 ERUs and in 2037 by 15,796 ERUs.

Table 4.16 Equalizing Storage Limiting Capacity

Planning Year	320 Zone		440 Zone		450 Zone	
	2027	2037	2027	2037	2027	2037
Equalizing Storage Available (gallons)	590,000	590,000	160,000	160,000	570,000	570,000
ERUs that can be Served	8,500	8,500	5,530	5,530	8,950	8,950
ERUs projected in Service Area	2,215	2,382	1,782	1,898	2,585	2,904
Equalizing Storage Surplus/(Deficit) (ERUs)	6,285	6,118	3,748	3,632	6,365	6,046

Available standby storage is the total storage available above the 20 psi HGL minus the operational storage and available equalizing storage. Rearranging the equation in Section 4.3.1.3 yields the following equation for number of ERUs that can be served with the available standby storage:

$$N = (SB + 2 \text{ days} * Q_F)/(2 \text{ days} * ADD)$$

Where:

- N = Number of ERUs.
- SB = Available standby storage, in gallons.
- Q_F = Firm capacity, in gpd.
- ADD = Average day demand per ERU, in gpd/ERU.

Table 4.17 shows the City's available standby storage is over 1.78 MG. Because both 320 and 440 Zones have so much firm capacity, this is enough storage to serve over 11,450 ERUs. These zones have surplus Standby Storage throughout the planning period. However, the 450 Zone shows an ERU deficit of 585 by 2027 and 924 by 2037, therefore confirming the storage deficiency found during the storage analysis in the 450 zone.

Table 4.17 Standby Storage Limiting Capacity

Planning Year	320 Zone		440 Zone		450 Zone	
	2027	2037	2027	2037	2027	2037
Available Standby Storage (gallons)	501,916	501,916	458,883	448,882.9	820,973	810,973
ERUs that can be Served	3,750	3,750	7,700	7,680	2,000	1,980
ERUs projected in Service Area	2,215	2,382	1,782	1,898	2,585	2,904
Standby Storage Surplus/(Deficit) (ERUs)	1,535	1,368	5,918	5,782	(585)	(924)

Table 4.18 shows the City's available standby storage after recommended Well 9 has been created. The City has surplus standby storage throughout the planning period.

Table 4.18 Standby Storage Limiting Capacity - With Option 2 Recommendations (Well 9)

Planning Year	320 Zone		440 Zone		450 Zone	
	2027	2037	2027	2037	2027	2037
Available Standby Storage (gallons)	501,916	501,916	458,883	448,882.9	820,973	810,973
ERUs that can be Served	3,750	3,750	7,700	7,680	9,030	9,000
ERUs projected in Service Area	2,215	2,382	1,782	1,898	2,585	2,904
Standby Storage Surplus/(Deficit) (ERUs)	1,535	1,368	5,918	5,782	6,445	6,096

4.6 Hydraulic Model Update

The City's hydraulic water distribution model is the primary tool for evaluating the City's distribution system. The model evaluates how the City's water infrastructure handles future demands and verifies that recommended improvements will eliminate system deficiencies.

The City maintains the hydraulic model of their distribution system in WaterCAD by Bentley. The hydraulic model was updated using the data provided by the City for the various elements of the hydraulic model described below. A summary of all the updates performed in the model is presented in this section.

4.6.1 Elements of the Hydraulic Model

The following provides a brief overview of the various elements of the hydraulic model and the required input parameters associated with each:

- Junctions: Locations where pipe sizes change, where pipelines intersect, or where water demands are applied and are represented by junctions in the hydraulic model. Required inputs for junctions include service elevation and water demands.
- Pipes: Water mains are represented as pipes in the hydraulic model. Input parameters include length, diameter, roughness coefficient, and whether or not the pipe includes a check valve (i.e., does not allow reverse flow).
- Tanks:
  - Cylindrical Tanks: Water tanks are included in the hydraulic model as cylindrical tanks. Required input parameters for cylindrical tanks include bottom elevation, maximum level, initial level, and diameter.
  - Fixed Head Reservoirs: For water distribution system modeling, fixed head reservoirs are used to represent a water source with a constant HGL. Typically, fixed head reservoirs are used to represent water sources, such as groundwater supplies.
- Pumps: Input parameters for pumps include pump curves and operational controls.
- Valves: A number of different valves, such as pressure reducing valves (PRVs) are represented in the hydraulic model. Required input parameters for valves include diameter, operational controls, and other settings or head loss curves depending on the type of valve.
- Demands: Water demands are applied at specific junctions in the hydraulic model.

- Fire Flows: Fire flows are simulated by assigning a fire demand to certain junctions in the model based on land use. The modeling software will then run a system-wide fire flow analysis, in which each junction with an assigned fire flow will be analyzed and a residual pressure will be computed. This eliminates the need to manually run fire flows throughout the system and increases the number of junctions that can be analyzed.

4.6.2 Physical Features Update

The updated all-pipe model contains 400 nodes and 540 segments of pipe. In addition, there are 6 tanks, 8 well and supply sources, and 1 pump station. This section summarizes all updates performed in the hydraulic model for the purpose of this system analysis. The model incorporates the latest geographic information system (GIS) and computer-aided design (CAD) data received from the City on February 2018.

4.6.2.1 Pressure Zones

The pressure zone boundaries are verified and updated when necessary in the hydraulic model. Corrections are made to pressure zone assignments for all pipes and junctions.

4.6.2.2 Pipes

Pipes included in the model were checked against the most recent City CAD and GIS databases and diameters were updated accordingly. Additionally, any missing loops or recent developments were added to the hydraulic model.

4.6.2.3 Storage Tanks

All of the City's tanks are modeled as cylindrical tanks. Storage tank dimensions, such as diameter, height, bottom elevation, were checked against the latest data provided by the City.

4.6.3 Demand Allocation Process

4.6.3.1 Process Overview

The hydraulic model was updated with the medium demand projections presented in Chapter 3, which provides demands by customer class for each pressure zone. The demand allocation process spatially distributed these future demands to the model's many nodes. Each node represents the demands from nearby customers that may include multiple customer classes (e.g., commercial and residential). Demand is allocated based on the number and class of customers contributing to each model node.

The land use of the contributing area, in acres, to each node was calculated using GIS. The demand projections were developed based on accounts, not area, therefore the demands were converted to a demand per acre factor. Using the demand per acre factors, the projected demands were calculated for the contributing area to each node.

4.6.3.2 Demand Allocation

The demand allocation was based on the land use within these contributing areas. The existing (Year 2018) demands were allocated based on current land use. Future demands were allocated based on land use, where the contributing area was limited to vacant and redevelopable lands within the City. Future scenarios consist of planning years 2027, and 2037.

The demands were projected by customer class. Each customer class corresponds to a particular land use type. Irrigation customer class demands were allocated proportionally to all non-single-family residential areas in the system, except open space. Open spaces were not allocated demands. Distribution system leakage and "other authorized use" demands were allocated uniformly across the system. Large consumer demands were assigned independently to specific locations to accurately capture the hydraulic impacts of these large demands.

Existing demand per acre factors for each land use type were calculated by dividing the customer class demand by the number of acres currently connected to the water system in the corresponding land use categories. Demands were then spatially distributed to the nodes in the model.

Each node represents the demands from nearby customers, which may include customers from multiple classes. The contributing area of each land use type to each model node on the parcel scale was calculated using GIS. Automated GIS tools initially assigned parcels to each model node. The results of the automated analyses were reviewed and some parcels were reassigned to better represent the source of water for the customers. Commonly, undeveloped or vacant areas were reassigned to the nearest potential system connection to approximate the impact of expansion on the existing system. Additionally, parcels bordering multiple mains were reviewed and reassigned when necessary.

Then, node demand was calculated by multiplying the demand per acre factors by number of acres for each land use type contributing to the node.

Future demand per acre factors were calculated for the demand anticipated in addition to existing demand by 2027, and 2037. Future demands were allocated on top of existing demands to nodes with the following three types of contributing area:

- Parcels that are currently developed and are expected to connect to the water system in the future,
- Parcels that are currently undeveloped and expected to develop and connect to the water system within the planning period, and
- Connected parcels that are expected to redevelop within the planning period.

Demands of currently connected parcels that are not expected to redevelop within the planning period did not change for the future scenarios.

The resulting demand allocation does not establish the actual water use for individual customers; rather it represents a typical water use based on large groups of customers. Similarly, the actual site of development or redevelopment is not considered, rather future demands are spread across a large area that the City has established as vacant or having the potential for redevelopment.

Note, the demands presented in this section were developed for planning purposes and should not be used for permitting or design of development-scale projects.

4.6.4 Fire Flows

Fire flow demands were also updated in the model. The quantity of water available for firefighting establishes an important level of service for a water system. The City's established criteria for fire flow were used to update the hydraulic model. The following criteria are minimum requirements:

- 1,000 gpm for all single-family residential areas of the City for two hours with a minimum of 20 psi residual anywhere in the system.
- 3,000 gpm for multi-family residential and commercial areas of the City for three hours with a minimum of 20 psi residual anywhere in the system.

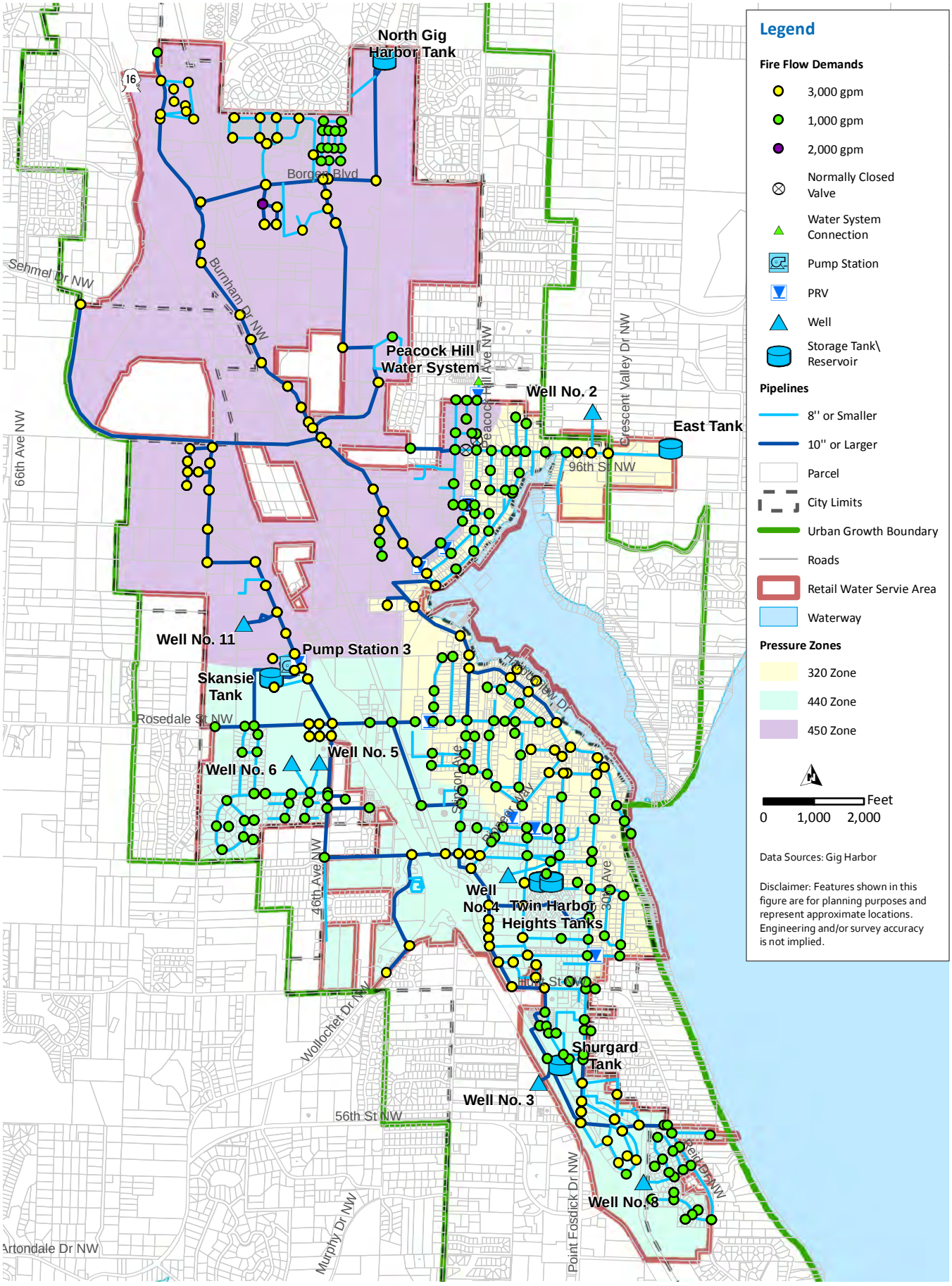
Parks and open spaces within the City were not allocated fire flows.

Figure 4.5 shows the minimum fire flow required at nodes throughout the system based on land use.

Additionally, the City has one specific fire flow customer (Home Depot) located within Gig Harbor North, at 5120 Borgen Boulevard, that requires 2,000 gpm for four hours (0.48 MG).

4.6.5 Hydraulic Update and Calibration

The updated hydraulic model provides an excellent tool for evaluating the distribution system. The model should be updated periodically to maintain reasonable prediction of water system conditions. An extended period simulation (EPS) calibration of the model was last performed by Carollo in 2014 and can be found in Appendix Q. An update would include incorporating main replacements and improvements, adding new service areas, incorporating operational changes to the tanks and pumps, adjusting PRV settings, and adjusting demands to match demand projections and land use. As part of this periodic update, hydrant flow tests should be conducted to verify the accuracy of the model and aid in monitoring system changes. Additionally, fire flow tests should be conducted to validate model results for new developments in areas with low pressures or high head loss.



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Figure 4.5 Fire Flow Requirements

4.7 Evaluation of the Distribution System

The updated model was used to evaluate the distribution system under future demand conditions. The distribution system was evaluated against four performance criteria. Areas not meeting the criteria are considered deficient and system improvements are identified to achieve the required level of service.

4.7.1 Evaluation Criteria

The evaluation criteria are from the City's policies and criteria presented in Chapter 2. These policies are at least as stringent as DOH Design Manual and WAC 246-290 requirements. The distribution system was evaluated for the following criteria:

- High ADD Pressure. Maximum recommended pressure is 100 psi during ADD.
- Low PHD Pressure. Minimum allowed pressure is 30 psi during PHD.
- High Velocity. Maximum allowed velocity is 10 feet per second (ft/s) during PHD.
- Available Fire Flow. During fire flow during MDD conditions, system pressures must remain above 20 psi.

4.7.2 Identified Deficiencies

4.7.2.1 High ADD Pressure

International plumbing code requires the installation of individual PRVs when the meter pressure exceeds 80 psi. Although the City has no maximum pressure criteria, system pressure above 100 psi are identified for informational purposes. The model was run in extended period simulation during ADD to identify the range of pressures typically experienced in the system. Figure 4.6 shows model nodes with pressures above 100 psi during 2027 ADD, which is the planning year where demands will be the lowest and therefore pressures will be the highest. High pressure nodes under both 2027 ADD and 2037 ADD are the same as those for 2037 ADD. This criterion is a guideline rather than a requirement. The results are provided for the City's information. No improvements are recommended.

4.7.2.2 Low PHD Pressure

PHD conditions were simulated for each planning year to identify areas with operating pressures below 30 psi. There are no low-pressure issues in the entire distribution system under either 2027 or 2037 planning year.

4.7.2.3 High Velocity

The City's goal is to maintain velocities under 10 ft/s in distribution pipes during the PHD. No pipes were found to exceed the velocity criteria in any planning year. Therefore, no improvements are recommended.

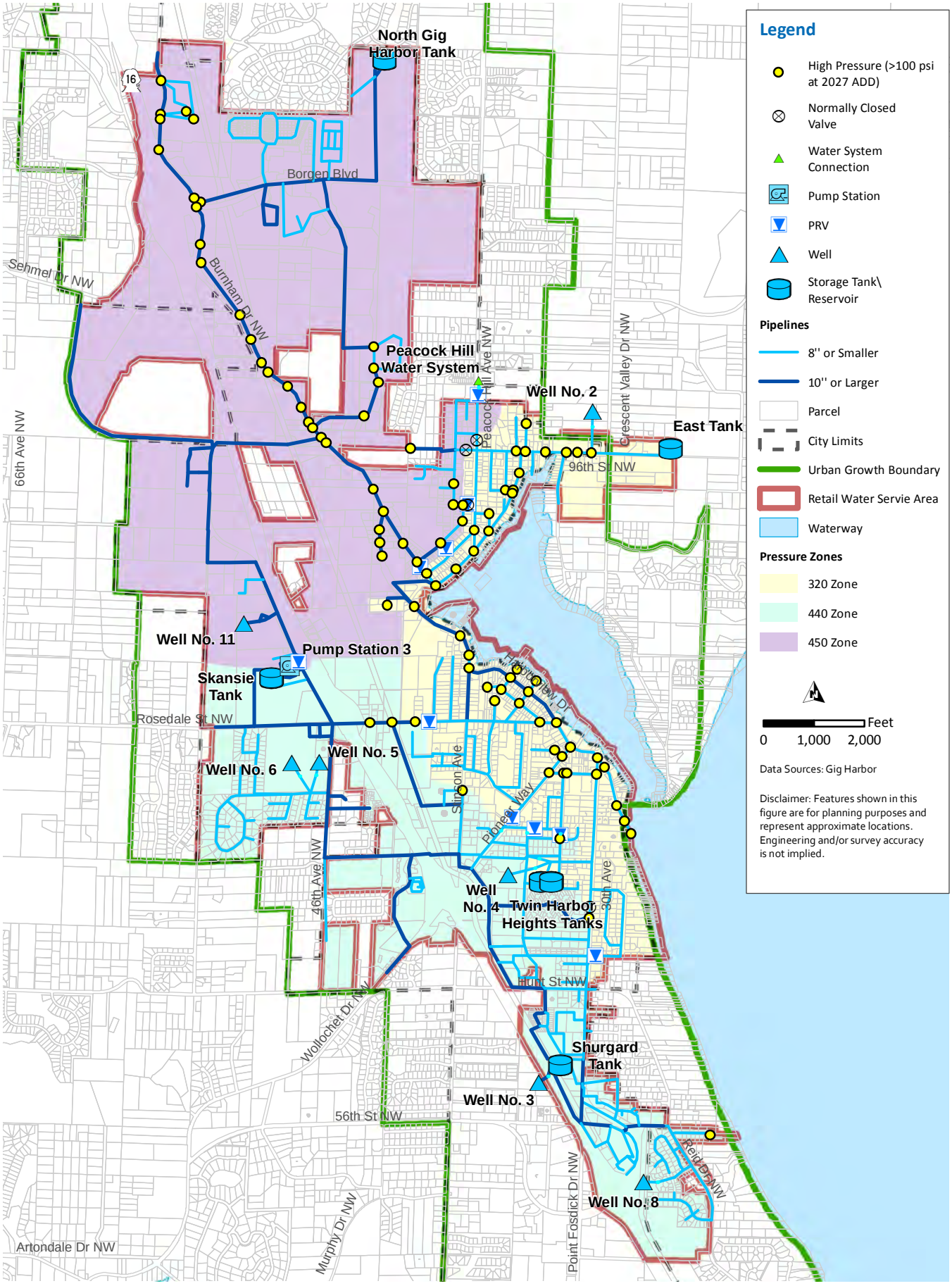
4.7.2.4 Available Fire Flow

The City criterion requires fire flows to be met while supplying MDD and maintaining 20 psi throughout the distribution system. Fire flows are typically the largest flows a system experiences and often a major factor in pipe sizing and configurations. The hydraulic model was used to systematically simulate a fire at all model nodes representing fire hydrants for each of the planning years. Deficient nodes that cannot provide required fire flows while maintaining system pressures everywhere else in the system above 20 psi are shown in Figure 4.7 for planning year 2027. There is no change in results for planning year 2037. Fire flow deficiencies for the 1,000 gpm requirement are shown in purple, while nodes failing to meet the 3,000 gpm requirement are shown in red.

During the fire flow analysis, reservoirs are set at the 20 psi HGL, which is the bottom of the fire suppression storage component. This is often much lower than typical operating levels. Therefore, locations that may have sufficient pressure and flow during annual hydrant testing may be deficient with these lower reservoir levels.

4.7.3 Future Service Area Infrastructure

The City has several areas in its system currently undeveloped. Some of these areas are located at higher elevations than the currently highest customers served. It is recommended that these customers be served through BPS. Specific studies will be recommended based on future development locations to confirm infrastructure requirements. Figure 4.8 shows the locations of the areas that will need further evaluation to connect to the City's distribution system.



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Figure 4.6 High Pressure Areas During 2027 ADD

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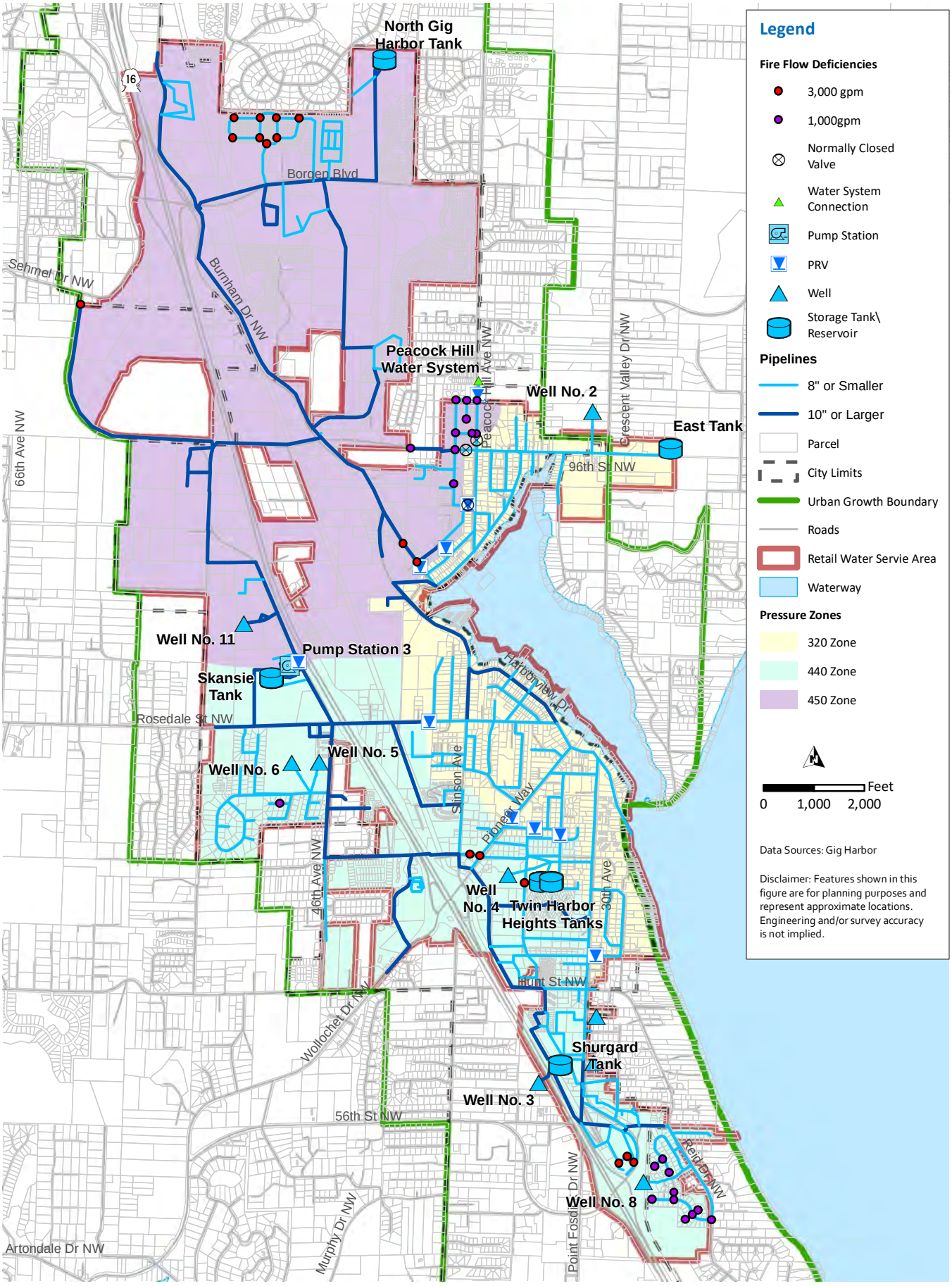


Figure 4.7 Fire Flow Deficiencies Year 2027 Before Improvements

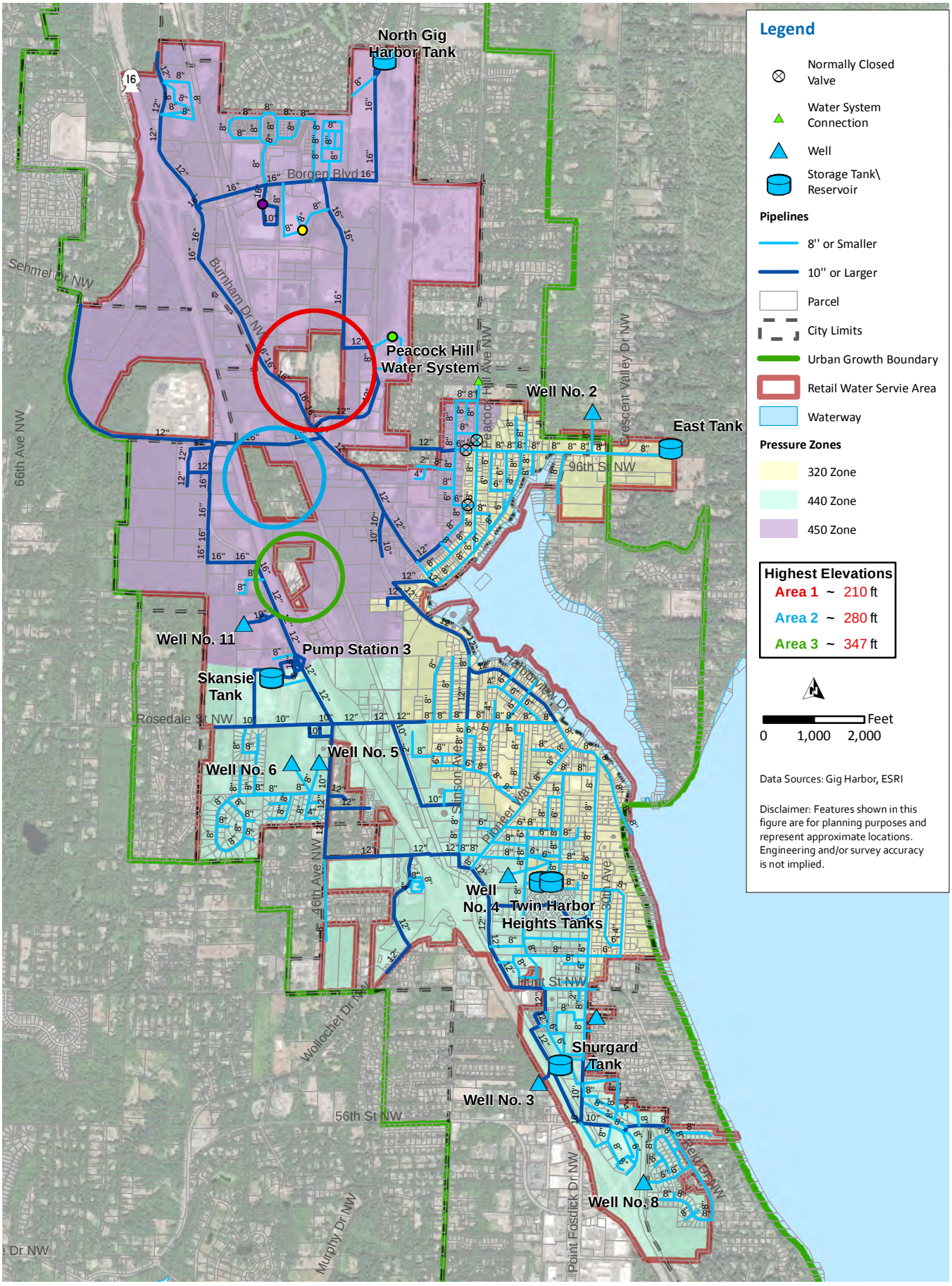


Figure 4.8 Future Potential Customers at Higher Elevation

4.7.4 Identification of Improvement Projects

Improvements were developed and are recommended to meet the projected deficiencies identified in the previous section. Improvements mainly include pipe upsizing, and main looping.

The recommended improvements are shown in Figure 4.9. Figure 4.10 shows that all deficiencies presented in Figure 4.7 are not deficient after implementation of the recommendations highlighted in this section and in Figure 4.9.

Detailed information on each recommended pipe improvement project can be found in Table 4.18. Once implemented, the system will meet future fire flow requirements for the planning year.

A total of 10,043 feet, or 1.9 miles, of pipe improvements is recommend and summarized in the table below.

The columns used in Table 4.19 refer to the following:

- Identification (ID): Each pipe segment is assigned an ID. This is an alphanumeric identifier that starts with one letter, indicating the type of project (N = new pipe, U = Upsize), and is followed by a number.
- Pressure Zone: This is the pressure zone in which the project is located.
- Location: Street in which the improvement is proposed.
- Length: Estimated length of the proposed pipeline (feet).
- Existing Size: Diameter of the existing pipeline (inches [in.]).
- Proposed Size: Diameter of the proposed pipeline (in.).

Table 4.19 Proposed Pipe Improvements

Project ID	Pressure Zone	Location	Length (ft)	Ex. Size (in)	Proposed Size (in)
N-01	450 Zone	South of St Anthony Hospital Connecting Canterwood Blvd NW and Bering St. NW	808	-	12
N-02	450 Zone	Connection between Sehmel Dr. NW and Burnham Dr. NW across Highway 16	4,323	-	12
N-03	450 Zone	connection between Vernhardson St. and Burnham Dr. NW	1,674	-	12
N-04	440 Zone	Olympic Dr. NW and 56th St. NW	184	-	8
U-01	440 Zone	Along Grandview St. Between Stinson Ave and Pioneer Way	441	6	12
U-02	440 Zone	Shore Acres	186	6	8
U-03	440 Zone	Shore Acres	135	6	8
U-04	440 Zone	Shurgard Tank to 30th Ave.	283	8	12
U-05	440 Zone	Shurgard East Tee	515	8	12
U-06	440 Zone	Olympic Village Loop	714	8	12
U-07	440 Zone	Along Reid Dr. NW between 56th St. NW and 55th St. NW	578	6	8
U-08	440 Zone	Deer Creek Lane	202	4	8
Total			**10,043**		

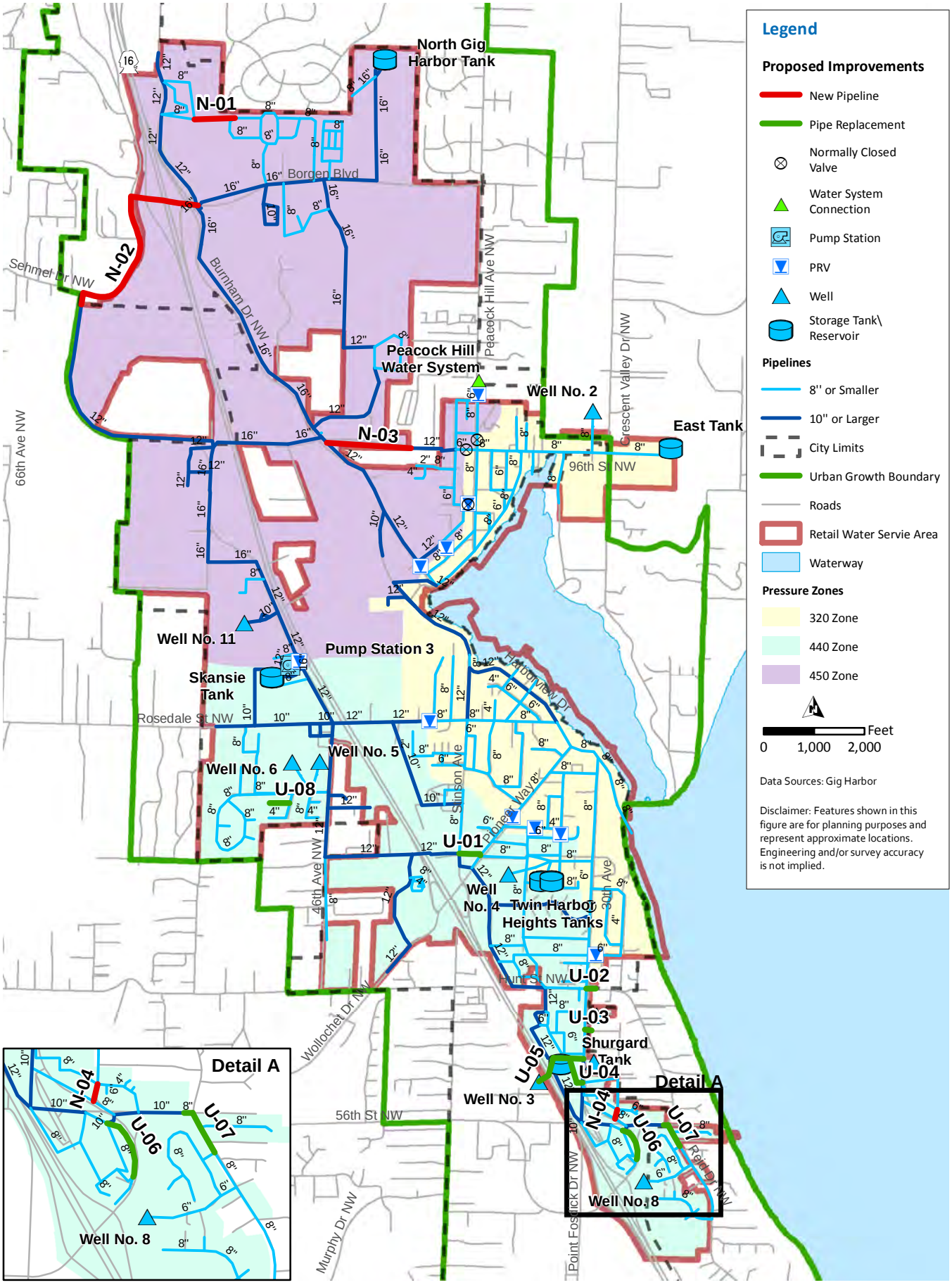


Figure 4.9 Recommended Distribution System Improvements

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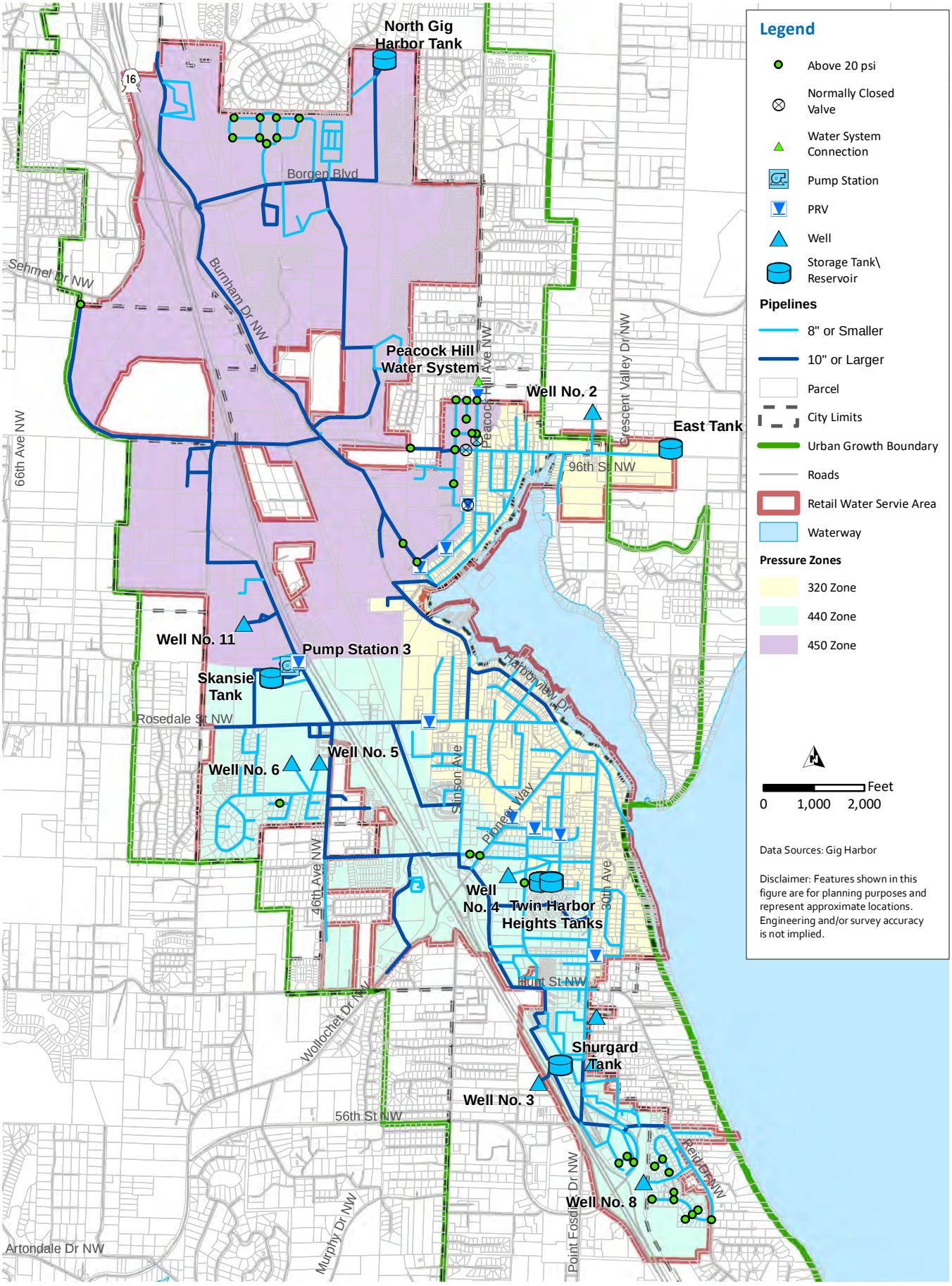


Figure 4.10 Fire Flow Results After Recommended Projects Implementation

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Chapter 5

WATER USE EFFICIENCY PROGRAM

5.1 Introduction

The City of Gig Harbor (City) promotes efficient water use to conserve and protect their existing water supplies for present and future residents. The City promotes water conservation and efficient use through a variety of activities that encompass their Water Use Efficiency (WUE) Program. The program encourages conservation and utilizes continued improvements to reduce leakages and water loss in the City's system. This chapter details both the City's existing and future WUE programs.

5.2 WUE Program Background

In 2003, the Washington State Legislature passed the Engrossed Second Substitute House Bill 1338, known as the Municipal Water Law or the WUE rule, to address the increasing demand on Washington's water resources. This law established that all municipal water suppliers (MWS) must use water more efficiently in exchange for water right certainty and flexibility to help them meet future demand.

The WUE rule, which became effective on January 22, 2007, emphasizes the importance of measuring water use and evaluating the effectiveness of the water supplier's WUE program. The intent is to minimize water withdrawals and water use by implementing water saving activities and adopting policies, resolutions, ordinances, or bylaws. This chapter follows the guidelines set forth in the Water Use Efficiency Guidebook, Third Edition, (January 2017).

5.2.1 Current WUE Program

The City's current WUE Program was established as part of the 2008 Water System Plan update. Per the Washington State Administrative Code (WAC) 246-290-830(4)(a), all water purveyors with 1,000 or more connections were required to set efficiency goals through a public process. The established goals promote water use efficiency for internal operations and for water customers. The previous plan established a goal to reduce the consumption per Equivalent Residential Unit (ERU) by 10 percent by 2028. This goal was most recently updated in 2018 to the following:

- Decrease residential consumption by 0.25 percent for each year for the next six years.

The following summarizes the City's current program.

5.2.1.1 Supply-Side Measures

The City implements the following supply-side measures as part of their WUE Program. A number of these measures are mandated by the Washington State Department of Health (DOH) per the Water Use Efficiency Guidebook. The following summarizes the City's supply-side measures:

- Record and monitor supply source production (Mandatory).
- Record and monitor customer demand through customer water meters (Mandatory).
- Regularly test and calibrate source and large user's water meters (Mandatory).
- Replace or retrofit customer water meters with advanced meter reading (AMR) meters. By the end of 2020, the City will upgrade all customer meters to the new AMR meters.
- Perform periodic leak detection surveys through a private contractor.
- Repair or replace old distribution system piping with defects as budget allows.
- Reclaimed Water: Treated wastewater is used for wash down and process use and for landscape irrigation at the wastewater treatment plant (WWTP).

5.2.1.2 Demand-Side Measures

The City implements a number of demand-side measures that meet the DOH requirement for six WUE measures. These measures are similar to many of the example WUE measures presented in Appendix B of the Water Use Efficiency Guidebook. The following provides a summary of the City's demand-side measures:

- Include water consumption history on customer's utility bills for all customer classes.
- Perform water audits for large water users, as requested.
- On-site irrigation at the WWTP with treated effluent.
- Educate the public on water conservation through the Annual Water Quality Report pamphlets at City Hall and on the City website (https://www.cityofgigharbor.net/DocumentCenter/View/599/Indoor---Outdoor-Water-Conservation-PDF).
- High-use customers are notified to check for leaks and educated on the consequences of unchecked leaks.

5.2.2 Distribution System Leakage

Minimizing distribution system leakage (DSL) is a significant element of supply-side WUE requirements. DSL above 10 percent on a three-year rolling average is considered excessive and necessitates the creation of a water loss control action plan. DSL is the difference between total water production and documented water use (retail and authorized unmetered). The estimate of DSL is dependent on the accuracy of meter readings for supply and customer meters and the accuracy of tracking authorized unmetered use for activities such as fire hydrant flushing. Table 5.1 presents the City's reported three-year rolling average DSL from 2011 through 2017. The City has consistently maintained DSL below the DOH standard of 10 percent.

Table 5.1 Distribution System Leakage (Three-Year Rolling Average)

Year	DSL (%)
2011	4.3
2012	4.8
2013	6.2
2014	5.7
2015	4.8
2016	3.2
2017	7.0

5.2.3 Historical Effectiveness of Current WUE Program

The effectiveness of the City's current WUE Program was evaluated by looking at historical trends in residential water consumption. Average residential water consumption for 2015 through 2017 has been 204 gallons per day (gpd) per equivalent residential unit (gpd/ERU). Residential has decreased from 205 gpd/ERU in 2015 to 202 gpd/ERU in 2017. Overall, residential water consumption has dropped by 1.5 percent since 2015, or 0.75 percent per year on average. The City's WUE measures have been effective at meeting their WUE goal of 0.25 percent per year over the last three years. It is acknowledged that other factors beyond the success of the WUE program may have played a prominent role in this decrease, such as weather and economic conditions.

The City has historically allocated approximately $5,000 per year for WUE Program demand-side measures. Supply-side measures are funded through the general operating funds and are not tracked. This level of effort has been effective at meeting the City's WUE goals in recent years. A major cause is believed to be water savings in new construction, which will continue to effectively save water in the future.

5.3 Future WUE Program

The City plans to continue its efforts to encourage efficient water use. Going forward, the program will continue to focus on measures targeted at residential customers. The WUE Program goal for the future will be:

- Demand-Side Goal: Reduce residential water consumption by 0.25 percent per year.

5.3.1 Mandatory Measures

The WUE Program includes supply-side measures that the City implements to understand and control leakage, including new meters and periodic leak detection surveys. The City's WUE program will continue to meet all mandatory measures in the future.

5.3.1.1 Additional Measures

The City's current rate structure bills customers on a base rate plus a uniform volumetric charge. The City will reevaluate a more aggressive rate structure, such as inclined block rates, in future rate studies.

5.3.1.2 Reclaimed Water

Per WAC 246-290-100 and WUE requirements, water systems with over 1,000 connections must evaluate reclaimed water opportunities. As mentioned previously, the City currently uses treated wastewater at the WWTP for process use and irrigation. In addition, the City completed a Phase 1 study, Water Reclamation and Reuse Site Evaluations and Study (HDR 2012), to evaluate the feasibility of a reclaimed water program. A Phase 2 study is planned to be completed in 2020 to further evaluate reclaimed water opportunities.

5.3.2 Future WUE program Supply-Side Measures

The City will continue their existing program for replacement of customer water meters with AMR. The AMR meter provides operational benefits, reduces data error and helps identify customer-side leaks. It also allows leak detection and customer education through the detailed water use data and statistics provided by the AMR system.

5.3.3 Future WUE Program Demand-Side Measures

The City will continue the existing program measures described in Section 5.2. The City exceeds the minimum DOH requirement of six WUE measures.

5.3.4 Projected Demands with WUE Goals

The projected water demands considering the water savings from the City's WUE Program were represented with the low demand scenario presented in Chapter 3. Projected demands with WUE savings were compared to the medium demand projection. The low and medium demand projections assume a demand of 205 gpd/ERU. The low demand projections assumes the WUE program will successfully meet the City's goal of reducing residential consumption by ERU by 0.25 percent per year through 2028. Both demand projections assume the City's DSL will be maintained at 4.7 percent. Table 5.2 presents the projected average day demand (ADD) and maximum day demand (MDD) with and without the WUE program for the 20-year planning period. The projected demands with the WUE Program are also shown in Figure 5.1. For ADD, WUE measures are projected to provide a reduction of 0.1 million gallons per day (mgd), or 6.7 percent, by 2037. For MDD, WUE measures are projected to provide a reduction of 0.3 mgd, or 8.8 percent, by 2037.

Table 5.2 WUE Demand Projections

Demand Scenario	2037 Projection with WUE (mgd)	2037 Projection without WUE (mgd)	Water Savings (mgd)	Percent Savings
ADD	1.4	1.5	0.1	6.7
MDD	3.1	3.4	0.3	8.8

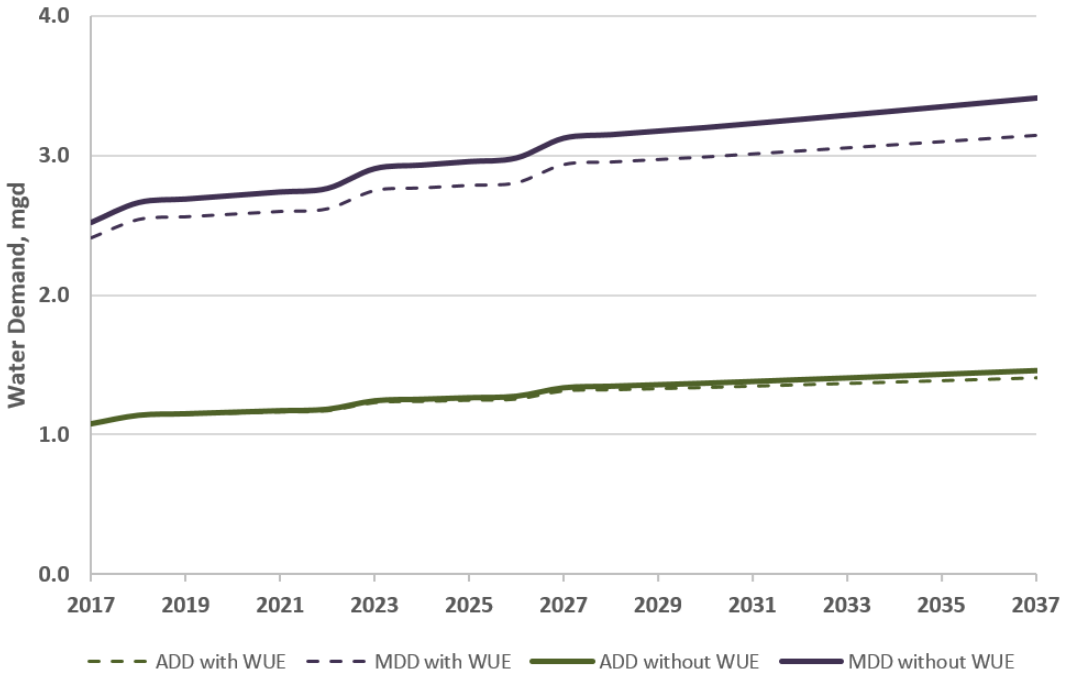


Figure 5.1 Projected Demands with Water Use Efficiency

5.3.5 Future WUE Program Effectiveness

The effectiveness of the existing WUE Program was evaluated using system-wide residential water use data. Measuring the effectiveness of the City's future WUE Program against the established goal could be similarly evaluated using system-wide residential water use data. Estimating the water savings directly resulting from the City's WUE Program in a single year is difficult. Therefore, long-term trends should be used to more clearly show the impact of the City's WUE Program.

Once AMR is implemented, the City could consider targeted WUE efforts to address water use to customers in a particular area or user profile. Using AMR, the City can estimate overall usage and peak water use rates. The first step would be to establish a baseline from historical information. The second step would be to evaluate the resulting water use after promoting WUE, through targeted activities and events, to customers. It is recommended that water use be tracked for at least a year to identify trends. Some consideration would need to be given to variations in weather and economic conditions.

5.3.6 Budget

The City recognizes the importance of continuing their WUE efforts. The WUE program provides cost savings through demand reduction and reduction in DSL. Continuing the WUE Program can help reduce the need for additional supply and assist the City during curtailment periods. The City believes the WUE Program to be a cost-effective program. The City has historically budgeted $5,000 per year for WUE demand-side measures. Supply-side measures will continue to be funded as part of the City's general operating funds, as the City considers these fundamental to running the system. Going forward, the City plans to continue budgeting similarly for WUE Program measures.

Chapter 6

WATER RIGHTS AND SOURCE WATER PROTECTION

6.1 Introduction

The City of Gig Harbor (City) has an expanding water system. As new demand and population growth occurs within the City's retail water service area, new groundwater and other supply sources will need to be developed to meet the City's water demands. The City is evaluating all feasible avenues to secure new water supplies to meet projected increases in demand. The City currently receives its water from eight production wells. The City has an additional well that is used for emergency/standby purposes (Perrow Well) that is disconnected from the system. Source water protection is regulated by the Washington State Department of Health (DOH).

6.2 Water Right/General Conditions

The City holds six additive municipal purpose certificated water rights, one non-additive certificated right, and one non-additive water right permits that authorize a total annual quantity (Qa) of 2,265 acre-feet per year (afy) (2.02 million gallons per day (mgd)) of groundwater and a maximum instantaneous quantity (Qi) of 3,115 gpm (4.48 mgd). The certificates of water rights for the wells and the DOH Water Right Self-Assessment Form for Water System Plan are included in Appendix K.

- Washington State Department of Ecology (Ecology) water right certificates and the attached report of examination (ROE) detailing each water right have certain provisions attached to each right. These provisions have changed slightly over the years but can be distilled down to the following general provisions required for all City wells:
  - Record water use daily required. The maximum monthly withdrawal and total monthly volumes shall be submitted to Ecology annually (if requested).
  - Maintain access ports and measure water levels, static and pumping, at least monthly.
  - Sample each well for chloride concentration in April and August each year. Samples must be analyzed by a state accredited laboratory. (The City wells are completed below sea level and chloride is an indicator of sea water intrusion into the aquifer.) Sample results are to be reported to Ecology annually (if requested) and if concentrations exceed 100 milligrams per liter, immediate action is required to reduce concentrations.
  - City must maintain a water conservation plan as approved by DOH.

6.3 Groundwater Supply Sources

The City relies upon its groundwater wells to meet all of its current supply needs. The City's water system (DOH ID 276009) currently has eight active production wells (Wells 2, 3, 4, 5, 6, 8, additional Well 10 allowed pursuant to RCW 90.44.100, and the recently permitted and constructed Well 11). These wells make beneficial use of water authorized by the City's eight water rights, all of which qualify pursuant to the Revised Code of Washington (RCW) 90.03.015 for municipal water supply purposes. All of the City's wells/water rights are applied to beneficial use on an annual basis. Copies of the well logs and water right certificates for each well are included in Appendix K.

The City's wells are generally in very good condition. Each well is visited daily by City staff, monitored by the Supervisory Control and Data Acquisition (SCADA) system during work hours and the mechanical and electrical equipment is maintained regularly. Aquifer levels and daily production records are collected and recorded and reviewed for any indications of reduced well efficiency.

Should an indication of reduced well efficiency occur, the City will proceed with additional field diagnostics. Well rehabilitation will be considered in the event of unacceptable losses of well efficiency. Well replacement will be considered if well rehabilitation is not appropriate or is unsuccessful in improving the well's efficiency.

6.4 Existing Supply Facilities

6.4.1 Well 1: Certificated Groundwater Right G2-*01015C (590-C)

Well 1 is located in the vicinity of the intersection of Adams and Judson Streets about 400 feet west of Soundview Drive in the northwest quarter of Section 8, Township 21, North Range 2 East in Pierce County. The original Well 1 was constructed in 1951 with 18-inch casing installed to a depth of 375 feet. The 18-inch casing was withdrawn to 73 feet below grade as a 10-inch casing was gravel packed in place with perforations opposite water bearing zones logged from 260 to 265 and 73 to 83 feet. At construction, this well produced 340 gallons per minute (gpm) with 31 feet of drawdown.

Well 1 is a certificated, additive groundwater source authorized to provide water for municipal supply purposes (G2-*01015C/590-C) and has a priority date of October 19, 1948. The water right for this source allows a Qi of 400 gpm and a Qa of 238 afy. The place of use of Water Right 1 is designated as the "Town of Gig Harbor."

Well 1 is listed on the City's Water Facilities Inventory (WFI) Form as source S01 with a capacity of 120 gpm. It is listed as inactive starting November 16, 1992. Due to water quality and production problems affecting this source, the point of withdrawal of the additive annual quantity (Qa) of the Well 1 water right was transferred in 1988 by change application to the City's Well 4 source. Subsequent to this change, the City abandoned the Well 1 site, but retained the authorized Qi associated with the Well 1 water right. The City resumed beneficial use of the Well 1 additive annual quantities Qa at Well 4. To this end, the ROE for Well 4 states "The City will retain the rights for a total of 980 acre-feet per year by placing Well No. 4 online. Based on a pumping rate of 230 gpm, Well No. 4 must be pumped 14 hours per day to yield the 238 acre-feet required to replace the loss of production from Well 1."

6.4.2 Well 2: Certificated Groundwater Right G2-00522

Well 2 is located in the City Park near the intersection of Hall Randall Road and Vernhardson Street, about 500 feet northeast of the north end of Gig Harbor in the SW4 of Section 32, Township 22, North Range 2 East. Well 2 was drilled in 1963 to a depth of 121 feet with 10-inch casing. At that time, it was a flowing artesian well yielding 20 gpm from an eight-inch well screen exposed to the aquifer between depths of 116 and 121 feet. The original pumping test showed a capacity of 425 gpm with 76 feet of drawdown.

Well 2 is a certificated additive groundwater source (G2-00522) authorized to provide water for municipal supply purposes with a priority date of April 5, 1971. The place of use of Well 2 is designated as "Area served by the Town of Gig Harbor." The water right certificate for this source, which was amended in 2002 by Ecology pursuant to an approved exempt well consolidation, allows a maximum Qi of 330 gpm, a maximum additive Qa of 209 afy, and a non-additive Qa of 116 acre-feet.

6.4.3 Well 3: Certificated Groundwater Right G2-25078

Well 3 is located in the power line right-of-way near the intersection of Soundview Drive and 56th Street SW in the NW4 of Section 17, Township 21, North Range 2 East. Well 3 was drilled in 1978 to a depth of 907 feet with 16-inch casing. Seventy-five feet of 14-inch pipe size, stainless-steel well screen is installed at selected intervals between 745 and 900 feet opposite the most permeable sections of the aquifer. A 6-inch well screen assembly was subsequently sand packed inside of the 14-inch screen assembly to eliminate sand production. The original pumping test showed a capacity of 708 gpm with 28 feet of drawdown.

Well 3 is a certificated, additive, and partially non-additive groundwater source authorized to provide water for Municipal Supply purposes with a priority date of November 15, 1978. The place of use of Well 3 is designated as "Area served by the Town of Gig Harbor." The water right for this source allows a maximum Qi of 625 gpm, a total additive Qa of 538 afy, and a non-additive Qa of 442 afy. Pursuant to the issuance of the Well 3 water right, the City's total certificated additive annual quantity was set at that time by Ecology at 980 afy.

6.4.4 Well 4: Certificated Groundwater Right G2-27393

Well 4 is located inside the fenced area at the City's Harbor Twin Harbor Heights Tanks 1 and 2 near the intersection of Grandview Drive and McDonald Street in the SW4 of Section 8, Township 21, North Range 2 East. Well 4 was drilled in 1988 to a depth of 446 feet with 12-inch casing. Thirty feet of 6-inch pipe size, stainless-steel well screen is installed with a sand pack between 409 and 438 feet opposite the most permeable section of the aquifer. The original pumping test showed a capacity of 200 gpm with 83 feet of drawdown.

As noted in the description of Well 1, Well 4 was permitted and later certificated to serve as a non-additive point of withdrawal for the additive annual quantity Qa associated with the City's Well 1 source (G2-*01015C), which was taken offline in 1988 due to persistent water quality problems. During the permitting process, Well 4 was also designated as a municipal purpose water right and issued a new additive Qi of 230 gpm, independent of the Well 1 water right Qi (i.e., 400 gpm).

The Qa authorized for Well 4 (i.e., 238 afy) is equivalent to the Qa authorized under the Well 1 water right. Consequently, the Well 4 water right (i.e., annual quantity) is designated as "supplemental to existing rights" – meaning the Well 1 water right (G2-*01015C). This regulatory intent is confirmed in the Well 4 ROE which expressly states that Well 4 was drilled as a replacement for the loss of yield from Well 1. Under any circumstance, the Well 4 water right (G2-27393) authorizes the City to withdraw a maximum Qi of 230 gpm and a Qa of 238 afy.

6.4.5 Well 5: Certificated Groundwater Right G2-27794

Well 5 is located southwest of the intersection of 74th Street Northwest and 47th Avenue Court Northwest, in Tract E of the North Creek housing development in the NW4 of Section 7, Township 21, North Range 2 East. Well 5 was drilled in 1990 to a depth of 899 feet with 16-inch casing. Fifty-eight feet of 10-inch pipe size, stainless-steel well screen is installed with a sand pack between 726 and 813 feet opposite the most permeable sections of the aquifer. The original pumping test showed a capacity of 503 gpm with 142 feet of drawdown.

Well 5 is a certificated additive and non-additive groundwater right (G2-27794) with a priority date of June 21, 1990, which is authorized to provide water for municipal supply purposes. The place of use of Well 5 is designated as the "Area served by the City of Gig Harbor". The water right for this source when originally issued in January, 1994, allowed a maximum Qi of 500 gpm, a maximum additive Qa of 88 afy, and a non-additive Qa of 248 afy. As noted in more detail below, the ROE issued for Well 5 "inappropriately" sought the relinquishment of the Well 1 water right (GWC 590-A)—an action which never occurred.

On August 8, 2001, the City requested by water right change application, the consolidation of an exempt well serving one single family residence and five mobile homes into its Well 5 source and water right. Subsequent to its investigation of the proposed change, Ecology issued its decision on December 31, 2001, and issued a superseding certificate on January 18, 2002. Although Ecology denied the consolidation request, the related ROE, as reflected in the superseding certificate, increased the prior authorized additive Qa of the Well 5 water right from 88 afy to 336 afy, and eliminated any prior reference to non-additive annual quantities. Moreover, the ROE expressly stated that the original Well 5 ROE prepared by Ecology "inappropriately" sought the relinquishment of Well 1's water right (GWC 590-A). The revised (change) ROE issued for Well 5 further noted that the original Well 5 ROE (improperly) omitted from a revised water right table, the City's Well 8, and related groundwater right.

As a consequence of Ecology's corrective actions in the revised Well 5 ROE, the City was recognized as having a total Qa of 1,364 afy which corresponded to the amount required to meet the population growth estimated in the City's 1994 water system plan.

6.4.6 Well 6: Certificated Groundwater Right G2-28102/G2-29896

Well 6 is also located southwest of the intersection of 74th Street Northwest and 47th Avenue Court Northwest, in Tract E of the North Creek in the NW4 of Section 7, Township 21, North Range 2 East about 20 feet from Well 5. Well 6 is completed in the intermediate aquifer which is not connected to the deep aquifer supplying water to Well 5.

Well 6 was drilled in 1991 to a depth of 592 feet with 16-inch casing. Forty feet of 14-inch pipe size, stainless-steel well screen is installed between 496 and 561 feet opposite the most permeable sections of the aquifer. In 2004, an eight-inch well screen assembly was sand packed inside of the 14-inch screen assembly to eliminate sand production. The final pumping test showed a capacity of 1,200 gpm with 48 feet of drawdown.

Well 6 was approved as a non-additive groundwater source authorized to provide water for Municipal Supply purposes with a priority date of March 29, 1991. The place of use of Well 6 is designated as "Area served by Gig Harbor". The water right for this certificated source allows a maximum Qi of 1,000 gpm, and a non-additive Qa of 672 afy. The water right table contained in the Well 6 ROE, which was issued in April 1994, repeated the same errors regarding the City's total, additive Qa found in Ecology's original Well 5 ROE.

On January 11, 2000, the City filed a new water right application requesting a Qi of 1,000 gpm, and a Qa of 672 afy to be withdrawn from Well 6. The purpose of the new application was to add new, additive Qa to the City's water supply in order to meet projected water demands. On October 25, 2004, Ecology issued a ROE which corrected the errors contained in the original Well 6 ROE, and authorized an additive Qa of 896 afy, and a non-additive Qi of 1,000 gpm. The non-additive Qi of 1,000 gpm is directly related to the 1,000-gpm authorized under the original Well 6 water right, G2-28102. As a result of the issuance of G2-29896, the City's total additive Qa was set at 2,265 afy.

6.4.7 Well 7: Perrow Well

The Perrow Well (S07) is located south of the Burnham Drive Northwest roundabout near the intersection of Burnham Drive Northwest and 53rd Avenue Northwest in the SW4 of the NW4 of Section 31, Township 22, North Range 2 East. The property is owned by Wade Perrow.

The Perrow Well was drilled in 1987 as a test well to determine water availability on the north side of the City. Drilled to a depth of 401 feet with 8-inch casing, the well identified water bearing sands and gravels identified between 320 and 401 feet. A six-inch well screen was installed between depths of 335 and 366 feet. Well construction problems prevented completion in the more permeable section of the aquifer identified between 370 and 400 feet. The original pumping test showed a capacity of 37 gpm with 77 feet of drawdown.

The Perrow well was developed as a permit exempt well pursuant to RCW 90.44.050 and consequently does not have a water right permit or certificate. Currently this well is physically disconnected from the City's water system and is a stand-alone source. However, it has not been abandoned and is managed by the City as an emergency standby source.

6.4.8 Well 8: Certificated Groundwater Right G2-07773 (6018 - A)

Well 8 is located near the north side of Olympic Village in the NE4 of the SE4 of Section 17, Township 21, North Range 2 East. Well 8 was drilled in 1965 to a depth of 555 feet with 10-inch casing. The deep part of the well was not water bearing and was backfilled to a depth of 242 feet. An eight-inch well screen was installed between depths of 217 and 227 feet. The original pumping test showed a capacity of 30 gpm with 15 feet of drawdown.

Well 8 and its related water right were first issued to the Peninsula Water Development Co. in 1965 to serve the Rushmore Subdivision, a residential area now falling within Gig Harbor. In 1971, Harbor Water Company (Washington Water Services) acquired Well 8, the water right, and associated water system and continued to provide service to Rushmore residents. In 1991, Harbor Water Company conveyed Well 8, the related water right, and water system to the City. Subsequent to its acquisition, the City integrated Well 8 and its related water rights/supply into the City's water distribution system.

Well 8 is a certificated, additive groundwater source with a priority date of September 2, 1965, that qualifies as a municipal purpose water right pursuant to RCW 90.03.015. As noted above, the water right was originally issued to Peninsula Water Development Co. for "community domestic" purposes and allows a maximum instantaneous withdrawal of 30 gpm Qi and a maximum additive Qa of 48 afy. The place of use of the original water right refers to a legal description of the (Rushmore) subdivision served by Peninsula Water Development Co. and later Harbor Water Company.

In January 2001, the City filed a change application to conform the place of use of the Well 8 water right to the City's approved water service area. The change application was approved with no effect on the quantities authorized in the original certificate. On December 31, 2001, a superseding certificate was issued by Ecology that recognized the prior (additive) authorized instantaneous and annual quantities and confirmed the water right's place of use to "the water service area of Gig Harbor, as described in the City's Water System Comprehensive Plan."

6.5 Water Supply/Source Characteristics

The updated water supply and source characteristics for the City are detailed in the wellhead protection program (WHPP) report included in Appendix L.

6.6 Groundwater Applications

6.6.1 Well 9: Proposed Additive Groundwater Source (G2-29937A)

Well 9 is a proposed additive/primary groundwater source that would be sited near the Gig Harbor North Tank site off Borgen Boulevard in the NW4 of the SE4 of Section 30, Township 22, North Range 2 East. The well is expected to be drilled into the deep aquifer that now supplies Well 3 and Well 5 at a depth between 400 and 600 feet below sea level.

The City filed a water right application for Well 9 on August 30, 2000, requesting a new primary/additive municipal purpose water right from this well in the amount of 1,000 gpm (Qi) and 1,000 afy (Qa) (G2-29937A). Subsequent to filing the Well 9 application, the City was advised by Ecology that it did not have sufficient staff resources to process the application in a timely manner. As a consequence of being unable to secure a new water supply, the City was compelled to impose a building moratorium in 2004. The moratorium was relieved in 2005 when a new additive right was issued to an adjacent water system using Ecology's Cost Reimbursement process.

Since 2005, no action has been taken by Ecology on the City's Well 9 application. Because of complex hydrogeologic issues associated with Well 9 and potentially high-cost reimbursement expenses, the City advised Ecology in May, 2008 of its decision to postpone the permitting of Well 9 and plan to first develop Well 10.

With Well 10 online, Well 11 fully permitted, and the recent completion of the United States Geological Survey (USGS) Kitsap Basin Groundwater Model, the City is revisiting the potential schedule for development of Well 9 as a new non-additive water source. The development of Well 9 as a non-additive source would provide greater redundancy to the City's water supply and more specifically, the pressure zone that would be served by Well 10. Investigation of Well 9 as a non-additive source is expected to commence in 2018. Based on the findings of this investigation, the City may submit a new, totally non-additive application for Well 9 in 2018 or 2019 that requests 1,000 afy, and 1,000 gpm. Under this scenario, the City would work to complete permitting and construction of Well 9 by 2021. Subsequent to completion of Well 9 as a non-additive source, the City will assess the timeline/demand conditions to determine when it is necessary to seek permitting of this source as an additive source. In that circumstance, the City will request an additive permit under its pending additive application G2-29937-A.

6.6.2 Well 10: Replacement Well/Additional Point of Withdrawal (G2-30743)

On May 28, 2008, the City submitted an application to secure an additive/primary water right for Well 10 in the amount of 750 gpm (Qi) and 800 afy (Qa). Because the Well 10 location is within the vicinity of City Park, and also falls within the same area described in the notice of publication for existing Well 2 (G2-00522), the City pursued Well 10 with the knowledge that it could also serve as a replacement/additional point of withdrawal for Well 2.

A candidate Well 10 test hole was drilled by the City in February 2009 to provide hydrogeologic and well production information. Pursuant to that work, and a determination by the City's hydrogeologists that Well 10 could not produce the desired quantities, the City determined in the summer of 2009 that it would not seek to permit the well. Instead, the City converted Well 10 into a replacement well/non-additive additional point of withdrawal for Well 2 (Qi - 330 gpm/Qa - 209 additive/116 non-additive), thereby allowing it to more reliably meet needed summer peaking supply and instantaneous flow requirements from this well site.

6.6.3 Well 11: Permitted Non-Additive Groundwater Right (G2-30575)

Subsequent to the City's decision to convert Well 10 into a replacement/additional point of withdrawal for Well 2 (G2-00522), in the fall of 2009, the City commenced work in 2011 to study and permit Well 11 as a non-additive water right. This work resulted in the City securing a non-additive water right permit (G2-30575) on June 20, 2012, for Well 11 in the amount of 1000 gpm (Qi) and 1000 afy (Qa). Well 11 is intended to help the City meet its source reliability standard (i.e., ability to meet peak demand with largest source of supply offline).

On April 29, 2015 the City requested an extension of the permit to allow further time to complete the design and construction of related facilities. On May 6, 2015, Ecology issued an extension for the permit out to June 6, 2018. Well 11 is scheduled to be completed and on-line by May 2018. Upon completion of this well, the City shall submit appropriate Completion of Construction documents to Ecology.

6.7 Water Supply Interties

6.7.1 Washington State Department of Corrections (WSDOC)

The City has an intertie and agreement with WSDOC which was based on a developer extension agreement dated October 11, 1994. The agreement expired when the line extension was installed and WSDOC paid all related costs and charges. Since that time, WSDOC has paid for water in accordance with the City's ordinance rate. The City currently provides 80,000 gallons per day (gpd) (29.2 million gallons per year (MG/year) average use, and 210,000 gpd peak usage water service.

6.7.2 Shore Acres Water System

The City has an intertie and water sales agreement with the Shore Acres Water System (Shore Acres) to provide all water needed by members of the system. The City provides fire flow and storage facilities for the Shore Acres' community and Shore Acres is responsible for any water quality testing required from their distribution system. The maximum supply for Shore Acres, per their 2006 Water System Plan Update, is 25.8 MG/year at build-out, which is estimated to occur in 20 years. The City and Shore Acres renewed/rolled-over their contract in 2008 for another 20-year term. The new water supply contract remains in good standing and is attached in Appendix M.

6.7.3 Stroh's Water Company (Emergency Fire Flow Intertie)

On December 23, 2009, the City Council adopted an ordinance (Ordinance No, 1181) approving an amendment to the City's water system plan requested by Stroh's Water Company (Stroh's). The amendment authorizes the City to extend emergency fire flow service to two parcels totaling 4.16 acres, south of Hunt Street, east of SR 16 and the existing Cushman Trail, currently occupied by Stroh's Feed and Garden Supplies and Unlimited Rentals. Both parcels are located within Stroh's service area, as well as within the City's corporate boundaries. Subsequent to passage of the ordinance, an intertie agreement between the City and Stroh's was executed to prohibit Stroh's use of emergency fire flow water to meet its potable demands and/seasonal peaking needs. See Appendix M.

Absent the extension of the City's fire flow service, the subject property cannot be redeveloped due to supply deficiencies affecting Stroh's water system. The fire flow service is to be provided by an existing 12-inch City water main that exists within Hunt Street along the north property line. The City determined that if only fire flow is provided, it has adequate pressure to serve the site and no additional water rights are required. See Appendix M (Ordinance No. 1181).

6.7.4 Peacock Hill Water System (Emergency Intertie)

In 1986, an agreement was executed between the City and Washington Water Service Company (WWSC), previously Harbor Water Company, Inc., for the delivery of City water supply to the (WWSC) Peacock Hill Water System. See Appendix M. Subsequent to City's 2001 water system plan update, the WWSC indicated that an alternative arrangement for water supply to this area of the City was more desirable. This resulted in changes to the original agreement and construction by the City of the Gig Harbor North storage tank and a booster pump station (located near the Skansie Tank) to fill the tank to help better serve the area. The WWSC's 400 Zone discussed in the 2001 Plan has been merged into the City's 450 Zone with the construction of a City transmission main connection in Burnham Drive to the Gig Harbor North Reservoir. The Pressure Reducing Valve connection with the WWSC was then converted to an emergency intertie and is no longer the source of supply to customers in this area. The Peacock Hill Water System is solely served by the City of Gig Harbor.

6.8 Water Right Analysis

Chapter 4 of this Plan describes the supply evaluation in detail, including identifying the City's supply criteria, understanding the City's existing water supply, and completing the Ability to Pump analysis. Table 6.1 shows a summary of the well supply.

Table 6.1 Well Supply

Source	Maximum Instantaneous Flow Rate (Qi) (gpm)(1)	Maximum Annual Volume (Qa) (gpm)	Current Pumping Capacity (gpm)
Well 1	400	238	0
Well 2	330	130	272
Well 3	625	334	626
Well 4	230	417(4)	159
Well 5	500	208	524
Well 6	1,000	556	1,019
Well 8	30	30	12
Well 10	330	130	-
Well 11(3)	1,000 (NA)(2)	1,000(4)	1,000
Total Additive Well Supply	**3,115**	**1,404**	
2037 MDD (High Scenario)	**2,502**		
2037 ADD (High Scenario)		**1,030**	
2037 Surplus (Deficit)	**613**	**375**	

Notes:
(1) Water Right and Well Pumping Capacity data.
(2) NA refers to Non-Additive well.
(3) Expected Pumping Capacity for Well 11 is 1,000 gpm.
(4) Well 4 and Well 11 have non-additive water rights.
Abbreviations: ADD - average day demand; MDD - maximum day demand.

Overall, however, the City has sufficient water rights to meet projected demands over the next 10- and 20-year planning horizons. Consequently, there is no immediate need for the City to secure a new additive water right. Further detail is shown in the DOH Water Right Self-Assessment Form found in Appendix K.

6.9 Source of Supply Alternatives

Over the past 35 years, the City's population and land base have expanded significantly. Further growth is projected to occur over the next 25 years as population density increases within the City's existing boundaries and urban growth area.

As a matter of law, the City has an on-going responsibility to plan for and develop the water supplies necessary to meet its projected population growth, as well as to maintain and protect the viability of the City's existing sources. Table 6.1 shows that the City is anticipated to have an excess of approximately 613 gpm in water rights by 2037, which represents approximately 20 percent of the City's Qi. However, there can be various factors that may limit existing supply yields. These include seasonal and development-based impacts on source aquifers; the increasingly stringent and dynamic regulatory environment governing water supply, water quality, and water rights; tribal treaty right issues; and the implementation of the Endangered Species Act (ESA) in an urbanized setting.

In addition to using the City's full water rights and to take advantage of opportunities that may arise in the next 20 years, the City has also reviewed its future supply alternatives as shown below.

6.9.1 Pending Water Rights

The City continues to pursue the pending water rights referenced above and considers this a viable alternative.

6.9.2 Surface Water

The small creeks and streams located in the Gig Harbor area are either closed to further surface water appropriation or subject to the minimum instream flow rule. (Washington State Administrative Code (WAC) 173-515-040). Because of such closures and instream flow rules, Ecology has not seriously entertained the issuance of new primary rights for these surface waters for several years. Due to the foregoing factors, tribal opposition, and the advent of the ESA, development of new surface water rights is not considered a viable supply alternative.

6.9.3 Acquisition of Existing Rights

State water law allows the transfer of existing rights to new places of use and purposes of use if such actions do not impair existing rights and do not create new, adverse effects upon pre-existing aquatic habit, flow, and water quality conditions. The City has explored the potential of securing existing water rights within the vicinity of its service area that are still valid and could provide water of sufficient quality and quantity to be of value to the system. However, no water rights have been identified within a reasonable distance of the City's service area which are still active and/or provide sufficient quantities to warrant their acquisition. This alternative is therefore not considered a reasonable or practicable alternative source of supply alternative.

6.9.4 Enhanced Conservation Measures

The City's Water Use Efficiency (WUE) Program includes water conservation, inclining rate structures, public education, distribution of water efficient household plumbing fixtures, and leak detection can play an important role in prolonging use of existing water supplies and delaying the time when new source is required. Further detail can be found in Chapter 5 of this Plan. For infrastructure planning purposes, it is not recommended to rely on these measures, and therefore provides a conservative safety factor.

6.9.5 Water Right Changes

Water right changes include a variety of options, including changes in place of use, purpose of use, and to the point of diversion or withdrawal of water, as well as the addition of points of diversion or withdrawals to allow groundwater production in a wellfield configuration.

6.9.6 Regional Supply Purchases

The opportunity for the City to acquire water supply from wholesale water systems in Pierce County are generally non-existent. Neither the original or new Narrow Bridge (SR-16) have water transmission lines attached to their structures. Further, for the moment, Washington State Department of Transportation (WSDOT) specifically precludes attachment of a water transmission line from the new Tacoma Narrows Bridge. Thus, the City has no ability to access supply from such regional wholesalers as Tacoma Public Utilities, Pierce County, and Lakewood Water District. Nor is water available from the City of Bremerton in Kitsap County, the closest largest municipal system.

6.9.7 Aquifer Storage and Recovery

The viability of aquifer storage and recovery (ASR) is subject to many factors, not least of which is the presence and availability of suitable aquifers. In the Puget Sound area, these characteristics are:

- High aquifer transmissivity to permit rapid recharge and recovery.
- Deep aquifer, to provide storage capacity and hydraulic separation from surface waters.
- Good aquifer confinement by aquitards to reduce the loss of stored water.
- Aquifer storativity and depth to water, to provide sufficient aquifer storage capacity.
- Compatible water quality between aquifer and recharge waters.

A primary limitation in the Puget Sound area in general, and around the City in particular relative to ASR, is the limited presence of aquifers that are suitable for recharge and recovery. The majority of aquifers in the Gig Harbor area are sea-level, and have little, if no residence time for storage and recovery. The deeper aquifer system tapped by the City and others has yet to be sufficiently characterized to be developed for ASR purposes.

6.9.8 Use of Reclaimed Water and Other Non-Potable Sources

6.9.8.1 Wastewater Reclamation/Reuse

Within recent years, the City modified and expanded its existing wastewater treatment plant (WWTP) which discharges to marine waters. In undertaking this work, the City designed the WWTP expansion project so it could accommodate future Class A reclamation/treatment facilities. Should these facilities be developed, the treated/Class A effluent could be used to meet a component of the City's existing and projected non-potable irrigation demands. To this end, the City has identified potential reclaimed water opportunities which include:

- Cemeteries.
- Parks.
- Playgrounds.
- School Yards.
- Street Sweeping.
- Dust Control.
- Aquifer Recharge.

Because of the significant cost in upgrading the existing WWTP to produce Class A effluent, and the relatively small quantities associated with the potential reclamation uses cited above, the City has determined it is not yet cost-effective to produce and distribute reclaimed water within its service area for non-potable uses. The City is aware, however, of Ecology's new draft rule regulating the beneficial use and treatment of reclaimed water, including provisions that may allow the use of reclaimed water to mitigate for new groundwater and/or surface water withdrawals. The City intends to closely study the rule, once adopted, to determine if the opportunity to use reclaimed water for mitigation purposes can be pursued in a legally feasible and cost-effective manner.

6.9.8.2 Desalination

Desalination treats seawater for potable use using energy-intensive treatment processes. Use of seawater from the Puget Sound does not require a water right. However, treatment is typically the limiting factor. Therefore, it should be considered if no other freshwater options are available.

6.10 Summary of Findings

The City is planning on maximizing its full use of water rights and pending water right applications. Further, the City will continue to work on their WUE program and will move forward with attaining future water rights.

6.11 Groundwater Management

The overall goal of the state WHPP is to prevent the contamination of groundwater used by Group A public water systems. This is to be accomplished by providing management zones around public wells, identifying existing groundwater contamination sources, and managing potential sources of groundwater contamination prior to their entry into the drinking water system. Under the WAC, local public water systems have the primary responsibility for developing and implementing local WHPPs. However, due to the limited jurisdictional and regulatory authority afforded most purveyors, coordination with other local, State, and Federal agencies is essential to the successful implementation of a WHPP.

6.11.1 Wellhead Protection Plan

This plan has been updated from the 2008 WHPP with a new contaminant source inventory and hazard ranking and is attached as Appendix L. Portions of the 2008 WHPP are referenced in the new plan and can also be found in Appendix L.

Once placed on-line, Well 11, as well as Well 10, will be added in the next update.

The revised WHPP identified 23 actual and potential hazards within the study area. Of these, six hazards were confirmed contaminated sites and the rest were identified as potential hazards. The following confirmed contaminated sites are explained in further detail in the WHPP:

- T & Y Management Inc.
- Olympic Tire & Auto Service Center Inc.
- U-Haul Gig Harbor.
- Pape & Sons Construction Inc.
- Shell Station 121515.
- Gig Harbor Veterinary Hospital Inc.

The 2008 WHPP recommended 26 Wellhead Protection Implementation Tasks. Of these, the City has identified a number of tasks remaining, which are shown in Table 6.2. The remainder were completed or deemed no longer applicable.

Table 6.2 WHPP Implementation Tasks

Task	Description
1	It is recommended that the City seek to create awareness of the wellhead protection area (WHPA) by posting metal "WATER SUPPLY PROTECTION AREA" signs at the borders of the WHPA.
2	Review routine leak detection procedures for sewer lines. Request utilities use "leakproof" piping for new sewer construction and replace older lines. There are currently multiple sewer force mains located throughout the City that range in size from two inches to six inches. The City currently has contingency plans in place for pump and line failure, however, the City should develop an emergency response procedure for sewer force main breaks within the 1-year travel zone of the WHPA.
3	Encourage Pierce County to maintain their delegated authority of well drilling inspection. Coordinate with this program to gain advance notice of drilling in or near the City's WHPAs.
4	Request County, State, and private landowners to utilize vegetation management practices to protect water quality.

Upon allocation of funds from the City Council, the City is preparing to complete WHPA notification letters within the WHPA to any identified potential contaminators and local emergency responder agencies. A copy of the letter is found in the WHPP. The Water Department provides drinking water quality reports to customers annually with their May and June utility billings. The reports are also available on the City's website. This document includes informational and educational resources for residential property owners.

A Spill Response Plan was developed in the previous WHPP effort it remains in effect. No updates to this plan were needed.

6.11.2 Wellhead Protection Area Delineation

New WHPAs for the City's eight selected water supply wells were delineated for this project. The WHPAs for seven of the eight Gig Harbor water supply wells (2, 3, 4, 5, 6, 10, and 11) were delineated using the USGS Kitsap Peninsula groundwater flow model (Frans and Olsen, 2016). The USGS model was used to estimate the 6-month, 1-year, 5-year, 10-year, and 20-year "capture zones" for these wells operating each well's permitted maximum Qi.

These WHPAs were delineated based on the maximum installed pump capacity for each well. Wells 2 and 10 are located close enough to each other that they share modeled travel times from vicinity sources. The same is true for Wells 5 and 6. In some locations wellfield protection areas for multiple wells overlap; therefore, potential contamination sources are ranked based on the shortest travel time to any water supply well. Gig Harbor Well 8 is the shallowest city water supply well and could not be simulated with the USGS model due to limitations of the model to simulate the shallow aquifers.

The modeling effort and results are detailed in the WHPP report included in Appendix L.

Chapter 7

OPERATION AND MAINTENANCE PROGRAM

7.1 Responsibility and Authority

7.1.1 Objectives

The Operation and Maintenance Manual for the water system has two primary objectives. The first is to provide documentation of satisfactory water system management operations in accordance with WAC 246-290-100 and 246-290-415.

The second objective is to furnish a document that clearly outlines day-to-day operations to keep the system running smoothly. It provides information regarding individual water system components, routine maintenance, safety, cross-connection control, and emergency response. This document can be used in conjunction with an Employee Handbook as an overview of the operation of the water system for new employees or other interested persons. It is also intended to complement the City of Gig Harbor's (City's) 2016 Comprehensive Emergency Management Plan (CEMP).

7.1.2 Water System Management and Personnel

The City owns a Group A community water system, which is operated by the Operations Division of the Public Works Department (PWD). The City's Operations Division is set up such that all staff work on water, sewer, parks and streets. The Public Works Director, who reports to the City Administrator, Mayor and City Council, manages all aspects of building, land use planning and public works-related City functions, including water system operations. A City organization chart is presented on Figure 7.1. This chart illustrates the specific personnel positions and corresponding responsibility for the City water system.

The Operations Division is organized into three branches: Operations, Treatment Plant (wastewater) and Administrative. The Operations Branch is managed by the PWD Supervisor. The Operations Division is responsible for operation and maintenance of the water and wastewater systems, including day-to-day operations, preventive maintenance, equipment repair, material acquisition, field engineering, water quality monitoring, budget formulation, billing, and office and record-keeping assistance. The Operations Division's Administrative staff coordinates the reporting and record-keeping aspects of the City's Cross-Connection Control Program, tracks customer complaints, and is responsible for emergency planning, drills, and implementation of the improvement program.

The PWD also includes an Engineering Division, which is primarily responsible for city infrastructure improvements and the review of public development projects. Engineering staff are responsible for the planning, development and implementation of projects from the Capital Facilities Element as funded in the annual budget. This involves the design and construction management of City-funded capital improvement projects for City water improvement projects.

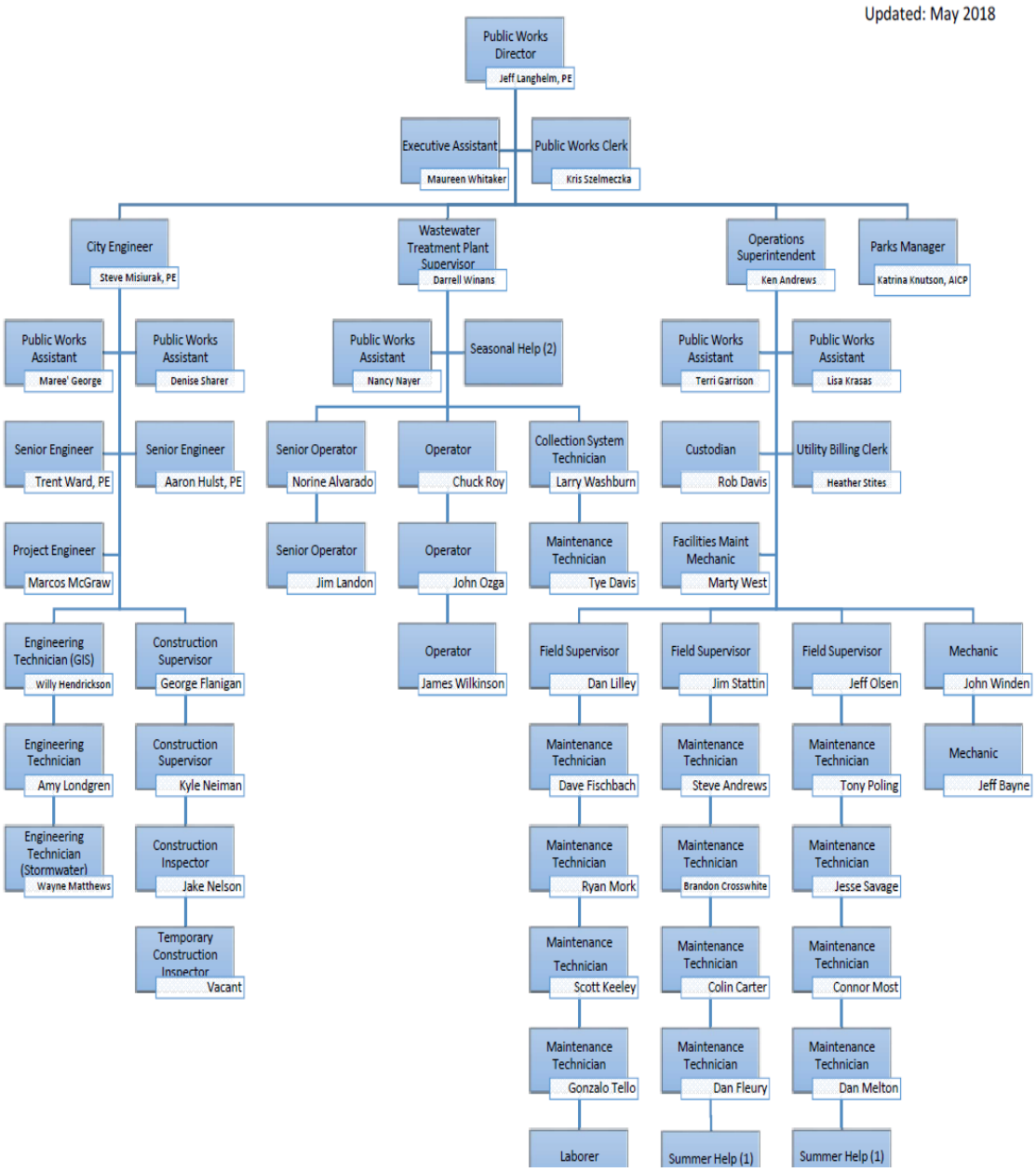


Figure 7.1 2018 City of Gig Harbor Public Works Organizational Chart

7.1.3 Certification Requirements

Water Works Operator Certification, required under Washington State Administrative Code (WAC) 246-292, requires that Group A community water systems designate the certified operator(s) in responsible charge of the daily operational activities of the public water system, water treatment facility and/or distribution system that will directly impact water quality and/or quantity of drinking water. A designated certified operator shall also be in responsible charge and available for each operating shift. The certified operator in responsible charge of each operating shift shall be certified at a minimum of one level lower than the classification of the purification plant or distribution system.

Based on the population served, the City is required to have a Water Distribution Manager 2 (WDM2). The minimum requirements for a WDM2 are 12 years of education and three years of operating experience. Operators must also take and pass an examination.

In addition, the City is required to have a cross-connection control specialist (CCS) who is responsible for:

- The system's cross-connection control program.
- Initial inspection of premises served by the system for cross-connections.
- Periodic re-inspection of premises served by the system for cross-connections.

The City shall also have a backflow assembly tester (BAT) who is responsible for inspecting, testing and monitoring backflow prevention assemblies in accordance with WAC 246-292.

The requirements for a CCS are 12 years of education and 6 months of experience. There are no minimum education or experience requirements for a BAT. Both the CCS and BAT must also take and pass relevant examinations.

Table 7.1 lists the certifications of the City Operations Division personnel. In addition to the mandatory certifications, the Operations Division maintains additional certifications held by supporting personnel, including Water Distribution Manager 1 (WDM1), CCS, and BAT. Many employees hold multiple levels of certification. The City must notify the Water Works Certification Board about any changes in the mandatory or supporting certification personnel.

Table 7.1 City Operations Division Personnel Certifications

City Personnel	Certification Number	Additional Certifications
Ken Andrews	0013978	CCS, WDM2
Jeff Olsen	010289	CCS, WDM2
Jim Stattin	6132	WDM2
Tony Poling	6252	CCS, WDM2
Steve Andrews	5775, B4651	CCS, BAT, WDM2
Dave Fischbach	8233, B3561	CCS, BAT
Jeff Bayne	10101	WDM1
Jacob Nelson	11116	WDM1
Brandon Crosswhite	11380	WDM1
Jesse Savage	12054	WDM1

7.1.4 Professional Growth

In order to promote and maintain expertise for the various grades of operator certification, Washington State requires all certified operators to comply with professional growth requirements. To demonstrate professional growth, a holder of Water Distribution Manager (WDM) or CCS certification shall accomplish one of the following activities during each professional growth reporting period:

- Accumulate a minimum of three continuing education units (CEU) or college credits.
- Advance by examination in the Washington water works operator certification program or achieve certification by examination in a different classification.

Educational programs sponsored by the Washington Environmental Training Center, Evergreen Rural Water of Washington, the Pacific Northwest Section of the American Water Works Association (AWWA), and the Washington State Department of Health (DOH) are the most popular sources of CEUs for certified operators in Washington State. The Operations Division has encouraged staff to become certified and retain their certifications and budgeted approximately $10,000 for training and continuing education in 2018.

7.1.5 Customer Complaint Response

The Operations Division maintains a record of all customer complaints on a Citizen Communication Log form. The staff member obtains information about the type and duration of the water problem the customer is experiencing. The most common water complaints are brown water or water with a "rotten egg" odor. Complaints are forwarded to the maintenance crew. To alleviate such problems, maintenance crews typically flush the watermain, which generally resolves aesthetic problems quickly. In 2016, the City received 33 aesthetic water complaints, and in 2017 received 28 water complaints.

7.1.6 Health Advisory and Notification Procedures

In a loss of pressure situation, the Water Department contacts people and business in the effected area, as well as, contact DOH to inform the parties of the situation.

After pressure is restored, the City's crews flush the affected mains and issue boil water notices until acceptable samples and testing are achieved.

7.2 Water System and Control

7.2.1 Introduction

It is important for water utilities to have a program in place to ensure satisfactory operation of the water system and continuous reliability of critical system components.

This section describes the City's program for operation, monitoring and control of its various water system facilities. These facilities include eight groundwater wells, one emergency intertie (Peacock Hill Water System), six reservoirs, one booster pump station (Skansie Tank), nine pressure reducing stations, two master meters serving wholesale customers, and over 2,583 service connections. The City's telemetry system is also described in this section. The related activities performed by operations staff are identified, and the schedule for performing these tasks is presented.

Another significant responsibility of the Operations Division is routine maintenance of various water system components. This section discusses the City's preventive maintenance program for various system components, presents a review of recent maintenance activities, and summarizes the City's materials inventory. Finally, suggestions and recommendations are presented for the City's existing operation and maintenance program.

7.2.2 Major System Components

Locations of major system components are shown on Figure 1.6, Hydraulic Profile. Normal operations of each facility are described in Chapters 1 and 3 of the City's Water System Plan. Additional information on some City facilities is provided below.

7.2.2.1 Source

Table 7.2 provides operational information for each of the City's six wells currently online.

Table 7.2 Active Well Operational Data

Well Number	Well Name	Maximum Pumping Rate	Pressure Zone Served	Pump Type
2	Town Park	272	320	Turbine
3	High Level	626	440	Submersible
4	Harbor Heights	159	320	Submersible
5	North Creek	524	440	Submersible
6	North Creek	1,019	440	Submersible
8	Rushmore	12	450	Submersible
11	Well 11	1,000	450	Submersible

7.2.2.2 Storage

Table 7.3 provides details pertaining to the operation levels of each reservoir.

Table 7.3 City Storage Tanks

Storage Facility	Nominal Volume (MG)	Overflow Height (ft)	Overflow Elevation (ft)	Call Level (ft)	Shutoff Level (ft)
East Tank	0.23	16	318.5	310	311.5
Twin Harbor 2 Heights Tanks	0.5	30	317.2	317	319
Shurgard Tank	0.53	111	440.3	427	435
Skansie Tank	1.13	112	441.4	427	435
North Gig Harbor Tank	2.23	148	450	n/a(1)	n/a(1)
Total	**4.42**				

Notes:
(1) The booster pump station which supplies the zone served by the North Gig Harbor Tank is operated by system pressure, not by direct tank call levels.
Abbreviations: ft - feet; MG - million gallons.

7.2.2.3 Booster Pump

The sole booster pump, located near the Skansie Tank, is designed to provide 4,100 gallons per minute (gpm) at a head of 95 ft (41 pounds per square inch [psi]) and is used primarily for fire flows in the Bujacich area and to eliminate stagnant water at the Gig Harbor North tank by providing additional head at the Gig Harbor North tank.

7.2.2.4 Auxiliary Power

The City has one portable 200-kilowatt (kW) generator, which can be used to supply auxiliary power at any of the wells. Well Numbers 2, 3, 5, 6, and 7 are equipped with a manual transfer switch to accommodate the portable generator. Well 11 is equipped with an onsite automatic back-up diesel powered generator facility and automatic transfer switch.

7.2.3 Routine System Operation

The City performs routine operation and maintenance of the water system in accordance with the following schedule.

7.2.3.1 Three Days Each Week

- Observe well and tank sites for signs of vandalism or unauthorized trespass.
- Inspect and adjust chlorination equipment. Check and record chlorine residuals. Refill chlorine tanks as necessary.
- Record master meter readings.
- Check reservoir levels.

7.2.3.2 Monthly

- Collect routine coliform samples.
- Submit chlorination report to state.

7.2.3.3 Every Two Months

- Read service meters.

7.2.3.4 Annually

- Review and update Water Facilities Inventory.
- Submit Cross-connection Control Annual Summary Report.
- Prepare and distribute Consumer Confidence Report.
- Submit Annual Water Use Efficiency (WUE) Performance Report.

7.2.4 Preventive Maintenance

The most cost-effective method for maintaining a water system is to provide a planned preventive maintenance program. A planned preventive maintenance program can provide the optimum level of maintenance activities for the least total maintenance cost. In addition to routine maintenance, the City performs preventive maintenance according to the following schedule. Preventive maintenance procedures are described in the following sections.

7.2.4.1 Monthly

- Inspect/repair/replace service meters as requested.
- Inspect reservoir vents, hatches and overflows.

7.2.4.2 Quarterly

- Flush dead-end lines.

7.2.4.3 Annually

- Exercise valves and repair as necessary.
- Fire Department tests all fire hydrants, and Operations Division repairs the hydrants as necessary.
- Check and maintain Pressure Reducing Valve (PRV) stations.
- Inspect storage tank exteriors, including vent screens and the integrity of the access hatch and other openings into the tanks, and repair/replace as necessary. This inspection includes the condition of anchor bolts, access ladder, balcony and any other appurtenances.
- Calibrate source meters.

7.2.4.4 As Needed Basis

- Inspect storage tank interiors - conduct underwater video inspection.
- Update inventory of potential contamination in wellhead protection areas as required by WAC 246-290-135.

7.2.5 Pumps and Wells

The pumps and wells are complex units involving several major maintenance items. The most expensive and disruptive maintenance task in this area is the removal, repair and reinstallation of source pumps. Monitoring and recording pump discharge volume and pressure, along with water levels (static and pumping), documents performance, usually provides advance warning of excessive pump wear, and signals the need for pump replacement.

Maintaining sanitary conditions around each well site and monitoring activities in the wellhead protection area are also critical aspects of preventive maintenance. These activities are done on an ongoing basis. Wellhead protection is discussed further in Chapter 6.

7.2.6 Reservoirs

Improperly maintained reservoirs can lead to contamination of public water systems. Contaminants can enter the reservoir through cracks or openings at the vent, overflow or drain screens. Deteriorating hatch covers and vandalism can also compromise reservoir water quality. Poorly designed and maintained reservoirs can hamper the emergency operation of a water system. If reservoir drains do not function properly, it may be impossible to purge a contaminant from the system. Written documentation of reservoir maintenance is completed with each inspection and repair, and a copy of the report retained on file.

Shurgard tank will be next for recoating inside and out (per Capital Improvement Program [CIP]); North tank should follow with inspections for interior and exterior. Skansie tank was recoated in approximately 2011; Harbor Heights tanks #1 and #2 were recoated in 2014; East Tank was recoated in 2016. A record of reservoir maintenance over the last ten years is provided in Table 7.4.

Table 7.4 Water Storage Tank Maintenance

Location	Cleaned and Inspected	Coatings Interior	History Exterior	Next Scheduled Inspection
Shurgard Tank	2005	2020	2003	2020
Harbor Heights 1	2003	2014	2003	2026
Harbor Heights 2	2005	2014	2005	2026
Skansie Tank	1998	2011	2007	2020
East Tank	1998	2016	1991	2026
North Tank	1998	2020	2006	2020

Each tank must be cleaned and inspected for leaks at least once every five years. The City retains a contractor to provide an underwater video inspection of the tanks and prepare written and video reports. The reservoirs are recoated on an as-needed basis.

AWWA standards for storage tank disinfection allow for several alternative methods. The City's preferred method is to directly apply a strong chlorine solution to the inner surfaces of the structure. The recommended procedure is provided below.

A 200 parts per million (ppm) available chlorine solution is prepared by dissolving one ounce of High Test Hypochlorite (HTH) (65 percent calcium hypochlorite) to every 24 gallons of water. The powder should be made into a paste and then added to the water. This solution can be applied with suitable brushes or spray equipment. The solution should thoroughly coat all exposed surfaces, including the inlet/outlet piping and drain piping, such that the piping should have available chlorine of not less than 10 ppm when filled with water:

- The disinfected surface should remain in contact with the strong chlorine solution for at least 30 minutes. The interior surfaces of the reservoir should then be rinsed with potable water. The inlet/outlet and drain piping should be purged of the 10-ppm chlorinated water and the reservoir filled to overflow level.
- After the disinfection procedure is complete, and before the reservoir is placed in service, water from the full reservoir shall be sampled and tested for coliform organisms. Subject to satisfactory bacteriological testing, the remaining water may be delivered to the distribution system.

7.2.7 Distribution System Maintenance

7.2.7.1 Valves

The City exercises distribution valves on an annual basis. Leaking or non-operating valves are repaired or replaced as necessary. The City maintains a record for each valve in its Asset Management System that indicates its maintenance and repair history.

7.2.7.2 Fire Hydrants

The local fire department inspects each hydrant once a year and notifies the City if any hydrants need repair; if so, the Operations Division staff completes the necessary repairs. Hydrant maintenance history is recorded in the City's Asset Management System. An example of the interface can be found in Appendix N.

7.2.7.3 Watermain Flushing

The City currently flushes selected dead-end mains in the system quarterly and other mains as deemed necessary. Dead-end water lines are susceptible to water quality problems and require more frequent removal of stagnant water and debris that might have been deposited. The City maintains records of the amount of water used for all main flushing.

7.2.7.4 Meters

Accurate water metering is an essential financial and conservation-oriented component of water system infrastructure. Substantial revenue may be lost through inaccurate metering of residential, commercial and industrial accounts. Under-registered water used is now considered "leakage." The importance of accurate master or source meter readings cannot be overestimated. Without accurate master or source meter readings, the water utility cannot determine lost and unaccounted-for water volumes.

Service meters should be calibrated and/or replaced according to the following schedule:

- The 3/4-inch and one-inch meters should be tested every 15 years and replaced if necessary. Replacement is recommended if it is cheaper to replace meters than to test and, if necessary, repair meters.
- The two-inch through four-inch meters should be tested and calibrated every three to six years.
- The four-inch and larger meters should be tested and calibrated every one to three years.

The City examines service meters every two months for excessive use or defects so that they can be calibrated or replaced if necessary.

7.2.7.5 PRV Devices

Routine inspection and maintenance of PRV devices are critical for maintaining a working intertie between pressure zones. The valves are tested and serviced annually.

7.2.7.6 Leak Detection

Water loss through leakage is a serious problem for many public water systems. Besides increasing pumping costs, leaks can seriously undermine pipe bedding and trenching, resulting in property damage via roadbed and sidewalk collapse. Unattended leaks can increase in severity to a point that pressure loss or water outages can occur. The City owns its own testing equipment and conducts leak detection surveys for two or three days annually. The City directs the contractor to review areas where older watermains exist and where watermain problems exist or are anticipated. Based on the leak detection results, the City immediately schedules necessary repairs.

Conducting a comprehensive leak survey provides other advantages, including:

- Prioritizes watermain replacement.
- Reduces unaccounted-for water.
- Promotes water conservation.
- Reduces pump run time, resulting in lower energy costs.
- Increases overall system capacity.

7.2.8 Water Quality

The Operations Division routinely monitors water quality from each of its sources and throughout the distribution system.

The Coliform Monitoring Plan defines the locations of 14 sample stations representative of the population served by the water system. The City collects 10 samples monthly, except for the summer months, when nine samples are collected. The reduced sampling reflects the lower non-community school population during the summer months. The City also collects two source samples per month. Repeat sample sites have also been identified. Repeat samples are conducted within 24 hours of routine sampling when a routine distribution system sample is unsatisfactory. One sample is collected from the same site as the original coliform presence, plus a sample from each of the three repeat sites identified in The Coliform Monitoring Plan. The Coliform Monitoring Plan is included in the Appendix I.

Source monitoring includes inorganic, volatile and synthetic organic chemicals, and radionuclides on a schedule prescribed by the WAC. This monitoring is provided annually by the DOH. The 2017 Water Quality Monitoring Report is included in the Appendix J. Annual nitrate samples are collected from all wells during the third week of May. The City applies for monitoring waivers that the DOH offers.

In addition to the required samples, the City collects chloride samples from wells S03, S04 and S05 twice a year to track possible salt-water intrusion.

If water quality exceeds a primary water quality standard, the City will work with the Northwest Regional Office of the DOH to determine the cause of contamination and take appropriate follow-up actions, including public notification. In case of a confirmed fecal or E-coli coliform or nitrate contamination, public notification must be implemented within 24 hours.

7.2.9 Cross-Connection Control

The City actively implements a written Cross-Connection Control program, including annual testing of all assemblies installed at high health premises. The City evaluates new as well as existing service connections. A copy of the City's Annual Summary Report for 2016 is included in Appendix O. A Cross-Connection Control Ordinance 1331 was also adopted and became effective June 6, 2016. A copy of the ordinance is included in Appendix O.

7.2.10 Safety Procedures

Operations Division staff attend monthly safety meetings that cover various topics throughout the year. Minutes from these safety meetings are kept on file at the City. The City also provides training for employees in the following areas:

- Asbestos Pipe.
- Trenching, Flagging, and Cardiopulmonary Resuscitation (CPR).
- Confined Space Entry.
- Trenching.
- Backflow Testing.
- Electrical Training.

7.2.11 Inventory of Materials

The Operations Division maintains an inventory of water system-related components sufficient for routine maintenance and minor emergencies. Included in this inventory are distribution valves 10 inches and less, watermain lines and related appurtenances in diameter of 12 inches and under, and spare water meters in sizes two inches and smaller. The City relies on several equipment suppliers for parts and supplies. These suppliers are listed in the City's 2016 CEMP.

7.2.12 Record Keeping and Reporting

Readily accessible documentation of various type of information is critical to the long term reliability of the water system, and to insure efficient operation of various components of the system. The City maintains records of all new and replacement facilities, as well operation and maintenance procedures. The City complies with all of the DOH minimum recordkeeping requirements as listed in Table 7.5.

Table 7.5 DOH Minimum Recordkeeping Requirements

Record Type	Minimum Retention
Public Notifications.	3 years
Chlorine residuals and other water treatment performance records.	3 years
Action taken to correct violations of primary drinking water standards.	3 years
Other records of operation and analyses required by DOH.	3 years
Bacteriological sample results.	5 years
Master list of installed backflow preventers.	5 years or for the life of the approved backflow preventer, whichever is shorter.
Records regarding backflow incidents and annual summary reports.	5 years
Source Meter Readings.	10 years
Sanitary survey reports or communications.	10 years
List of service connections and/or consumer's premises that pose a cross-connection.	As long as hazard exists
Project reports, construction documents and related drawings, inspection reports and approvals.	For the life of the facility
Chemical analysis.	As long as the system is in operation
Disinfection profiling and benchmarking.	Indefinitely

The DOH requires certain records, sample results and events to be reported to the DOH within a prescribed schedule. Table 7.6 summarizes these items.

Table 7.6 Sample Results and Events

Report, Sample Result, or Event	Time Frame
Monthly chlorination and other treatment reports.	Before the 10th day of the following month.
Water Facilities Inventory.	Annually
Fecal coliform or E. coli in a sample.	By the end of the business day.
Coliform in a sample.	Within 10 days of notification by the laboratory.
Acute bacteriological violation or Nitrate violation.	As soon as possible, but no later than 24 hours after the violation is known.
Failure to comply with any national primary drinking water regulation (including failure to comply with any monitoring requirements).	Within 48 hours.
Consumer confidence Report.	July 1.
WUE Annual Performance Report.	July 1.
Cross Connection Annual Summary Report.	Yearly in March or April.
A backflow incident is known by the purveyor to have either contaminated the public water system; or has occurred within the premises of a consumer served by the City.	As soon as possible, but no later than the end of the next business day (notification of local authority having jurisdiction, and local health department is also required).

7.3 Emergency Response

7.3.1 Introduction

Utility Emergency Planning can be defined as the activities that prepare a utility to respond to an emergency situation. Emergencies can be small or large with respect to their effects on utility operation and service.

Many utilities cope with smaller scale or "routine" emergency situation frequently, perhaps weekly or daily. Larger scale or "disaster" emergency situations occur far less frequently, but many aspects or effects of a disaster manifest themselves in the same way as the routine emergencies. In many respects, a disaster can be considered the simultaneous occurrence of many smaller scale emergencies. If a utility is well prepared to handle the routine emergencies, it will be better prepared to handle disasters.

The operation of the water system under emergency conditions is an important responsibility of City staff. Emergency contact information, including City staff and DOH contacts, are located below in Table 7.7.

Table 7.7 Emergency Contact Information

Contact Agency	Contact Phone Number
City of Gig Harbor	
Shop	(253) 851-8406
Public Works On-Call	(253) 530-6888
WWTP	(253) 851-8999
WWTP On-Call	(253) 377-0549
Shared	(253) 377-3995
Association of Washington Cities	(800) 824-1609
DOH (Water) After Hours Emergency Line	(877) 481-4901
DOH (Water) Day Time Emergency Line	(253)-395-6757
Pierce County	
Health Dept. (Water)	(253) 798-7683
Health Dept. (Sewer)	(253) 798-6470
Parks (Maintenance)	(253) 537-9203
Public Works Road	(253) 798-7250
Maint. (Purdy) Sheriff	(253) 798-6000
Signs/Signals	(253) 798-4722
(traffic sig)	(253) 531-6990
Army Corps of Engineers (water debris)	(206) 764-3406
Century Tel	(800) 550-8110
Comcast (Emergency Repairs)	(253) 896-5688
Washington State Department of Ecology (spills)	(360) 407-6242
Department of Emergency Management Emergency Operations Center	(253) 798-7470

Contact Agency	Contact Phone Number
Washington State Department of Transportation:	
Signs	(253) 536-6089
Road Shop (potholes)	(360) 874-3050
Claims	(800) 737-0615
Traffic Signals (24 hr.)	(253) 536-6089
Traffic Signal Maintenance	(360) 357-2616 (800) 260-4214 - after hours
Fire Com (911)	(253) 581-3888
Fire Department	(253) 851-3111
Peninsula Light Co. (Operations)	(253) 857-5950
Peninsula School District - Transportation	(253) 530-3900
Police	(253) 851-2236
Puget Sound Energy - Emergency Number	1-888-225-5773
Purdy Transfer Station	(253) 847-7555
Utility Locating Service	1-800-424-5555

The City updated its Emergency Response Plan (ERP) in 2016 and is now referred to as the 2016 CEMP. The CEMP includes responses to the finding of the Vulnerability Assessment. This plan is intended to be implemented in coordination with other emergency planning documents such as the City Employee Emergency Procedures Handbook and the Gig Harbor/Key Peninsula Regional Emergency Plan. The CEMP is not included in this document due to the inclusion of personal information (emergency contact numbers) and the desire to keep just one emergency response document current and as useful as possible. The CEMP is available for review by authorized agencies as necessary and approved by the Operations Division Director.

The updated CEMP includes the key components of the previous ERPs, including an Emergency Call-Up List, Notification Procedures (including sample notifications), basic guidance for responding to emergency situations, and Action Plans for responding to specific types of major emergency events. The Plan also includes names and numbers for contractors, suppliers, critical customers and other agencies to contact in case of an emergency. These should be updated annually.

7.3.2 Emergency Response Procedures

Although it is not possible to anticipate all potential disasters affecting the City water system, formulating procedures to manage and remedy several common emergencies is appropriate. Step-by-step procedures for the most frequent emergency situations such as severe power outages, snow/ice storms, flooding, earthquakes, major fire and water contamination are included in the following sections. The 2016 CEMP provides additional information in the form of more detailed Action Plans for these and other, less common threats.

7.3.2.1 Power Failure

Various types of weather can cause loss of power, such as wind, lightning, freezing rain and freezing snowstorms. Traffic accidents can also cause power outages. The City owns a 200-kW portable generator to alleviate the effects of a power outage. Each City well is equipped with a manual transfer switch so that the portable generator can be connected to the well pump.

During a City-wide power outage, the combined storage of 4.42 MG will provide adequate water for the City for more than two days of average demand, with the largest pump completely out of service through the year 2028. The reservoirs currently contain storage for approximately 2.75 days at average daily use when full. City personnel will first check reservoir levels. Peninsula Light Company will be contacted at (253) 857-5950 to determine the estimated length of the power outage to each well area. If the outages are expected to last for several days, the City will notify its customers and request water conservation through radio, television, newspaper and/or police loudspeaker.

Table 7.8 presents the potential effects of a lengthy power failure on the water system components and recommended actions.

Table 7.8 Emergency Response Procedures for a Power Failure

Water System Component	Potential Effects	Recommended Actions
Transmission and Distribution System	• No effect.	• None.
Storage Facilities	• Telemetry system may be inoperable.	• Manually check reservoir levels.
Source Wells	• Well pumps will be inoperable without auxiliary power.	• Operate portable generator at the well deemed most appropriate.

7.3.2.2 Severe Snow/ Ice storm

A severe snow or ice storm will limit motor vehicle traffic, including the transportation of City personnel, and may affect the electrical power supply. Table 7.9 provides emergency response procedures for a severe snowstorm.

Table 7.9 Emergency Response Procedures for Severe Snowstorm

Water System Component	Potential Effects	Recommended Actions
Transmission and Distribution System	• Transportation of staff to various facilities for monitoring system and making repairs will be limited.	• Contact county or state highway department to expedite plowing of problem areas, keep chains or other snow gear for maintenance equipment on hand and keep valve locations current and available to maintenance personnel.
Storage Facilities	• No immediate effect, snow may prevent access.	• Clear snow from access roads.
Source Wells	• No direct immediate effects. Well pumps will be inoperable without auxiliary power if electrical supply is affected.	• Monitor availability of each well. • Operate portable generator at the well deemed most appropriate if electrical supply is affected.

7.3.2.3 Flooding

Heavy snowmelt and/or rains have the potential to cause flooding and landslides in the City. Table 7.10 presents emergency response procedures for flooding.

Table 7.10 Emergency Response Procedures for Flooding

Water System Component	Potential Effects	Recommended Actions
Transmission and Distribution System	• Transportation of staff to various facilities for monitoring system and making repairs will be limited.	• Increase frequencies of bacteriological tests (engineering samples) to assure water quality is not affected and observe conditions at bridges and prepare to close off washed-out pipes if necessary.
Storage Facilities	• No immediate effect; access may be limited.	• None.
Source Wells	• No direct immediate effects.	• None.

7.3.2.4 Earthquake

A severe earthquake could result in transmission line breaks, distribution system breaks, and structural damage to the reservoirs, wells and vaults that house critical valving and meters. A severe earthquake may not only have a substantial impact on the City water system but also on adjacent purveyors. Table 7.11 lists the potential effects of a severe earthquake on water system components as well as recommended actions.

Table 7.11 Emergency Response Procedures for Earthquake

Water System Component	Potential Effects	Recommended Actions
Transmission and Distribution System	• Transportation of staff to various facilities for monitoring system and making repairs will be limited. • Watermain or piping breaks, especially in fill areas and where pipes enter various types of structures (pump houses, vaults, bridge abutments).	• Isolate broken sections as they are located. • Check reservoir level. • Notify water customers of emergency and request customers to conserve water. • Shut down source pumps. • Repair break. • Disinfect isolated section.
Storage Facilities	• Reservoirs may be leaking or structurally damaged.	• Observe structures for visual signs of structural damage, leakage, cracks, etc. Also check storm drainage system in the vicinity for significant flows. • If non-observable leakage is suspected, isolate one reservoir at a time and monitor water level for at least 24 hours. • If structural damage is apparent, drain reservoir and inspect the interior of the tank.
Critical Valving and Meters		• Inspect all meter and valve vaults following a major earthquake to check for joint leakage caused by earth movements.
Source Wells	• Damage to piping systems. • Change to geological formations.	• Inspect all supply facilities for leakage or other structural damage. • Monitor static and pumping water levels.

7.3.2.5 Fire

An extensive fire may result in low distribution system pressures and drawing down of the City's reservoirs. Table 7.12 presents emergency response procedures for a major fire.

Table 7.12 Emergency Response Procedures for Major Fire

Water System Component	Potential Effects	Recommended Actions
Transmission and Distribution System	• Low pressure may occur in the extremities of the distribution system, depending on the extent of the fire demand.	• Monitor reservoir levels.
Storage Facilities	• Drawdown will occur with increased demand.	• Monitor reservoir levels.
Source Wells	• Additional pumps will be called on.	• No action.

In the event of a localized or limited loss of pressure in the distribution system, the department contacts residents and business in the affected area and inform DOH.

After pressure is restored, crews flush affected mains and issue boil water notices until acceptable samples and testing are achieved.

7.3.2.6 Contamination of the Water Supply

The water supply may be contaminated as a result of events like main breaks, cross- connections or pollution at an isolated source. Fecal or E-coli bacteriological and nitrate contamination are high public health risks and must be addressed immediately, including notification of all users within 24 hours. Other contaminants, while of concern, do not pose immediate health concerns and can be addressed over a longer period of time. The DOH (Northwest Regional office 253-395- 6750, after-hours number 1-877-481-4901) must be contacted whenever a primary contaminant level has been exceeded. DOH will work with the City to determine a course of action and assist with public notifications, if requested by the City.

The type or level of contamination present may not be known in breaches of security to storage tanks and source wells, and in some cross-connection events. DOH should be contacted to determine the appropriate course of action, including the potential contaminants that should be analyzed and to assist in locating a certified laboratory, if necessary.

Table 7.13 presents general emergency response procedures for contamination of the water system.

Table 7.13 Emergency Response Procedures for Contamination of the Water Supply

Water System Component	Recommended Actions
Transmission and Distribution System	• Close valves as required to isolate source of contamination. Repair and/or otherwise remove source of pollution. • Flush previously contaminated section and test until free of contamination prior to resumption of use. • Use de-chlorination methods to avoid chlorinated water from entering surface water.
Storage Facilities	• Isolate contaminated reservoir from the distribution system and decide on method of disinfection. • Consider draining, cleaning, and disinfecting reservoir if water is determined to be unsuitable for consumption. • Use de-chlorination methods to avoid chlorinated water from entering surface water. • Disinfect reservoir with chlorine in accordance with AWWA standards - take bacteriological samples and return to service when results are satisfactory.
Source Wells	• Close valves as required to isolate the source of contamination. • Repair and/or otherwise remove source of contamination. • Flush previously contaminated section and test until free of contamination prior to resumption of use. • Use de-chlorination methods to avoid chlorinated water from entering surface water.

Chapter 8
CAPITAL IMPROVEMENT PROGRAM

8.1 Introduction

This chapter summarizes the City of Gig Harbor's (City) comprehensive Capital Improvement Program (CIP) for the water system that is based on the analyses presented in previous Chapters. The purpose of the CIP is to provide the City with a guideline for planning and budgeting of its water system. The CIP consists of schedule and cost estimates in future dollars, assuming an annual inflation rate of three percent from initial cost estimates in March 2018 dollars, for each project.

8.1.1 Capital Project Categories

Capital projects can be categorized by the nature of infrastructure. These included:

- Supply Projects (S).
- Distribution System Capacity Improvements:
  - New Water Main Projects (N).
  - Upsize Projects (U).
- Storage Projects (ST).
- Asbestos Cement (AC) Replacement Projects (R).
- General Projects (G).

The above abbreviations were used as the initial letter in the Project Identification and aid in delineating the project category.

8.1.2 Capital Planning Periods

CIP projects were allocated into one of two planning periods referenced in previous chapters:

- Short-term (2018-2027).
- Long-term (2028-2037).

Projects within the short-term planning horizon were allocated to individual years to be consistent with the City's CIP planning. Projects in long-term planning horizons do not provide the same level of specificity, reflecting the uncertainty in future needs and City resources. The project timing in this Chapter is subject to change, as the City regularly reviews and updates its CIP based on changing conditions and priorities.

8.2 Cost Estimating Assumptions

8.2.1 Cost Estimate Level

The CIP cost estimates presented in this chapter are American Academy of Cost Engineers (AACE) Class 4 estimates. Class 4 estimates are budget level estimates. Actual costs may vary from these estimates by -30 percent to +50 percent. These costs were determined based on the City's and Carollo Engineers, Inc.'s (Carollo) perception of current conditions at the project locations.

All cost estimates were done using March 2018 dollars. The Engineering New Report (ENR) U.S. 20-City Construction Cost Index for March 2018 is 10,959. The estimates are subject to change as the project design matures. Cost of labor, materials, and equipment may vary in the future.

All project costs are in present dollars, unless indicated otherwise. A three percent annual inflation rate was applied when determining project costs in future dollars. For City-provided projects or cost estimates, all costs were assumed to be in future dollars. These project costs were discounted to present dollars assuming the same three percent annual inflation rate.

8.2.2 Cost Estimates Elements

The total project cost estimates were based on construction costs that are inflated using cost factors to account for non-construction project elements. The cost factors for the Water System Plan (Plan) are shown in Table 8.1. For a typical project, the cost factors would increase the construction costs by 45 percent to represent the total project cost. No cost factor was applied to projects costs provided by the City.

Table 8.1 Cost Factors

Adjustment Factors	Description	Factor
Contingency	Costs that may occur due to uncertainty in project scope and conditions.	30%
Engineering/Legal/Admin/Planning	Cost for planning, design, and to administer the project.	15%

8.2.3 Pipeline Unit Costs

Pipeline unit cost assumptions are shown in Table 8.2. These costs were developed from similar projects. To be conservative, these unit costs assume open-trench construction in improved areas. If trenchless construction is possible for some projects, the cost estimates may need to be modified. Costs include pavement cutting, excavation, hauling, shoring, pipe materials and installation, backfill material and installation, and pavement replacement. The unit costs are for construction in stable soil at a depth ranging between 3 to 5 feet. Steep slopes, extensive permitting, or acquisition of right of way may result in additional costs. These costs are construction costs only and do not include the Contingency and Engineering/Legal/ Admin/Planning cost factors.

8.2.4 Well Costs

New well project costs were developed based on construction costs for the City's Well 11 project. A total cost of $2,500,000 was used for drilling and constructing the well.

Table 8.2 Pipeline Unit Construction Costs

Pipe Size (Inches)	Pipeline Unit Cost (Amount Per LF)(1)
8	$180
10	$200
12	$220
16	$240
18	$260
24	$310
Trenchless Installation(2)	$500

Notes:
(1) Pipeline unit costs are for construction only.
(2) Cost for trenchless installation of 12 inch pipe and casing.
Abbreviations: LF - linear foot.

8.2.5 Additional Costs

Other costs for the CIP included costs for a pressure reducing valve (PRV) station. Unit construction costs were based on similar projects and are shown in Table 8.3.

Table 8.3 Additional Construction Costs

Type	Unit Cost
PRV Station	$100,000

8.3 Capital Improvement Projects

CIP projects are based on analyses in previous chapters. The CIP projects are summarized in Table 8.6 and are in March 2018 dollars. Table 8.7 summarizes the CIP projects in escalated dollars. The tables present the costs for the short- and long-term planning horizons. The tables also provide a total project cost and average annual cost for all CIP items. The locations of CIP projects are shown at the end of this Chapter in Figure 8.1.

8.3.1 Supply Improvements

The City's existing and planned supply meets the current and short-term projected demands. It is the City's goal to meet the maximum day demand with the largest source out-of-service. This increases the reliability and redundancy of the City's water supply system.

Based on the supply analysis presented in Chapter 4, the City does not need an additional source within the next 20 years. It is projected that the City will need to develop an additional supply source near the 20-year mark. However, the storage analysis performed in Chapter 4 recommended a new well in the 450 Zone to help mitigate storage deficiencies.

Additionally, the City's largest well (Well 6) contains high levels of iron and manganese and therefore it is recommended that the water be treated. There are numerous different treatment options available; for planning purposes a granular media filtration system is considered.

8.3.1.1 Well 9 and PRV Station (S-01)

Well 9 is recommended for redundancy of the groundwater supply system. This will mitigate the need for additional standby (emergency) storage in storage tanks. This improvement is consistent with the City's operational goals of investing in its supply sources to make for a more redundant and reliable system. Well 9 is anticipated to have a production capacity of 1,000 gallons per minute (gpm). A PRV station will be constructed in conjunction with development of Well 9.

The City is investigating opportunities for water reuse and reclamation and considering development of reuse and reclaimed water facility in conjunction with Well 9. Costs for this project will be updated as the City further evaluates these opportunities.

This project is planned in the short-term, from 2023 to 2025. This cost estimate was based on the well unit construction costs and additional costs provided by the City. The project is estimated to cost $3,774,000.

8.3.1.2 Well 3 – Clean and Inspect Well Casing (Well 3) (S-02)

The well casing for Well 3 will be cleaned and inspected in 2019 at a cost of $243,000. This project cost was provided by the City.

8.3.1.3 Well 6 Treatment System (S-03)

The City's 2008 Plan identified the need for a treatment system to address high levels of iron and manganese at Well 6. The updated water quality analysis, as shown in Chapter 4 of this Plan, indicates that this need still applies. The treatment system will consist of pressure vessel filters and chemical feed facilities, including drums for chemical storage and chemical feed pumps. The design of the system requires further development, however, it would likely consist of 8 to 12 pressure vessels of roughly 48-inch diameter. The vessels will contain a granular media, likely pyrolusite, a granular from of manganese dioxide. Chlorine will be fed to the water prior to entering the pressure vessels to partially oxidize the iron and manganese, so that the iron and manganese become attached to the filter media. A building would likely be included to house the chemical feed facilities and control systems. The land required for the treatment system is estimated to be approximately 12,000 square feet (sf), inclusive of a building for the treatment equipment, and appropriate land area within a perimeter fence. Additional land may be required if a finished water storage tank is required or if a backwash water recovery tank is required. The cost for this project was based on the previous Plan update's cost of $1,740,000 updated to current dollars and additional City-provided costs. This project is estimated to cost $2,408,000 and is planned to be completed in 2030 and 2031.

8.3.1.4 Conjunctive Supply Strategy (S-04)

The City's Conjunctive Supply Strategy project allocates funds for the City's long-term supply development. This project funds the City's efforts to secure additional water rights and assist with well design and construction. A total of $170,000 was included for this project, split between 2023 and 2024. This project cost was provided by the City.

8.3.1.5 Emergency Intertie (Canterwood Water System) (S-05)

This project will connect the Peninsula Light Company's supply to the City's 12-inch main on Burnham Drive Northwest in the northwest corner of the City's 450 Zone. This intertie will provide emergency supply to the surrounding area, including St. Anthony's Hospital, in the event the water main to the south is unable to provide water. It is assumed this project will require the City to construct a PRV station and 1,000 LF of 12-inch main to connect the two water systems. This cost estimate is based on unit construction costs for pipeline and a PRV station as well as additional costs provided by the City. This project is estimated to cost $378,000 and is planned to be completed in 2019.

8.3.1.6 Well 11 (S-06)

The City is completing construction of Well 11 in 2018. This project is bonded for $3,000,000.

8.3.2 Distribution System Capacity Improvements

Distribution system improvements projects are broken down into two categories: new main extension projects and pipe upsize improvements. Details on both categories of projects are provided below.

8.3.2.1 New Main Extension Projects

The City recognizes that specific development projects will require extension of the current pipe network. These extensions will be primarily through installation of water mains that may include looping (service from two directions) in order to provide reliable service and enhance fire protection. The City will continue to support size increase opportunities with developer extensions. These projects are described below and summarized in Table 8.4.

Canterwood Boulevard NW and Bering Street NW (N-01)

This project consists of connecting the 8-inch Ductile Iron (DI) pipe in Bering St NW to the eight-inch DI pipe in Canterwood Boulevard NW with 808 feet of 12-inch DI pipe. This creates a loop and provides redundancy for the Gig Harbor North area. It is also necessary to ensure adequate pressure on Bujacich Road NW and other areas. This project is planned for the long-term period, in 2030, and the project cost is estimated to be $258,000.

Sehmel Drive NW and Burnham Drive NW (N-02)

This project consists of approximately 4,323 feet of 12-inch DI pipe constructed along Sehmel Drive NW connecting the main in Bujacich Road NW to the stub under SR-16 along Burnham Drive. Trenchless construction is assumed to be required for 300 feet to cross underneath SR-16, with the remainder to be open cut construction. This project is planned for the long-term period, in 2029, and the total cost is estimated to be $1,501,000.

Vernhardson Street and Burnham Drive NW (N-03)

This project consists of extending 1,674 feet of 12-inch DI from the existing 12-inch DI pipe in Vernhardson Street to the intersection of Burnham Drive NW. This project is planned for the short-term period, in 2022, and the total cost is estimated to be $534,000.

Olympic Drive and Hollycroft Street (N-04)

This project consists of extending 184 feet of eight-inch DI between Olympic Drive NW and Hollycroft Street. This improvement will increase looping in the area and fire flow availability in the Olympic Village. This project is planned for the short-term period, in 2020, and the total cost is estimated to be $59,000.

8.3.2.2 Pipe Upsize Improvements

Approximately 5,754 feet of pipe is recommended to be upsized in the distribution system. Pipe upsize improvements are mainly driven to meet level of service goals during fire flow condition. Pipe upsizing projects are described below and summarized in Table 8.4.

Grandview Street Between Stinson Avenue and Pioneer Way (U-01)

This project consists of upsizing 441 feet of existing 6-inch AC to 12-inch DI along Grandview Street between Stinson Avenue and Pioneer Way. This project is planned for 2019 and the project cost is estimated to be $466,000. This cost was provided by the City.

Shore Acres (U-02)

This project consists of upsizing 186 feet of existing 6-inch AC to 8-inch DI that connects to the Shore Acres meter. This project is planned for the long-term, in 2028, and the project cost is estimated to be $49,000.

Shore Acres (U-03)

This project consists of upsizing 135 feet of existing 6-inch DI to 8-inch DI that connects to the Shore Acres meter. This project is planned for the long-term, in 2028, and the project cost is estimated to be $35,000.

Shurgard Tank to Soundview Drive (U-04)

This project consists of upsizing 283 feet of existing 8-inch AC to 12-inch DI from Shurgard Tank to Soundview Drive. This project is planned for 2023 and the project cost is estimated to be $90,000.

Shurgard East Tee (U-05)

This project consists of upsizing 515 feet of existing 8-inch to 12-inch DI at the Shurgard East Tee. This project is planned for 2023 and the project cost is estimated to be $164,000. Project U-05 is needed to provide sufficient pressure during fire flow. Current piping from the Shurgard tank is only an 8-inch pipe. The tank needs to be able to supply 3,000 gpm for fire flow in the vicinity. The 8-inch pipe creates a lot of headloss in the system resulting in insufficient pressure during fire condition.

Olympic Village Loop (U-06)

This project consists of upsizing 714 feet of existing 8-inch polyvinyl chloride (PVC) to 12-inch DI along the Olympic Village Loop. This project is planned for 2024 and the project cost is estimated to be $228,000.

Reid Drive NW Between 56th Street NW and 55th Street NW (U-07)

This project consists of upsizing 578 feet of existing 6-inch DI to 8-inch DI along Reid Drive NW between 56th Street NW and 55th Street NW. This project is planned for 2023 and the project cost is estimated to be $151,000.

Deer Creek Lane (U-08)

This project consists of upsizing 202 feet of existing four-inch PVC to eight-inch DI along Deer Creek Lane. This project is planned for 2024 and the project cost is estimated to be $53,000. This project consists of upsizing a four-inch dead-end and the project should be completed as funding becomes available and opportunity arises.

Stinson Ave Between Rosedale Street NW and Pioneer Way (U-09)

This project consists of upsizing approximately 2,700 feet of existing eight-inch AC to 12-inch DI along Stinson Ave between Rosedale Street NW and Pioneer Way. This project is planned for 2019, with an estimated cost of $1,456,000. This project cost was provided by the City.

8.3.2.3 Summary of Distribution System Improvements Projects

The new main extension projects and pipe upsize projects are shown in Table 8.4; costs are shown in current and future dollars. Pipe sizes identified are minimum accepted diameters and may vary based on actual development requirements. Larger diameters may be necessary if only a portion of the pipe is constructed, if higher than anticipated demands are required, or ground elevations vary from the estimates.

Table 8.4 Distribution System Improvement Projects

Project ID	Pressure Zone	Location	Length (ft)	Ex. Size (inches)	Proposed Size (inches)	Total Project Cost (Current $)	Total Project Cost (Future $)	Project Timing
N-01	450	Canterwood Blvd NW and Bering Street NW	808	-	12	$258,000	$368,000	2030
N-02	450	Sehmel Drive NW and Burnham Drive NW	4,323	-	12	$1,501,000	$2,078,000	2029
N-03	450	Vernhardson Street and Burnham Drive NW	1,674	-	12	$534,000	$601,000	2022
N-04	440	Olympic Drive NW and Hollycroft St	184	-	8	$59,000	$63,000	2020
U-01	440	Grandview Street between Stinson Ave and Pioneer Way	441	6	12	$466,000	$480,000	2019
U-02	440	Shore Acres	186	6	8	$49,000	$66,000	2028
U-03	440	Shore Acres	135	6	8	$35,000	$47,000	2028
U-04	440	Shurgard Tank to Soundview Drive	283	8	12	$90,000	$104,000	2023
U-05	440	Shurgard East Tee	515	8	12	$164,000	$190,000	2023
U-06	440	Olympic Village Loop	714	8	12	$228,000	$272,000	2024
U-07	440	Reid Drive NW between 56th Street NW and 55th Street NW	578	6	8	$151,000	$175,000	2023
U-08	440	Deer Creek Lane	202	4	8	$53,000	$63,000	2024
U-09	320/440	Stinson Ave between Rosedale St NW and Pioneer Way	2,700	8	12	$1,456,000	$1,500,000	2019
Total			**12,743**					

8.3.3 AC Main Replacement Program (R-01)

The City attempts to replace AC mains within the system as scheduling and financing allow. These projects may be funded by the City, a developer, as part of a utility local improvement district (ULID), or by other means or a combination of these methods. The City has replaced many of the AC mains designated for replacement in the previous plan. There are approximately 38,500 LF of AC pipes remaining within the system, ranging in size from four inches to 12 inches. Existing AC mains are assumed to be replaced with pipe of the same size, with a minimum eight-inch diameter. These mains are projected to be replaced throughout the planning period. An annual program beginning in 2021, running through the long-term planning period (2037), will address continued AC main replacement efforts at an annual cost of $250,000. This annual program cost was provided by the City.

8.3.4 Storage Projects

8.3.4.1 Tank Recoating (ST-01)

The City performs periodic maintenance of their existing storage tanks as needed. This project covers recoating of the City's tanks. Tank recoating will take place in 2020 and 2026, with a total project cost of $1,543,400 in current dollars. This project cost was provided by the City.

8.3.5 General Projects

General projects are additional projects identified by the City and are presented in Table 8.5. The project costs and timing of these projects are based on information provided by the City.

Table 8.5 General Projects

Project ID	Project Name	Total Projected Cost (Current $)	Total Projected Cost (Future $)	Timing
G-01	Water System Plan Update	$750,000	$1,014,000	2018; 2027; Long-Term
G-02	Reuse and Reclaimed Water Study Phase Two	$50,000	$53,800	2020-2021
G-03	Water Share of Public Works Operations Building	$284,000	$300,300	2019-2020
G-04	Water Share of Public Works Decant Facility	$377,000	$400,000	2020
G-05	Water Share of Public Works Operations - Site Development	$961,000	$990,000	2019
G-06	Water Share of Satellite Reuse Plant in Waste Water Basin 12	$4,600,000	$6,343,000	2028-2029

8.3.6 Summary CIP

The City's complete CIP is presented in Appendix N. The short-term and long-term costs are summarized by project type in Table 8.6 and Table 8.7. Table 8.6 presents all CIP costs in current dollars while Table 8.7 presents all CIP costs in future dollars. The total short-term CIP cost is $16,084,000 ($17, 969,000 future dollars), or $1,608,000 per year ($1,797,000 future dollars). Long-term CIP project costs are $11,391,000 ($16,397,000 future dollars) or $1,139,000 per year ($1,640,000 future dollars).

Table 8.6 Gig Harbor CIP Summary (Current Dollars)

Type	Short-Term Costs	Long-Term Costs	Total Cost
New Water Main Projects	$593,000	$1,759,000	$2,352,000
Pipe Upsize Projects	$2,608,000	$84,000	$2,692,000
Storage Projects	$1,543,000	$0	$1,543,000
Supply Projects	$7,565,000	$2,408,000	$9,973,000
AC Replacement Projects	$1,603,000	$2,290,000	$3,893,000
General Projects	$2,172,000	$4,850,000	$7,022,000
Total	**$16,084,000**	**$11,391,000**	**$27,475,000**

Table 8.7 Gig Harbor CIP Summary (Future Dollars)

Type	Short-Term Costs	Long-Term Costs	Total Cost
New Water Main Projects	$664,000	$2,446,000	$3,110,000
Pipe Upsize Projects	$2,784,000	$113,000	$2,897,000
Storage Projects	$1,800,000	$0	$1,800,000
Supply Projects	$8,483,000	$3,529,000	$12,012,000
AC Replacement Projects	$1,918,000	$3,528,000	$5,446,000
General Projects	$2,320,000	$6,781,000	$9,101,000
Total	**$17,969,000**	**$16,397,000**	**$34,366,000**

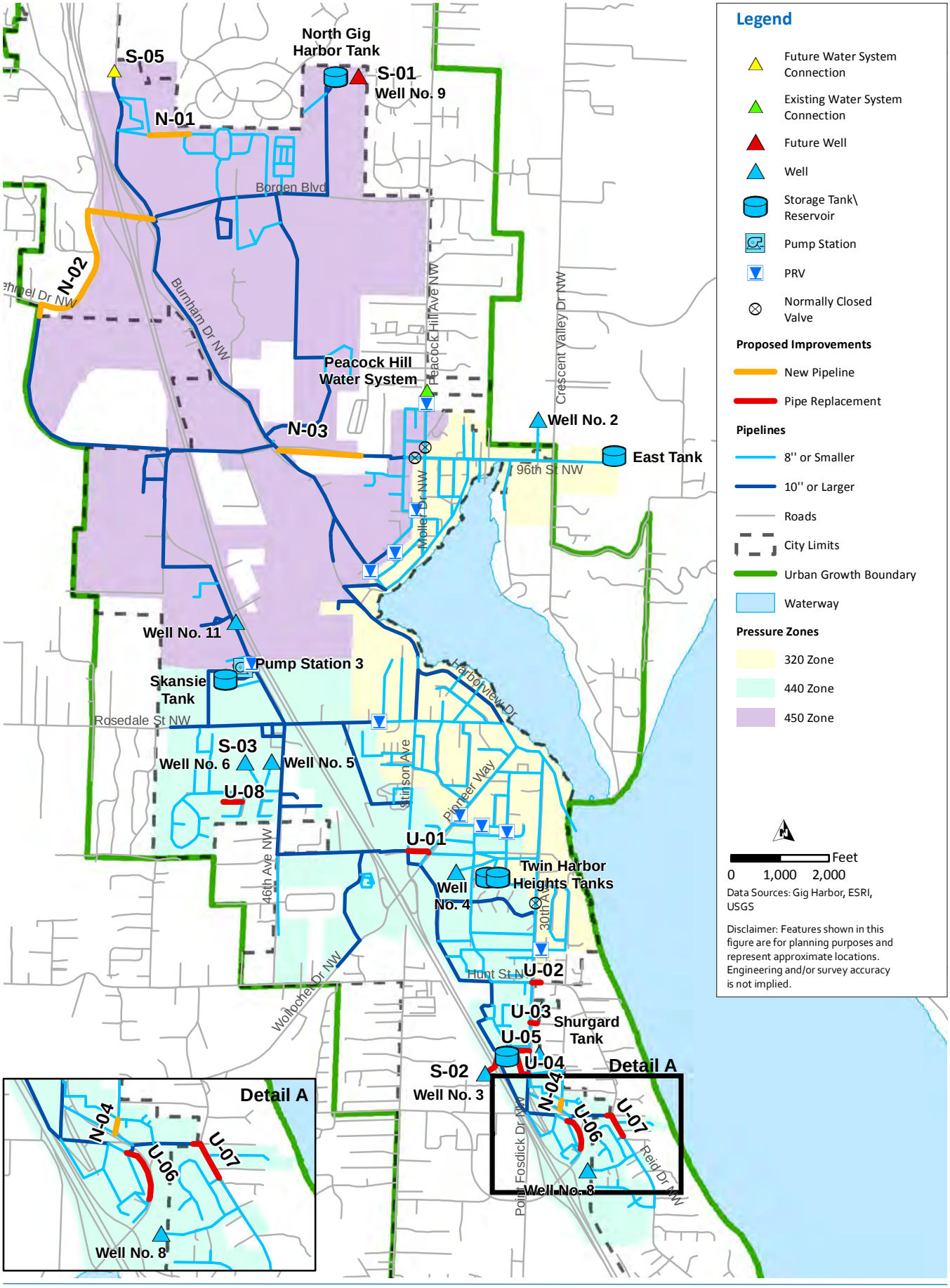


Figure 8.1 CIP Projects

Chapter 9

FINANCIAL PLAN

9.1 Introduction

An assessment of the current financial status of the water utility is provided below, followed by a projection of future cash flows and the ability of the utility to fund planned capital improvements using existing rate revenues or with recommended adjustments.

9.2 Existing Rates and Charges

Table 9.1 lists current monthly water rates for the different types of customers and rate adjustments scheduled for implementation in 2019 and 2020 (City Ordinance No. 1319). Monthly base charges are based on the size of a customer's meter and the overall demands placed on the system by the class as a group such as peaking factors and fire flow demands. The rates for larger meters are primarily based on the flow capacity for each meter as specified by the American Water Works Association. The commodity charge applies to all metered water use and only varies due to the customer class. The minor variations in the commodity charges for the three different customer classes are a result of each classes' different impact on the system during the summer as determined by peaking ratios between winter and summer water usage.

Table 9.1 Existing Monthly Water Rates and Adopted Increases

Customer Class / Meter Size (inches)	Monthly Base Charge ($)	Commodity Charge ($/CCF)	2019 Rate Increase	2020 Rate Increase
Residential	18.69	2.44	4.0%	4.0%
Multi-residential				
5/8 and 3/4	32.84	2.28	4.0%	4.0%
1	45.2	2.28	4.0%	4.0%
1-1/2	75.84	2.28	4.0%	4.0%
2	112.74	2.28	4.0%	4.0%
3	211.07	2.28	4.0%	4.0%
4	321.81	2.28	4.0%	4.0%
Commercial/Schools				
5/8 and 3/4	27.54	2.37	4.0%	4.0%
1	36.37	2.37	4.0%	4.0%
1-1/2	58.2	2.37	4.0%	4.0%
2	84.51	2.37	4.0%	4.0%
3	154.67	2.37	4.0%	4.0%
4	233.66	2.37	4.0%	4.0%

Notes:
(1) Rates do not include State or City taxes.
Abbreviations: CCF - hundred cubic feet.

9.2.1 General Facility Charge

The City of Gig Harbor (City) also receives revenue from a general facility charge (GFC). A GFC is a one-time only fee that is paid by all new customers connecting to the water system or by those customers who increase their meter size. The fee starts at $7,300 for a standard 3/4-inch meter (used by most single-family residences) and increases to $38,909 for a two-inch water meter. The City uses revenues from GFCs solely for funding capital improvements.

9.3 Existing Cash Flows

Table 9.2 lists annual operating revenues and expenses for 2015 through 2017. Table 9.3 presents the resulting annual net revenue from operations based on the cash flows in Table 9.2. In each of these years, the water utility generated sufficient revenue from monthly service rates to fund operations as well as paying the annual debt service (approximately $300,000) on outstanding water utility loans and bonds. The data in Table 9.2 is based on data provided by the City and amounts in 2015 and 2016 are actuals while the 2017 amounts are based on the City's currently adopted biannual budget.

Table 9.2 Historical Operating Revenues and Expenses

Revenues and Expenses	2015	2016	2017 Department Requirement
Operating Revenues			
Water - State Utility Taxes	$76,755	$87,397	$93,693
Water Sales	$1,625,290	$1,844,322	$1,956,025
All Other(1)	$28,189	$16,055	$13,300
Total Revenues	**$1,730,234**	**$1,947,774**	**$2,063,018**
Operating Expenses			
Admin - Public Works	$210,338	$226,893	$337,350
Admin and General Operation	$300,637	$310,530	$357,650
Maintenance - Wells	$207,225	$209,144	$414,600
Maintenance - Lines	$257,059	$345,240	$284,125
Maintenance - Meters	$46,231	$82,666	$120,900
Maintenance - Hydrants	$2,657	$600	$21,600
Customer Service - Meter Reading	$23,573	$26,249	$35,300
Customer Service - Billing Accounts	$44,841	$38,162	$39,200
Operations	$71,305	$91,749	$71,315
Inspection Services	$6,702	$9,038	$13,200
Capital Projects	$29,041	$7,150	$57,300
Total Expenses	**$1,199,609**	**$1,347,421**	**$1,752,540**

Notes:
(1) All other includes revenues from late fees, engineering fees, and other miscellaneous sources.

Table 9.3 Historical Operating Cash Flows

Operating Cash Flows	2015	2016	2017 Department Requirements
(+) Total Operating Revenue	$1,730,234	$1,947,774	$2,063,018
(-) Total Operating Expenses	($1,199,609)	($1,347,421)	($1,752,540)
Net Revenue from Operations	**$530,625**	**$600,353**	**$310,478**

9.4 Projected Operating Cash Flows

A budget forecast is required in order to assess the ability of the water utility to fund planned capital improvements recommended in this Plan. A ten-year budget forecast was developed, which utilizes historical cash flows with cost escalators, and then combined with planned capital improvements costs. A financial strategy was then developed to fund required capital costs while minimizing the impact on monthly rates through the issuance of debt and leveraging the benefits of growth. Table 9.4 lists a budget forecast of operating revenues and expenses for the years 2018 through 2027.

9.4.1 Rate Adjustments and Resulting Operating Cash Flows

The budget modeling used to analyze the utility indicates that additional revenue will be required in concert with the issuance of new debt in order to balance cash flows and fund capital. The model assumes that the currently planned four percent rate adjustments already enacted for implementation in 2019 and 2020 and then 2.5 percent annual increases will be implemented through 2027. The resulting impacts of these rate adjustments are reflected in the revenues and expenses presented in subsequent tables in this chapter.

The operating revenues in Table 9.4 include the 4.0 percent rate adjustments already enacted by ordinance and scheduled for implementation in 2019 and 2020, additional rate increases as recommended by this analysis (see section 9.6), as well as the impact of customer growth. Operating expenses in Table 9.4 are based on the City's department request in 2017 with future years adjusted annually for various cost escalators and customer growth. The annual cost escalators used in the projection are:

- Salary cost of living adjustments (COLA): 4.0 percent.
- General inflation: 2.5 percent.
- Electricity cost inflation: 5.0 percent.
- Benefits inflation: 4.0 percent.

In addition, the projection utilizes the State water utility tax rate (5.029 percent) applied to all service rate revenue in order to estimate future tax costs and customer growth of 3.0 percent a year from 2018 through 2021 and 1.0 percent a year from 2022 through 2027. This growth rate results in the addition of 140 new customers per year through 2021 and 50 new customers a year from 2022 through 2027. Customer growth impacts monthly rate revenues as well as increases electrical costs associated with pumping water. Note that the growth rate used in this financial analysis is not the same as the growth rates used in other areas of this Plan. This is due to the financial analysis minimizing growth to be conservative while the engineering analysis requires higher growth to be conservative.

Table 9.4 Projected Operating Revenues and Expenses (2018 - 2027)

Operating Revenues and Expenses	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Operating Revenues										
Water - State Utility Taxes	$108,300	$115,600	$123,300	$129,700	$134,100	$138,600	$143,300	$148,200	$153,200	$158,400
Water sales	$2,166,600	$2,311,000	$2,465,400	$2,592,500	$2,680,300	$2,771,100	$2,865,200	$2,962,300	$3,062,800	$3,166,700
All Other	$13,500	$13,500	$13,500	$13,500	$13,500	$13,500	$13,500	$13,500	$13,500	$13,500
Total Revenues	**$2,288,400**	**$2,440,100**	**$2,602,200**	**$2,735,700**	**$2,827,900**	**$2,923,200**	**$3,022,000**	**$3,124,000**	**$3,229,500**	**$3,338,600**
Operating Expenses										
Admin - Public Works	$341,700	$366,800	$393,200	$404,300	$457,800	$471,000	$484,200	$497,700	$512,100	$526,600
Admin and General Operation	$415,500	$427,000	$439,200	$451,300	$463,900	$476,600	$490,000	$503,600	$517,700	$531,900
Maintenance - Wells	$394,800	$407,700	$420,800	$434,800	$448,900	$463,700	$479,000	$494,800	$511,200	$528,200
Maintenance - Lines	$226,200	$232,600	$239,600	$246,300	$253,200	$260,600	$268,100	$275,600	$283,700	$291,600
Maintenance - Meters	$121,300	$124,400	$127,800	$130,900	$134,400	$137,800	$141,400	$145,100	$148,700	$152,600
Maintenance - Hydrants	$21,800	$22,400	$23,000	$23,700	$24,300	$24,900	$25,600	$26,300	$27,000	$27,700
Customer Service - Meter Reading	$36,400	$37,500	$38,700	$39,800	$41,000	$42,200	$43,400	$44,700	$46,100	$47,500
Customer Service - Billing Accounts	$39,700	$40,900	$42,100	$43,200	$44,500	$45,800	$47,000	$48,400	$49,800	$51,300
Operations	$123,800	$131,000	$138,800	$146,200	$139,700	$144,200	$149,000	$153,800	$158,900	$164,100
Inspection Services	$13,500	$13,900	$14,300	$14,700	$15,200	$15,700	$16,100	$16,600	$17,100	$17,700
Capital Projects	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenses	**$1,734,700**	**$1,804,200**	**$1,877,500**	**$1,935,200**	**$2,022,900**	**$2,082,500**	**$2,143,800**	**$2,206,600**	**$2,272,300**	**$2,339,200**

9.5 Projected Debt Service

The water utility will need to issue new debt, most likely in the form of revenue bonds, in order to partially fund planned capital improvements. In order to minimize the cost of issuing new debt, this analysis assumes revenue bonds are used to finance projects in 2019 / 2020 and a second issuance of bonds in 2025. Table 9.5 lists scheduled annual debt service for outstanding water utility loans and bonds, as well as estimated annual debt service for new debts, based on four percent annual interest and a term of 20 years. Table 9.5 includes one item that shows positive annual payments. This is a credit associated with Build America Bonds (BAB) that offset annual debt payments. The loan funds received from the issue of new debts and the identification of each project to be debt funded are recorded under capital revenues in section 9.6.

9.5.1 Projected Net Revenue from Operations

Net revenues from operations can now be estimated based on the projected cash flows in Table 9.4 and forecasted annual debt service in Table 9.5. Table 9.6 shows the annual revenue from operations that is available to fund capital costs after paying for maintenance costs and future debt service. Note that the revenue already reflects the City's scheduled 4.0 percent rate increase in 2019 and 2020 and 2.5 percent adjustments in 2021 through 2027.

9.6 Capital Cash Flows

Since annual debt service has been included under operating cash flows, the remaining capital cash flows result from revenues from loans, grants, developer contributions, earned interest, and from GFCs paid by new customers.

Table 9.7 lists projected capital revenues for the water utility from 2018 through 2027. GFC revenue is based on the previously identified annual growth in customers multiplied by the current GFC for a standard 3/4-inch water meter of $7,300. Earned interest income is based on an annual rate of 1.0 percent applied to the total cash reserves in a given year. Funds from the issuance of new debt are listed by capital project in the year scheduled and correspond to the new annual debt service costs listed in Table 9.5.

Project S-06 (New Well 11) is identified as a new contribution in aid of construction (CIAC) and accounts for the fact that this project is being funded by current debt funds that are already accounted for within existing debt service costs.

Projected interest earnings are based on estimated mid-year reserve cash balances and an assumed interest earnings rate of 1.0 percent.

Capital improvement costs are from Chapter 8 and are repeated in Table 9.10.

Table 9.5 Projected Annual Debt Service for Existing and Recommended Water Utility Loans and Bonds (2018 - 2027)

Annual Debt Payments	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
2010 W/S Revenue Bonds	($160,700)	($159,800)	($157,000)	($155,500)	($153,700)	($151,600)	($150,700)	($147,900)	($37,900)	($37,900)
2010 BAB Credits	$26,400	$25,000	$23,500	$21,900	$20,200	$18,300	$16,400	$14,300	$13,300	$13,300
2017 W/S Revenue Bonds (69% sewer, 31% water)	($143,100)	($143,200)	($144,100)	($141,700)	($142,500)	($143,200)	($142,200)	($141,900)	($143,000)	($142,400)
2014 LTGO LOCAL (29% water)	($15,600)	($15,600)	$0	$0	$0	$0	$0	$0	$0	$0
2015 LTGO LOCAL (10% water)	($6,400)	($6,400)	($6,400)	$0	$0	$0	$0	$0	$0	$0
2017 LTGO LOCAL (3% water)	($4,000)	($4,000)	($3,800)	$0	$0	$0	$0	$0	$0	$0
New Debt - S-01 Well 9 and PRV Station	$0	$0	$0	$0	$0	$0	$0	$0	($328,000)	($328,000)
New Debt - G-04 Water Share of Public Works Decant Facility	$0	$0	$0	($29,400)	($29,400)	($29,400)	($29,400)	($29,400)	($29,400)	($29,400)
New Debt - G-05 Water Share of Public Works Operations - Site Development	$0	$0	($57,700)	($57,700)	($57,700)	($57,700)	($57,700)	($57,700)	($57,700)	($57,700)
Total	**($303,400)**	**($304,000)**	**($345,500)**	**($362,400)**	**($363,100)**	**($363,600)**	**($363,600)**	**($362,600)**	**($582,700)**	**($582,100)**

Table 9.6 Projected Net Revenue from Operations (After Debt Service is Paid) (2018 - 2027)

Operational Summary	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
(+) Total Operating Revenues	$2,288,400	$2,440,100	$2,602,200	$2,735,700	$2,827,900	$2,923,200	$3,022,000	$3,124,000	$3,229,500	$3,338,600
(-) Total Operation and Maintenance	(1,734,700)	(1,804,200)	(1,877,500)	(1,935,200)	(2,022,900)	(2,082,500)	(2,143,800)	(2,206,600)	(2,272,300)	(2,339,200)
(-) Total Debt	(303,400)	(304,000)	(345,500)	(362,400)	(363,100)	(363,600)	(363,600)	(362,600)	(582,700)	(582,100)
Net Revenue	$250,300	$331,900	$379,200	$438,100	$441,900	$477,100	$514,600	$554,800	$374,500	$417,300

Table 9.7 Projected Annual Capital Cash Flows (2018 - 2027)

Capital Revenues	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Transfer from Operations	$250,300	$331,900	$379,200	$438,100	$441,900	$477,100	$514,600	$554,800	$374,500	$417,300
Connection Charges	$1,022,000	$1,022,000	$1,022,000	$1,095,000	$365,000	$365,000	$365,000	$365,000	$365,000	$365,000
New Loan - N-01 Canterwood Boulevard NW and Bering Street NW	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
New Loan - N-02 Sehmel Drive NW and Burnham Drive NW	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
New Loan - S-01 Well 9 and PRV Station	$0	$0	$0	$0	$0	$0	$0	$4,458,300	$0	$0
New Loan - S-03 Well 6 Treatment System	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
New Loan - G-04 Water Share of Public Works Decant Facility	$0	$0	$400,000	$0	$0	$0	$0	$0	$0	$0
New Loan - G-05 Water Share of Public Works Operations - Site Development	$0	$990,000	$0	$0	$0	$0	$0	$0	$0	$0
New CIAC - S-06 Well 11	$3,000,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Interest Earnings from Cash	$21,000	$19,800	$14,700	$22,400	$28,600	$28,300	$28,600	$32,500	$33,200	$31,600
Total Capital Revenues	**$4,293,300**	**$2,363,700**	**$1,815,900**	**$1,555,500**	**$835,500**	**$870,400**	**$908,200**	**$5,410,600**	**$772,700**	**$813,900**

9.7 Cash Flows with New Loans and Rate Adjustments

The City performs regular water utility rate studies in order to review existing rates and charges, review forecasted revenues, adjust the existing senior/low-income discount rate, and assess against the respective planned capital projects in the water system plan.

Table 9.8 lists annual rate adjustments used by the budget model to balance cash flows, pay planned capital improvements, and maintain adequate cash reserves.

Table 9.9 provides a summary of all cash flows for the water utility for the years 2018 through 2027 assuming the rate adjustments listed in Table 9.8 and new loans listed in Table 9.5 are implemented.

9.8 Summary

The water utility will be undergoing an extensive period of capital improvements and is expected to spend approximately $18 million in capital costs over the next ten years. As a result of the magnitude of capital costs, the water utility will be unable to fund planned capital without the issuance of new debt. Given the limited options available from Washington State to aid funding capital, the City will likely need to issue revenue bond debt. This analysis assumes two large revenue bond issues of approximately $1.4 million in 2019 / 2020 and another $4.5 million in 2025.

The costs borne by monthly rates will increase with the new debt and as a result, the City will need to adjust rates. Table 9.8 lists the annual rate increases assumed by the budget model that are required to balance cash flows and maintain adequate cash reserves. The water utility currently has approximately $1.5 million in cash reserves. The budget model shows that the water utility will increase reserves by about $2 million over the next ten years that will be available for capital projects scheduled on later years.

The budget model does include revenues from growth (GFC) that are a significant source of funds available to pay for capital improvements. Based on the growth assumed in this financial analysis, the water utility will generate more than $6.0 million over the next ten years, or almost a quarter of the total cost of all planned capital improvements. Therefore, it is important for the City to monitor growth and associated revenues from GFCs, and adjust rates, debt, and capital scheduling to conform with growth.

Table 9.8 Monthly Rate Adjustments (2018 - 2027)

Rate Increases	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Annual Rate Increase (%)	0.0%	4.0%	4.0%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%

Table 9.9 Projected Utility Cash Flows (2018 - 2027)

Summary	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Operational Summary										
(+) Total Operating Revenues	$2,288,400	$2,440,100	$2,602,200	$2,735,700	$2,827,900	$2,923,200	$3,022,000	$3,124,000	$3,229,500	$3,338,600
(-) Total Maintenance Expenses	(1,734,700)	(1,804,200)	(1,877,500)	(1,935,200)	(2,022,900)	(2,082,500)	(2,143,800)	(2,206,600)	(2,272,300)	(2,339,200)
(-) Total Debt	(303,400)	(304,000)	(345,500)	(362,400)	(363,100)	(363,600)	(363,600)	(362,600)	(582,700)	(582,100)
Net Revenue	**$250,300**	**$331,900**	**$379,200**	**$438,100**	**$441,900**	**$477,100**	**$514,600**	**$554,800**	**$374,500**	**$417,300**
Capital Summary										
Start of Year Cash	**$1,583,000**	**$2,626,300**	**$1,337,200**	**$1,596,800**	**$2,875,000**	**$2,851,800**	**$2,812,300**	**$2,911,400**	**$3,581,700**	**$3,064,400**
(+) Connection Charges and Interest Inc.	1,043,000	1,041,800	1,036,700	1,117,400	393,600	393,300	393,600	397,500	398,200	396,600
(+) Transfer from Operations	250,300	331,900	379,200	438,100	441,900	477,100	514,600	554,800	374,500	417,300
(+) Total Loan Funds	0	990,000	400,000	0	0	0	0	4,458,300	0	0
(+) Total CIAC Funds	3,000,000	0	0	0	0	0	0	0	0	0
(-) Total Capital Expenses	(3,250,000)	(3,652,800)	(1,556,300)	(277,300)	(858,700)	(909,900)	(809,100)	(4,740,300)	(1,290,000)	(625,300)
(-) Transfer to Operations	0	0	0	0	0	0	0	0	0	0
Net Capital Revenue	**1,043,300**	**(1,289,100)**	**259,600**	**1,278,200**	**(23,200)**	**(39,500)**	**99,100**	**670,300**	**(517,300)**	**188,600**
End of Year Cash	**$2,626,300**	**$1,337,200**	**$1,596,800**	**$2,875,000**	**$2,851,800**	**$2,812,300**	**$2,911,400**	**$3,581,700**	**$3,064,400**	**$3,253,000**

Table 9.10 Planned Capital Improvements (2018 - 2027)

Capital Improvements	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
N-01 Canterwood Boulevard NW and Bering Street NW	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
N-02 Sehmel Drive NW and Burnham Drive NW	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
N-03 Vernhardson Street and Burnham Drive NW	$0	$0	$0	$0	($601,000)	$0	$0	$0	$0	$0	($601,000)
N-04 Olympic Drive NW and Hollycroft Street	$0	$0	($62,600)	$0	$0	$0	$0	$0	$0	$0	($62,600)
U-01 Grandview Street between Stinson Avenue and Pioneer Way	$0	($480,000)	$0	$0	$0	$0	$0	$0	$0	$0	($480,000)
U-02 Shore Acres	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
U-03 Shore Acres	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
U-04 Shurgard Tank to Soundview Drive	$0	$0	$0	$0	$0	($104,300)	$0	$0	$0	$0	($104,300)
U-05 Shurgard East Tee	$0	$0	$0	$0	$0	($190,000)	$0	$0	$0	$0	($190,000)
U-06 Olympic Village Loop	$0	$0	$0	$0	$0	$0	($272,200)	$0	$0	$0	($272,200)
U-07 Reid Drive NW between 56th Street NW and 55th Street NW	$0	$0	$0	$0	$0	($175,000)	$0	$0	$0	$0	($175,000)
U-08 Deer Creek Lane	$0	$0	$0	$0	$0	$0	($63,300)	$0	$0	$0	($63,300)
U-09 Stinson Avenue from Rosedale Street NW to Pioneer Way	$0	($1,499,700)	$0	$0	$0	$0	$0	$0	$0	$0	($1,499,700)
ST-01 Tank Recoating	$0	$0	($799,900)	$0	$0	$0	$0	$0	($1,000,000)	$0	($1,799,900)
S-01 Well 9 and PRV Station	$0	$0	$0	$0	$0	($75,400)	($100,300)	($4,458,300)	$0	$0	($4,634,000)
S-02 Clean and Inspect Well Casing (Well 3)	$0	($250,000)	$0	$0	$0	$0	$0	$0	$0	$0	($250,000)
S-03 Well 6 Treatment System	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S-04 Conjunctive Supply Strategy	$0	$0	$0	$0	$0	($99,700)	($100,300)	$0	$0	$0	($200,000)
S-05 Emergency Intertie (Canterwood Water System)	$0	($400,100)	$0	$0	$0	$0	$0	$0	$0	$0	($400,100)
S-06 Well 11	($3,000,000)	$0	$0	$0	$0	$0	$0	$0	$0	$0	($3,000,000)
R-01 Asbestos Cement Water Line Replacement Program	$0	$0	$0	($250,000)	($257,700)	($265,500)	($273,000)	($282,000)	($290,000)	($299,100)	($1,917,300)
G-01 Water System Plan Update	($250,000)	$0	$0	$0	$0	$0	$0	$0	$0	($326,200)	($576,200)
G-02 Reuse and Reclaimed Water Study Phase Two	$0	$0	($26,500)	($27,300)	$0	$0	$0	$0	$0	$0	($53,800)
G-03 Water Share of Public Works Operations Building	$0	($33,000)	($267,300)	$0	$0	$0	$0	$0	$0	$0	($300,300)
G-04 Water Share of Public Works Decant Facility	$0	$0	($400,000)	$0	$0	$0	$0	$0	$0	$0	($400,000)
G-05 Water Share of Public Works Operations - Site Development	$0	($990,000)	$0	$0	$0	$0	$0	$0	$0	$0	($990,000)
G-06 Water Share of Satellite Reuse Plant in WW Basin 12	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Capital Costs	**($3,250,000)**	**($3,652,800)**	**($1,556,300)**	**($277,300)**	**($858,700)**	**($909,900)**	**($809,100)**	**($4,740,300)**	**($1,290,000)**	**($625,300)**	**($17,969,700)**

Appendix A

ADOPTING RESOLUTION AND ORDINANCE OF PLAN

~~To be inserted at a later date. ~~

Appendix B

COMMENTS AND RESPONSES FROM PIERCE COUNTY, ADJACENT PURVEYORS, AND WASHINGTON STATE DEPARTMENT OF HEALTH

Chapter 1 - Description of Water Service

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

COMMENT NO.	SECTION	COMMENT BY	PERSON RESPONSIBLE	COMMENT	RESPONSE	CHANGE TO PLAN	STATUS OF CHANGE
1	Standard Service Area Agreement	Cary/PCPW	Kevin	The CWSP guidelined requires a copy of the Standard Service Agreement. The submitted guidelines from City of Gig Harbor claim the SSA is located in Chapter 2 of the submitted draft plan. I cannot locate the SSA in the plan.			Complete
2	Standard Service Area Agreement	Cary/PCPW	Kevin	If there is change to the service area boundary, please provide a signed service agreement as well as listing any interties or interlocal agreements.	Areas 1 and 2 are a correction to the service area map regarding the Washington Correctional Center for Women (WCCW) parcel #0122364006. In the previous plan it was incorrectly located on McCormick Forest Park. No SSA is required.	No change	Complete
3	Standard Service Area Agreement	Cary/PCPW	Kevin	I have provided an attachment. The attachment consists of a map with Pierce County GIS data layered over maps provided in the Gig Harbor WSP. The layering illustrates discrepancies within the service area.	i. Areas #3 and #4 have requested water service; however, in order to be granted, per City ordinance, the applicant would need to request approval of a Utility Extension (UEA) by City Council - - no formal request has been submitted at this time, so an SSA does not currently exist.		Complete
4	Standard Service Area Agreement	Cary/PCPW	Kevin	I have also attached a spreadsheet that lists the areas removed and added according to the Pierce County GIS database. Please provide clarification on the adjacent purveyors and existing water systems within the City's corporate boundary.	Areas 5 and 6 fall under Resolution 740, found in Appendix E, and was sent to Cary	No change	Complete
5	Franchise Agreement	Cary/PCPW	Kevin	There is an existing franchise Agreement with Pierce County and City of Gig Harbor. Please include a discussion about the current County Franchise Agreement within the city's Water System Plan.	The Franchise Agreement with Pierce County and the City of Gig Harbor was sent to Cary via email and can will be found in Appendix E. It should be noted that this agreement expired in 2017 and the City is looking into updating this.	No change	Complete
6	Table 1-12	Jennifer/John (DOH)	Trent	Per MWL, the "duty to serve" requires a process with a timeline for new applications requesting service, to appeal the City's decision. Describe this in more detail in Table 1-12.	Unclear what the reference is, since Table 1-12 does not exist. City to call Jennifer for explanation.	“reasonable timeline/timely manner” . Goal to respond within 4 weeks. In muni code 19.	Complete
7	Figure 1.4	Jennifer/John (DOH)	City	The intertie with Peacock Hill (DOH ID #66673) does not appear on either Gig Harbor's or Peacock Hill's Water Facilities Inventory (WFI). Figure 1.4 shows a PRV at this location. The plan indicates there is an air gap between the two systems. What are the hydraulic grade lines of the two water systems at the intertie?	There are two standpipes, one is theirs or ours. It is currently not connected. Semantics. Add an * to say currently not physically connected. Clarify text with air gap	Updates made to Figures 1.4 and 1.6 and clarification to section 1.7.7	Complete
8	Table 1.3	Jennifer/John (DOH)	Trent	There is some uncertainty about the well identifications. Is well 8 the Rushmore Well? Include the source numbers in the table. Well 10 is not included in the WFI. As a test well should it even be included here? It has not gone through the approval process. Is the column "Max. Instantaneous Flow Rate" the water right, Qi? Do wells 5 and 6 need to be throttled to avoid exceeding the water rights?	Well numbers are the same as the source # and will include an extra column to show this. City to include Well 10 to their WFI, as it is a replacement well.	Added note that Max Inst Flow Rate is Qi. Updated Table 1.3 to include Source #. Added note that Well 10 to be included in 2019 WFI.	Complete
9	Figure 1.5	Jennifer/John (DOH)	Kevin	The 320 and 440 pressure zones are indistinguishable from each other. It appears the original was created in color. Include a color version of the figure.	Color version : pw:\\IO-PW-INT.Carollo.local:Carollo\Documents\Client\WA\Gig Harbor\10711A00\Deliverables\Ch 01 Description of Water Service\Fig1.5_PressureZones.pdf	No change; City will send color digital copies of figures to DOH with comments.	Complete
10	General Note	Jennifer/John (DOH)	Kevin/Trent	There are many "should's" in the narrative throughout the plan. The plan should not indicate what the purveyor should do (including items in the CIP); the plan should indicate what the purveyor WILL or plans to do. Please provide the City commitments to what will be implemented in this next planning period or delete.	Apologies for including the word "should" throughout the plan. We will include a sentence in the Plan explaining where the word "should" is used, please consider that is what the City will do.	Include a sentence in Section 1.1 saying the word "should" is an action word for the City to do that.	Complete
11	General Note	Jennifer/John (DOH)	City	Provide signed local government consistency statements from Pierce County Planning and Public Works and your City planner.	City agrees to complete signed local government consistency statements.	Added to the Plan.	Complete
12							

Chapter 2 - Policies and Criteria

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 5/15/2018

Engineers...Working Wonders With Water®

COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	STATUS OF CHANGE
1							
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Chapter 3 - Planning Data and Water Demand Frecasting

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

carollo
Engineers...Working Wonders With Water®

COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	REFERENCE DOCS	STATUS OF CHANGE
6	Demand Forecast and Growth Projections	Cary/PCPW	Kevin	Reference information listed in the guidelines cites that population growth forecasts for the next 6 years (for each year) and 20 years is located in Appendix H. I cannot locate Appendix H. Please provide the section of the WSP where this topic is discussed.	a. Appendix H was sent to Cary, and Section 3.2 and Table 3.1 on page 3.1 references the population growth forecasts for the City	Appendix H was checked in the Plan.		Complete
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Section 4 - System Analysis

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	STATUS OF CHANGE
1	General Note	Jennifer/John	Aurelie	There are several places where storage volumes are not consistent across various tables. Please contact us to go over these.	Noted, the discrepency is mainly in Table 4.8. These numbers will be updated to match the rest of the tables. Table 4.10 should not show dead storage. The City has an additional 0.02 MG excess, no change to any of the other storage evaluation table and storage results.	Update Tables 4.8 and 4.10.	Completed
2	General Note	Jennifer/John	Dan/Aurelie	It is not clear whether fire suppression volumes are nested within standby volumes or vice versa. In some cases, the required standby storage is shown as zero MG. How is this consistent with DOH's recommendations to maintain a minimum 200 gal/ERU standby storage/	City stacks its system-wide fire supression storage in the 450 PZ. It doesn't maintain fire suppression in other PZs. WAC xxx describes that the City must maintain a minimum 200 gal/ERU; the City meets this criteria because it includes the sum of all supply capacities to the water system with the largest well site out of service. As previous noted, the City has projects to make all wells reliable.		Standby is calculated by PZ with sources supplying the zone only. You are correct, calc on page 4-22 should state " Qf = sum of all supply capacities to the pressure zone, with the largest well site out of service)
3	Table 4.10	Jennifer/John	Aurelie	How does the Grandview FCV differ from a PRV supplying the zone? How does it operate as a source? It is shown in Tables 4.10 and 4.11 as acting as a source for two pressure zones.	Grandview is a constant flow of 200 gpm from 400 PZ to 320 PZ, and therefore, was considered as a constant supply to the 320 PZ. The 200 gpm in Table 4.11 is negative.	Will update Table 4.11 to show 200 gpm as negative. No change to the results or numbers.	Completed
4	Table 4.12	Jennifer/John	Aurelie	Shows Well 11 as the sole source for the 450 pressure zone. Shouldn't Pump Station 3 also be considered as a source? How will this affect the evaluation?	PS3 was developed for emergency and water quality use. It's not considered a regular supply source by the City.	No change.	Completed
5	Table 4.14	Jennifer/John	Aurelie	Shows a storage deficit for the 450 pressure zone; however, using the data in the tables, it appears that there is an excess of storage under Option 1 (NEW BPS at North Tank). What are the cost estimates for this option? How do they compare with Option 2 (new well)?	After presenting options to City, they had a clear preference of having a well instead of a BPS at this location. The well will provide similar options but is not limited by the volume of the tank. City also chose the new well due to operational preferences and is willing to pay for the cost of a well than relying on two BPS.	No change.	Completed
6	General Note	Jennifer/John	Kevin/Trent	The plan states that the hydraulic model "should" be calibrated using hydrant flow tests. Was the model calibrated for the WSP? If not, it needs to be calibrated with results submitted for review. If it was calibrated include the results with the resubmittal.	EPS Calibration was last performed in 2014. Last static hydrant test calibration was performed in 2010.	Adding the 2014 memo which includes calibration into Appendix Q.	Completed
7	Figure 4.7	Jennifer/John	Aurelie	This figure indicates where fire flow is deficient in the distribution system. Is this before or after completion of the distribution system improvements in Table 4.19 and the CIP? What would Figure 4.7 look like if the improvements were included?	Indicates Fire flow defiiencies with no improvements	GIS to create Figure 4.10 to show the dots after recommended projects are implemented. Figure 4.7 will be renamed as Fire Flow Deficiencies with no Improvements.	Completed
8	Page 4-18	Jennifer/John	Aurelie/Dan/City	Per WAC 246-290-100 e (ii), provide a "source of supply analysis, which includes: (A) An evaluation of water supply alternatives if additional water rights will be pursued within twenty years; and (B) A narrative description of the system's water supply characteristics and the foreseeable effect from current and future use on the water quantity and quality of any body of water from which its water is diverted or withdrawn based on existing data and studies.	The City is considering an additional well (Well 9) with water rights in the next 20 years. Well #9 is a pending water right (G2-29937A) and is described in detail in Section 6.6.1. Section 6.9 details the source of supply alternatives for the City. For B), the modeling is addressing Well #9 and the system's water supply characteristics and foreseeable effect from current and future use on the water quantity and quality of any body of water from which its water is diverted or withdrawn based on existing data and studies.	Section 4.4.3.2 will include the sentence: Well #9 is a pending water right (G2-29937-A) for the City. Further detail about this pending water right can be found in Section 6.6.1. Additionally, Section 6.9 describes the impacts of alternative sources of supply beyond the City's exiting wells and pending water right applications.	Sentence added to the text
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Chapter 5 - Water Use Efficiency Program

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

carollo
Engineers...Working Wonders With Water®

COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	REFERENCE DOCS	STATUS OF CHANGE
1	Page 5-1	Jennifer/John	City	Your WUE goal can be extended for the 10 year planning period per the 2017 planning WAC change. Expanding the plan update consumer meeting into a public forum is possible by placing a notice on the DOH website at least 2 1/2 weeks in advance, and following WAC 246-290-830.	City agrees and will begin placing notices on DOH website per WAC 246-290-830.	No change.		Complete
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Chapter 6 - Water Rights, Supply Analysis, and Source Water Protection

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	REFERENCE DOCS	STATUS OF CHANGE
1	Page 6-13	Jennifer/John	City/PGG	Per the 2017 pre-plan notes, provide documentation of educational letters sent to residential property owners within your 1-year time-of-travel (TOT) and businesses in your 10-year TOT.	The Water Department provide drinking water quality reports to customers annually with their May and June utility billings. The reports are also available on the City's website. This document includes informational and educational resources for residential property owners.	Added to page 6-13		Complete
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Chapter 7 - Operation and Maintenance Program

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

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COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	REFERENCE DOCS	STATUS OF CHANGE
1	Table 7.2	Jennifer/John	Kevin	Include Well 11 in Table 7.2	Will update table	Including Well 11 in table		Complete
2	General Note	Jennifer/John	City	Describe the health advisory procedures that are used by the water department in the event of a localized and limited losses of pressure in the distribution system (Chapter 7). What are the notification procedures used for customers and health agencies?	In a loss of pressure situation, the Water Department contacts people and business in the effected area, as well as, contact DOH to inform the parties of the situation. After pressure is restored, the City's crews flush the affected mains and issue boil water notices until acceptable samples and testing are achieved.	Added section 7.1.6		Complete
3	Page 7-12 Table 7-7	Jennifer/John	Kevin	Correct DOH emergency contact information to "after-hours" emergency DOH number and add John Ryding, at 253-395-6757 for day time.	Will update table	Including new contact information		Complete
4	Coliform Monitoring Plan	Jennifer/John	City	There are numerous instances in the CMP where the site of the routine sample is not included in the list of repeat samples. After a positive routine sample the routine sample site must be used for one of the three repeat samples. Please update your repeat sample sites where needed.	City updated CMP	Appendix I was updated accordingly		Complete
5	Coliform Monitoring Plan	Jennifer/John	City	Provide a map of the CMP routine (required) and repeat (recommended) sample site locations.	City updated CMP	Appendix I was updated accordingly		Complete
6	General Note	Jennifer/John	City	The City is still not a member of WAWARN, why not? DOH highly recommends becoming a member. FEMA states prior to reimbursing, they will ask for mutual aid documentation. Becoming a WAWARN member demonstrates both managerial and financial capacity.	the city will consider becoming a member in the future	No change		Complete
7	CCC	Jennifer/John	City	Cross Connection Control (CCC). Per the July 13, 2017 pre-plan notes, provide a summary about customer survey response rate and next implementation tasks for this planning period.	City is currently implementing its Cross Connection Control ordinance No. 1331, copy added to the appendices	Text clarified and appendix updated		Complete
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Chapter 8 - Capital Improvement Program

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	REFERENCE DOCS	STATUS OF CHANGE
1	CIP Project 8.3.1.5	Jennifer/John	Kevin	CIP Project 8.3.1.5 describes an emergency intertie with the Canterwood Water System. The owner of the water system is Peninsula Light Company, not Washington Water Service.	Will change text to Peninsula Light Company.	Changed text as noted.		Completed
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Chapter 9 - Financial Plan
Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

carollo
Engineers...Working Wonders With Water®

COMMENT NO.	SECTION	COMMENT BY	RESPONSE BY	COMMENT	RESPONSE	CHANGE TO PLAN	REFERENCE DOCS	STATUS OF CHANGE
1	General comment	Jennifer/John	City	In 2018, DOH implemented a more in-depth asset management discussion in water system plans, and DOH commends the City for beginning asset management program implementation. Be advised in your next plan update, DOH will be looking for critical components to be identified in a table with age, life expectancy, condition rating, useful life left, replacement cost, and criticality. The DWSRF loan program currently provides bonus points for providing this information with an application.	"thanks for your comment, the City will look into this in their next rate study"	No change		Complete
2	Page 9-9	Jennifer/John	City	The Mayor and City Council have a fiduciary responsibility to the water system per WAC 246-290-100 (1) (j) to demonstrate financial viability. DOH commends your ordinance #1319 for the 2019 and 2020 rate increases. This plan identifes the need for an annual rate increase throughout the 10-year planning period in order to pay for the CIP. However, it appears there is no City commitment. The American Society of Civil Engineers recent report gives drinking water infrastructure a "D Grade." This fact may provide some support as you work toward the rate increases you need to fund this plan. A commonly used website by government utility loan programs is American FactFinder. This site shows the City of Gig Harbor's Median Household Income (MHI) at $74,159. Gig Harbor's average 2018 water rate (at usage of 205 gpd/ERU) is approx. $38.21/month per residential connection (page 9-1). This is 0.6 percent of the MHI for your area. The state and federal "affordability" index ranges between 1.5-2.5% for drinking water. This means there is room to create a more sustainable rate structure which funds the important projects of the future.	The City's policy is to consider rate increases on a biennium basis. As you noted, we have increased rates for 2019 and 2020, and will continue to do so in the future.	No change		Complete
3	Page 9-9	Jennifer/John	City/Ashley Emery	Setting a rate for the "full-cost" of providing water, and in order to, not create intergenerational inequity is the new way to improve financial viability. Many utilities are adding a capital project surcharge to their rate structures and showing it on the bill so customers understand that it takes both annual O&M expenses, as well as some replacement funding, to keep a water system financially viable. Also, it is good to let the customers know in good economic times that aging infrastructure is a huge capital expense, and rates need to be increased in order to not "kick the can" to the next generation.	The City performs regular water utility rate studies in order to review existing rates and charges, review forecasted revenues, adjust the existing senior/low income discount rate, and assess against the respective planned capital projects in the WSP.	No change		Complete
4	Page 9-9	Jennifer/John	City/Ashley Emery	a) Does the City have a financial policy for creating a dedicated capital project reserve fund?, b) What is the City's water system depreciation policy for how much aging infrastructure gets funded annually? C) Does the City have a capital replacement surcharge identified on customer bills?	See section 2.10	No change		Complete
5	Section 4.4.4	Jennifer/John	Kevin/City	Provide a 20th year capital project list in the plan per WAC 246-290-100 (4) (i). The projects identified for the "non-reliable" wells are not in the 10-year schedule. What is the timeline for these projects, as well as others not funded? If they are to be funded in the next planning period, it is vital to know what is coming "downstream" in order to financially prepare.	The 20-year CIP is located in Appendix P. The hook-up generators will be funded through the City's O&M budget. (TRENT TO CONFIRM)	Adding sentence in 4.4.4: The generator hook-up installation will be part of the City's annual O&M budget and is therefore not represented in the CIP.		Complete
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Electronic CIP

Record of Comment Log

PROJECT : **Water System Plan Update**
City of Gig Harbor
JOB # : 10711A.00
DATE UPDATED: 3/24/2022

Engineers...Working Wonders With Water®

COMMENT NO.	CIP ID	COMMENT BY	COMMENT	RESPONSE	CHANGE TO CIP	STATUS OF CHANGE
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Pierce County
Planning & Public Works

Dennis Hanberg—Director
dhanber@co.pierce.wa.us

2401 South 35th Street, Room 2
Tacoma, Washington 98409-7460
piercecountywa.org/ppw

February 27, 2019

Lara R. Kamereck
Carollo Engineers Inc
1218 Third Avenue, Suite 1600
Seattle, Washington 98101

Subject: **City of Gig Harbor 2018 Comprehensive Water System Plan**

Dear Ms. Kammereck:

Pierce County has reviewed the draft Gig Harbor Water System Plan dated October 2018. In reviewing your submittal, the following items need clarification prior to the County issuing a signed local Government Consistency Statement to the Washington State Department of Health (DOH).

1. **Standard Service Area Agreement**
   The CWSP guidelines require a copy of the Standard Service Agreement. The submitted guidelines from City of Gig Harbor claim the SSA is located in Chapter 2 of the submitted draft plan. I cannot locate the SSA in the plan. If there is change to the service area boundary, please provide a signed service agreement as well as listing any interties or interlocal agreements.

   I have provided an attachment. The attachment consists of a map with Pierce County GIS data layered over maps provided in the Gig Harbor WSP. The layering illustrates discrepancies within the service area. I have also attached a spreadsheet that lists the areas removed and added according to the Pierce County GIS database. Please provide clarification on the adjacent purveyors and existing water systems within the City's corporate boundary.

2. **Franchise Agreement**
   There is an existing Franchise Agreement with Pierce County and City of Gig Harbor. Please include a discussion about the current County Franchise Agreement within the city's Water System Plan.

3. **Demand Forecast and Growth Projections**
   Reference information listed in the guidelines cites that population growth forecasts for the next 6 years (for each year) and 20 years is located in Appendix H. I cannot locate Appendix H. Please provide the section of the WSP where this topic is discussed.

Thank you for submitting the City of Gig Harbor draft water system plan. Pierce County can consider issuing a signed Government Consistency Statement once the above requests are addressed. To expedite review of your revised submittal, please include a cover letter summarizing how each of the above comments are addressed in the revised WSP amendment and the page/section that each

response is located. To save costs and resources, I am only looking for copies of the revised pages/maps.

If you have any questions feel free to reach me at vaughan.cary@piercecountywa.gov or (253) 798-7163.

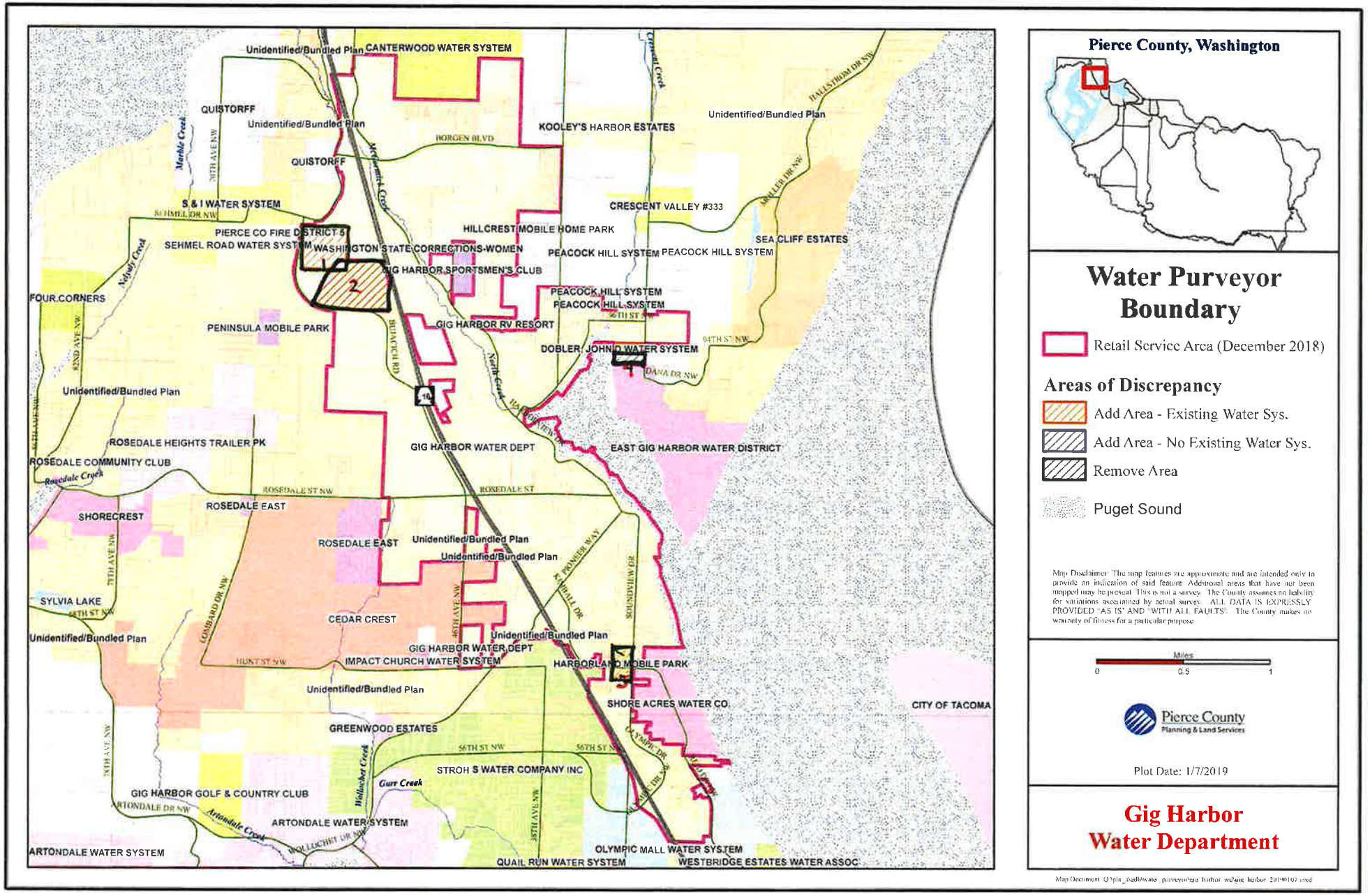
Sincerely,

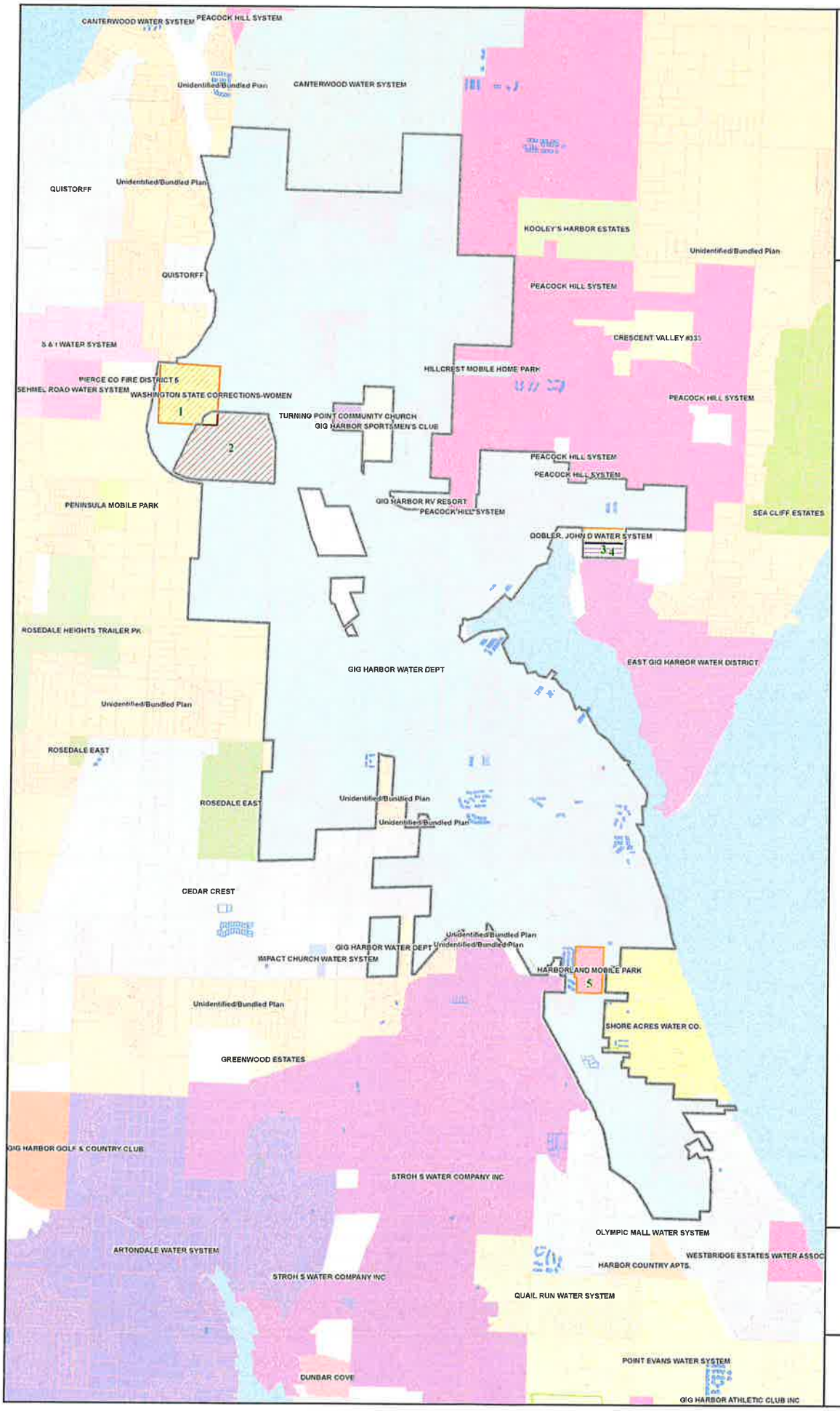
Vaughan Cary
Assistant Planner

VC: dw

enc: Comments on Water Purveyor Boundaries Map
Comments on Boundary Discrepancies Map
Areas Removed and Added Spreadsheet

cc: Trent Ward, Interim City Engineer, City of Gig Harbor, 3510 Grandview Street, Gig Harbor, WA 98335
ec: Debbie Bailey, Pierce County Department of Emergency Management
Chrissy Cooley, Tacoma-Pierce County Health Department
Jennifer Kropack, WA State DOH, 20425 72nd Avenue South, Suite 310, Kent, WA 98032
Warner Webb, Pierce County Fire Marshal


Unidentified/Bundled Plan
CANTERWOOD WATER SYSTEM
QUISTORFF
Unidentified/Bundled Plan
KOOLEY'S HARBOR ESTATES
Unidentified/Bundled Plan
BORGEN BLVD
QUISTORFF
S & I WATER SYSTEM
CRESCENT VALLEY #333
PIERCE CO FIRE DISTRICT 5
SEHMEL ROAD WATER SYSTEM
WASHINGTON STATE CORRECTIONS-WOMEN
HILLCREST MOBILE HOME PARK
SEA CLIFF ESTATES
PEACOCK HILL SYSTEM
PEACOCK HILL SYSTEM
GIG HARBOR SPORTSMEN'S CLUB
PEACOCK HILL SYSTEM
PEACOCK HILL SYSTEM
FOUR CORNERS
PENINSULA MOBILE PARK
GIG HARBOR RV RESORT
DOBLER, JOHN D WATER SYSTEM
Unidentified/Bundled Plan
ROSEDALE HEIGHTS TRAILER PK
GIG HARBOR WATER DEPT
EAST GIG HARBOR WATER DISTRICT
ROSEDALE COMMUNITY CLUB
ROSEDALE EAST
SHORECREST
ROSEDALE EAST
Unidentified/Bundled Plan
Unidentified/Bundled Plan
SYLVIA LAKE
CEDAR CREST
Unidentified/Bundled Plan
GIG HARBOR WATER DEPT
IMPACT CHURCH WATER SYSTEM
HARBORLAND MOBILE PARK
Unidentified/Bundled Plan
SHORE ACRES WATER CO.
CITY OF TACOMA
GREENWOOD ESTATES
STROH S WATER COMPANY INC
GIG HARBOR GOLF & COUNTRY CLUB
ARTONDALE WATER SYSTEM
ARTONDALE WATER SYSTEM
OLYMPIC MALL WATER SYSTEM
QUAIL RUN WATER SYSTEM
WESTBRIDGE ESTATES WATER ASSOC
Pierce County, Washington
Water Purveyor Boundary
Retail Service Area (December 2018)
Areas of Discrepancy
Add Area - Existing Water Sys.
Add Area - No Existing Water Sys.
Remove Area
Puget Sound
Map Disclaimer: The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The County assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY PROVIDED "AS IS" AND "WITH ALL FAULTS". The County makes no warranty of fitness for a particular purpose.
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Pierce County
Planning & Land Services
Plot Date: 1/7/2019
Gig Harbor
Water Department
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PIERCE COUNTY, WASHINGTON



Boundary Discrepancies

Submitted Service Area (December 2018)

Areas of Discrepancy

- Add Area - Existing Water Sys
- Add - No Existing Water System
- Remove Area

Map Disclaimer: The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The County assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. The County makes no warranty of fitness for a particular purpose.

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Pierce County

Department of Planning and Land Services

Gig Harbor Water Department

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13	Remove Area from Summit
14	Remove Area from Summit
15	Remove Area from Summit
16	Remove Area from Summit
17	Add Area - Another Water System Exists
18	Add Area - Another Water System Exists
19	Add Area - Another Water System Exists
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22	Add Area - Another Water System Exists
23	Add Area - Another Water System Exists

Existing Water System (Pierce County Data)
LEMLEY WATER SYSTEM
VALLEYBROOK VILLAGE
TACOMA COUNTRY ESTATES
RED GATE MOBILE HOME PK
CITY OF TACOMA
CITY OF TACOMA
CITY OF TACOMA

RECEIVED

APR 19 2019

CITY OF GIG HARBOR

COPY

State of Washington
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310 • Kent Washington 98032-2388

April 16, 2019

JEFF LANGHELM, HONORABLE MAYOR, HONORABLE COUNCIL MEMBERS
GIG HARBOR WATER DEPARTMENT
3510 GRANDVIEW STREET
GIG HARBOR WA 98335

RE: Gig Harbor, City of, System ID # 27600
Pierce County
Water System Plan – 2018
Submittal # 19-0108

Dear Mr. Jeff Langhelm, Honorable Mayor and Honorable Council Members:

Thank you for submitting the Water System Plan (WSP) for the City of Gig Harbor received in this office on January 17, 2019. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

System Description and Basic Planning Data

1. Per MWL, the "duty to serve" requires a process with a timeline for new applicants requesting service, to appeal the City's decision. Describe this in more detail in Table 1-12.
2. The intertie with Peacock Hill (DOH ID #66673) does not appear on either Gig Harbor's or Peacock Hill's Water Facilities Inventory (WFI). Figure 1.4 shows a PRV at this location. The plan indicates there is an air gap between the two systems. What are the hydraulic grade lines of the two water systems at the intertie?
3. Table 1.3. There is some uncertainty about the well identifications. Is Well 8 the Rushmore Well? Include the source numbers in the table. Well 10 is not included in the WFI. As a test well should it even be included here? It has not gone through the approval process. Is the column "Max. Instantaneous Flow Rate" the water right, Q_i? Do wells 5 and 6 need to be throttled to avoid exceeding the water rights?
4. Figure 1.5. The 320 and 440 pressure zones are indistinguishable from each other. It appears the original was created in color. Include a color version of the figure.

5. There are many "should's" in the narrative throughout the plan. The plan should not indicate what the purveyor should do (including items in the CIP); the plan should indicate what the purveyor WILL or plans to do. Please provide the City commitments to what will be implemented in this next planning period or delete.
6. Provide signed local government consistency statements from Pierce County Planning and Public Works and your City planner.

System Analysis and Design Standards

7. There are several places where storage volumes are not consistent across various tables. Please contact us to go over these.
8. It is not clear whether fire suppression volumes are nested within standby volumes or vice versa. In some cases the required standby storage is shown as zero MG. How is this consistent with DOH's recommendations to maintain a minimum 200 gal/ERU standby storage?
9. Table 4.10. How does the Grandview FCV differ from a PRV supplying the zone? How does it operate as a source? It is shown in Tables 4.10 and 4.11 as acting as a source for two pressure zones.
10. Table 4.12 shows Well 11 as the sole source for the 450 pressure zone. Shouldn't Pump Station 3 also be considered as a source? How will this affect the evaluation?
11. Table 4.14 shows a storage deficit for the 450 pressure zone; however, using the data in the tables, it appears that there is an excess of storage under Option 1 (New BPS at North Tank). What are the cost estimates for this option? How do they compare with Option 2 (new well)?
12. The plan states that the hydraulic model "should" be calibrated using hydrant flow tests. Was the model calibrated for the WSP? If not, it needs to be calibrated with results submitted for review. If it was calibrated include the results with the resubmittal.
13. Figure 4.7 indicates where fire flow is deficient in the distribution system. Is this before or after completion of the distribution system improvements included in Table 4.19 and the CIP? What would Figure 4.7 look like if the improvements are included?

Operations & Maintenance

14. Include Well 11 in Table 7.2.
15. Describe the health advisory procedures that are used by the water department in the event of localized and limited losses of pressure in the distribution system (Chapter 7). What are the notification procedures used for customers and health agencies?
16. Page 7-12, Table 7-7. Correct DOH emergency contact information to "after-hours" emergency DOH number and add John Ryding, at 253-395-6757 for day time.

17. Coliform Monitoring Plan.

    a. There are numerous instances in the CMP where the site of the routine sample is not included in the list of repeat samples. After a positive routine sample the routine sample site must be used for one of the three repeat samples. Please update your repeat sample sites where needed.

    b. Provide a map of the CMP routine (required) and repeat (recommended) sample site locations.

18. The City is still not a member of WAWARN, why not? DOH highly recommends becoming a member. FEMA states prior to reimbursing, they will ask for mutual aid documentation. Becoming a WAWARN member demonstrates both managerial and financial capacity.

19. Cross Connection Control (CCC). Per the July 13, 2017 pre-plan notes, provide a summary about customer survey response rate and next implementation tasks for this planning period.

Water Use Efficiency (WUE), Water Resources, and Source Protection

20. Page 4-18. Per WAC 246-290-100 (e) (ii), provide a "source of supply analysis, which includes: (A) An evaluation of water supply alternatives if additional water rights will be pursued within twenty years; and (B) A narrative description of the system's water supply characteristics and the foreseeable effect from current and future use on the water quantity and quality of any body of water from which its water is diverted or withdrawn based on existing data and studies.

21. Page 5-1. Your WUE goal can be extended for the 10 year planning period per the 2017 planning WAC change. Expanding the plan update consumer meeting into a public forum is possible by placing a notice on the DOH website at least 2 ½ weeks in advance, and following WAC 246-290-830.

22. Page 6-13. Per the 2017 pre-plan notes, provide documentation of educational letters sent to residential property owners within your 1-year time-of-travel (TOT) and businesses in your 10-year TOT.

Financial Capacity and Capital Improvement Plan (CIP)

23. In 2018, DOH implemented a more in-depth asset management discussion in water system plans, and DOH commends the City for beginning asset management program implementation. Be advised in your next plan update, DOH will be looking for critical components to be identified in a table with age, life expectancy, condition rating, useful life left, replacement cost, and criticality. The DWSRF loan program currently provides bonus points for providing this information with an application.

24. Page 9-9. The Mayor and City Council have a fiduciary responsibility to the water system per WAC 246-290-100 (1) (j) to demonstrate financial viability. DOH commends your ordinance #1319 for the 2019 and 2020 rate increases. This plan identifies the need for an annual rate increase throughout the 10-year planning period in order to pay for the CIP. However, it appears there is no City commitment. The American Society of Civil Engineers recent report gives drinking water infrastructure a "D Grade." This fact may provide some support as you work toward the rate increases you need to fund this plan.

    A commonly used website by government utility loan programs is American FactFinder. This site shows the City of Gig Harbor's Median Household Income (MHI) at $74,159. Gig Harbor's average 2018 water rate (at usage of 205 gpd/ERU) is approx. $38.21/month per residential connection (page 9-1). This is 0.6 percent of the MHI for your area. The state and federal "affordability" index ranges between 1.5 - 2.5% for drinking water. This means there is room to create a more sustainable rate structure which funds the important projects in the plan.

    Setting a rate for the "full-cost" of providing water, and in order to, not create intergenerational inequity is the new way to improve financial viability. Many utilities are adding a capital project surcharge to their rate structures and showing it on the bill so customers understand that it takes both annual O & M expenses, as well as some replacement funding, to keep a water system financially viable. Also, it is good to let the customers know in good economic times that aging infrastructure is a huge capital expense, and rates need to be increased in order to not "kick the can" to the next generation.

    a. Does the City have a financial policy for creating a dedicated capital project reserve fund?
    b. What is the City's water system depreciation policy for how much aging infrastructure gets funded annually?
    c. Does the City have a capital replacement surcharge identified on customer bills?

25. Page 4.4.4. Provide a 20th year capital project list in the plan per WAC 246-290-100 (4) (i). The projects identified for the "non-reliable" wells are not in the 10-year schedule. What is the timeline for these projects, as well as others not funded? If they are to be funded in the next planning period, it is vital to know what is coming "downstream" in order to financially prepare.

26. CIP Project 8.3.1.5 describes an emergency intertie with the Canterwood Water System. The owner of the water system is Peninsula Light Company, not Washington Water Service.

Other Documentation

27. Provide the following documentation:
    a. PE stamp.
    b. Adjacent utility correspondence, if any.
    c. Consumer meeting for the 2018 WSP update.
    d. SEPA Threshold Determination and filing date on SEPA register.
    e. Elected Governing Body approval of the plan.

We hope that you have found these comments to be clear, constructive and helpful in the development of your final draft WSP. We ask that you submit the revised WSP on or before **July 16, 2019**. In order to expedite the review of your revised submittal, please include a cover letter summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.).

Regulations establishing a schedule of fees for review of planning, engineering, and construction documents were adopted August 3, 2007 (WAC 246-290-990). The total cost is **$3,705.00**. An itemized invoice for the review of this project has been sent to the DOH primary contact on file for your water system. Please note that this fee covers our current review and one more submittal for this project. If additional submittals are required, then an invoice for additional fees will be included with our final approval letter. Please remit complete payment in the form of a check or money order within thirty days of the date of this letter in the enclosed envelope or mail payment to: **WSDOH, Revenue Section, PO Box 1099, Olympia WA 99507-1099**.

Thank you again for submitting your draft Water System Plan for our review.

Sincerely,

Jennifer Kropack
Regional Planner
253-395-6769

John Ryding, PE
Regional Engineer
253-395-6757

Enclosure: Invoice

Cc: Kenneth Andrews, PW Superintendent - Invoice
Trent Ward, City Engineer
Lara R. Kammereck, PE, Carollo
Tacoma-Pierce County Health Department
Vaughn Cary/Dan Cardwell, Pierce County, Planning & Public Works
Tammy Hall, Ecology, SWRO

Washington State Department of Health
Division of Environmental Health
Drinking Water

Local Government Consistency Determination Form

Water System Name: City of Gig Harbor PWS ID: 276009

Planning/Engineering Document Title: 2018 Comprehensive Water System Plan Update

Plan Date: March 2022

Local Government with Jurisdiction Conducting Review: City of Gig Harbor

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.	3-1 to 3-3	Yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	3-1 to 3-5	Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	2-2 to 2-5	Yes
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	2-2 to 2-5	Yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Throughout	Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature

4/4/22
Date

Ramona Knutson
Community Development Director
Gig Harbor

Appendix C

STATE ENVIRONMENTAL POLICY ACT (SEPA) CHECKLIST AND DETERMINATION OF NON-SIGNIFICANCE (DNS)

To be Completed by Applicant

RECEIVED BY
JUN 19 2017
CITY OF GIG HARBOR

Evaluation for Agency Use Only

ENVIRONMENTAL CHECKLIST

1. Proponent ©: **City of Gig Harbor**

   Address: **3510 Grandview Street**

   Gig Harbor, WA 98335

   Phone: **(253) 851-6170**

2. Representative: _____ Related Cases:

   Address: **3510 Grandview Street**

   Gig Harbor, WA 98335

   Phone: **(253) 851-6170**

3. Property Address or location (e): **City of Gig Harbor and its Urban Growth Area**

4. 1/4 S/T/R (f): **N/A**

5. Tax Parcel # (g): **N/A**

6. Total Acres: **N/A**

7. Permit Type: **N/A**

8. Zoning: **N/A**

9. Shoreline Environment: **N/A**

10. Water Body: **N/A**

* * * * * OFFICIAL USE ONLY * * * * *

SEPA # (a): 17-0009

Case # (b): PL-comp-17-0003

Date Received: 6/19/17 By:

Submittal: Complete___ Incomplete

Information Requested:

Proposal (d):

* * * * * OFFICIAL USE ONLY * * * * *

11. Brief Description of the proposal and Project Name:

This non-project action checklist is for the proposed Water, Wastewater, and Storm Drainage Elements updates to the City of Gig Harbor Comprehensive Plan.

12. Estimated Completion Date: **June 30, 2018**

13. List of all Permits, Licenses or Government Approvals Required for the Proposal (federal, state and local -- including rezones):

Adoption of ordinance by City Council by June 30, 2018; Concurrence by Dept of Health (Water System Plan), Dept of Ecology (Wastewater Plan) and Dept of Commerce (All Updates); City Council Committees; Applicable City Commissions.

14. Do you have any plans for future additions, expansion or further activity related to or connected with this proposal? If yes, explain:

N/A

15. Do you know of any plans by others which may affect the property covered by your proposal? If yes, explain:

N/A

16. Proposed timing or schedule (including phasing, if applicable):

N/A

17. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

City of Gig Harbor Comprehensive Plan Amendment, Updating of Water System, Wastewater and Stormwater Functional Plans.

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other
N/A

b. What is the steepest slope on the site (approximate percent slope)?
N/A

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.
N/A

d. Are there surface indicators or history of unstable soils in the immediate vicinity? If so, describe.
N/A

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.
N/A

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
N/A

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?
N/A

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

N/A

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 known.

N/A

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

N/A

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

N/A

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.

N/A

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

N/A

(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.

N/A

(4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

N/A

(5) Does the proposal lie within a 100-year flood plain? If so, note location on the site plan.

N/A

(6) Does the proposal involve any discharge of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

N/A

b. Ground

(1) Will ground water be withdrawn, or will water be discharge to ground water? Give general description, purpose, and approximate quantities if known.

N/A

(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 systems(s) are expected to serve.

N/A

c. Water Runoff (including stormwater)

(1) Describe the source of runoff (including stormwater) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

N/A

(2) Could waste materials enter ground or surface waters? If so, generally describe.

N/A

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

N/A

4. Plants

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

_Deciduous tree: alder, maple, aspen, other
___ Evergreen Tree: fir, cedar, pine, other
___ Shrubs
_Grass
_ Pasture
___ Crop or grain
___ Wet soil plants: cattail, buttercup, bullrush, 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?
N/A

c. List threatened or endangered species known to be on or near the site.
N/A

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
N/A

5. Animals

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

Birds: hawk ☐ heron ☐ eagle ☐ songbirds ☐ other ☐

Mammals: deer ☐ bear ☐ elk ☐ beaver ☐ other ☐

Fish: bass ☐ salmon ☐ trout ☐ herring ☐ shellfish ☐ other ☐

b. List any threatened or endangered species known to be on or near the site.
N/A

c. Is the site part of a migration route? If so, explain.
N/A

d. Proposed measures to preserve or enhance wildlife, if any:
N/A

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.
N/A

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
N/A

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:
N/A

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.
N/A

(1) Describe special emergency services that might be required.
N/A

(2) Proposed Measures to reduce or control environmental health hazards, if any:
N/A

b. Noise

(1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
N/A

(2) What types and level of noise would be created by or associated with the project on a short-term or a long-terms basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.
N/A

(3) Proposed measures to reduce or control noise impacts, if any:
N/A

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?
N/A

b. Has the site been used for agriculture? If so, describe.
N/A

c. Describe any structures on the site.
N/A

d. Will any structures be demolished? If so, what?
N/A

e. What is the current zoning classification of the site?
N/A

f. What is the current comprehensive plan designation of the site?
N/A

g. If applicable, what is the current Shoreline Master Program designation of the site?
N/A

h. Has any part of the site been classified an "environmentally sensitive" area? If so, specify.
N/A

i. Approximately how many people would reside or work in the completed project?
N/A

j. Approximately how many people would the completed project displace?
N/A

k. Proposed measures to avoid or reduce displacement impacts, if any?
N/A

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
N/A

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high-, middle-, or low-income housing.
N/A

b. Approximately how many units, if any, would be eliminated? Indicate whether high-, middle-, or low-income housing.
N/A

c. Proposed measures to reduce or control housing impacts, if any:
N/A

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?
N/A

b. What views in the immediate vicinity would be altered or obstructed?
N/A

c. Proposed measures to reduce or control aesthetic impacts, if any:
N/A

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
N/A

b. Could light or glare from the finished project be a safety hazard or interfere with views?
N/A

c. What existing off-site sources of light or glare may affect your proposal?
N/A

d. Proposed measures to reduce or control light and glare impacts, if any:
N/A

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?
N/A

b. Would the proposed project displace any existing recreational uses? If so, describe.
N/A

c. Proposed measures to reduce or control impacts on recreation including recreation opportunities to be provided by the project or applicant, if any:
N/A

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.
N/A

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.
N/A

c. Proposed measures to reduce or control impacts, if any:
N/A

14. Transportation

a. Identify public streets and highways service the site, and describe proposed access to the existing street system. Show on site plans, if any.
N/A

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?
N/A

c. How many parking spaces would the completed project have? How many would the project eliminate?
N/A

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).
N/A

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
N/A

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.
N/A

g. Proposed measures to reduce or control transportation impacts, if any:
N/A

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)? If so, generally describe.
N/A

b. Proposed measures to reduce or control direct impacts on public services, if any.
N/A

16. Utilities

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

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.

N/A

SIGNATURE

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

Date Submitted: 6/19/17 Signature: [signature]

SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS
(do not use this sheet for project actions)

Non-project proposals are those which are not tied to a specific site, such as adoption of plans, policies, or ordinances.

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?
   The text revisions proposed by this SEPA action reflect updates to the utility functional comprehensive plans. They will not likely affect discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise.

   Proposed measures to avoid or reduce such increases are:
   None

2. How would the proposal be likely to affect plants, animals, fish, or marine life?
   Proposed changes are not likely to affect plants, animals, fish, or marine life.

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:
   None

3. How would the proposal be likely to deplete energy or natural resources?
   It would not be likely to deplete energy or natural resources.

   Proposed measures to protect or conserve energy and natural resources are:
   None

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, flood plains, or prime farmlands?
   Proposed changes will not likely affect areas listed in the paragraph above.

   Proposed measures to protect such resources or to avoid or reduce impacts are:
   None

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?
   No proposed changes are likely to affect land and shoreline use that would be incompatible with the city's Shoreline Master Program

   Proposed measures to avoid or reduce shoreline and land use impacts are:
   None

6. How would the proposal be likely to increase demands on transportation or public services and utilities?
   These proposals will not likely increase demands on transportation or public services.

   Proposed measures to reduce or respond to such demand(s) are:
   None

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of environment.
   No changes are anticipated to conflict with local, state, or federal laws or requirements.

GIG HARBOR
"THE MARITIME CITY"

DEVELOPMENT SERVICES

Determination of Nonsignificance (DNS)
W.A.C. 197-11-970

Environmental Review Application No.: PL-SEPA-17-0001, PL-SEPA-17-0009, PL-SEPA-17-0010.

Parcel Numbers: See individual proposals for applicable parcel numbers

Action: 2016 Annual Comprehensive Plan Amendments

INDIVIDUAL PROPOSALS

1. PL-SEPA-17-0001: 2017 Comprehensive Plan Amendments. Review and update of the multiple Comprehensive Plan elements to address requested amendments from PSRC regarding consistency with VISION2040 and updates under the Growth Management Act. A complete update the Transportation Element and adoption of the City of Gig Harbor Active Transportation Plan.
Location: City Wide

Proponent: City of Gig Harbor, 3510 Grandview Street, Gig Harbor, WA 98335

2. PL-SEPA-17-0009: Water, Wastewater and Storm Systems Functional Plan Updates. Six-year update to the City's functional plans for the water, wastewater and storm system, including updates to the City's Capital Facilities Element to ensure consistency as required under state law.
Location: City wide – Proposal is not site-specific

Proponent: City of Gig Harbor, 3510 Grandview Street, Gig Harbor, WA 98335

3. PL-SEPA-17-0010: Henderson Comprehensive Plan Amendment and associated Development Agreement. Private application requesting a land use map amendment from Residential Low to Residential High Transition. Additionally, the applicant has requested a concurrent development agreement to shift additional density to the site requesting the land use map amendment from adjacent properties.

Location: 6014 and 6016 Woodhill Drive NW, Gig Harbor WA 98332 (Tax

ID Nos. 0122258002, 0122258003, 0122254011, 0122254011)

Proponent: Henderson Burnham LLC, 11126 Vipond Drive NW, Gig Harbor WA 98332

Lead Agency: City of Gig Harbor
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 43.21C.030(2)(c). This 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 upon request.

[x] This DNS is issued under WAC 197-11-340(2); **Comments must be submitted by September 3, 2018**.

Any interested person may appeal the adequacy of this SEPA Threshold Determination to the Gig Harbor City Council pursuant to the procedures set forth under Chapter 18.04 of the Gig Harbor Municipal Code if a written request for appeal is received within 7 days after the end of the comment period, or September 10, 2018, whichever is later. The written appeal must be submitted with a filing fee of three hundred dollars ($300.00).

Contact: Lindsey Sehmel, Senior Planner; Phone: (253) 851-6170

Responsible Official: Jennifer Kester
Position Title: Planning Director Phone: (253) 851-6170

Address: City of Gig Harbor
3510 Grandview Street
Gig Harbor, WA 98335

Signature _____ Date: July 5, 2018

cc: Proponents

NOTICE OF DETERMINATION OF NONSIGNIFICANCE

The City of Gig Harbor issued a Determination of Nonsignificance (DNS) under the State Environmental Policy Act Rules (Chapter 197-11-WAC) for the following comprehensive plan amendments:

1. **PL-SEPA-17-0001: 2017 Comprehensive Plan Amendments.** Review and update of the multiple Comprehensive Plan elements to address requested amendments from PSRC regarding consistency with VISION2040 and updates under the Growth Management Act. A complete update the Transportation Element and adoption of the City of Gig Harbor Active Transportation Plan.

2. **PL-SEPA-17-0009: Water, Wastewater and Storm Systems Functional Plan Updates.** Six-year update to the City's functional plans for the water, wastewater and storm system, including updates to the City's Capital Facilities Element to ensure consistency as required under state law.

3. **PL-SEPA-17-0010: Henderson Comprehensive Plan Amendment and associated Development Agreement.** Private application requesting a land use map amendment from Residential Low to Residential High Transition. Additionally, the applicant has requested a concurrent development agreement to shift additional density to the site requesting the land use map amendment from adjacent properties.

After review of the completed environmental checklists and other information on file with the agency, the City of Gig Harbor has determined the above proposal will not have a probable significant adverse impact on the environment.

Copies of the DNS are available at no charge from the City of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335. Telephone: (253) 851-6170.

Two public hearings on the proposed comprehensive plan amendments is tentatively scheduled before the City of Gig Harbor Planning Commission on Thursday July 19, 2018 at 6 p.m. and with the City of Gig Harbor City Council on September 24, 2018 at 5:30 p.m. in the Gig Harbor Civic Center Council Chambers located at 3510 Grandview Street. The public is invited to comment on this DNS at the public hearing, or by submitting written comments to the above address no later than **September 3, 2018**. This DNS does not become final until the end of the comment period. The deadline for appealing the final SEPA Threshold Determination is **September 10, 2018**.

Publish – Legal Notice - Peninsula Gateway – July 5, 2018

Appendix D

CURRENT WATER FACILITY INVENTORY FORM

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 05/03/2018
Printed: 5/24/2018
WFI Printed For: On-Demand
Submission Reason: Source Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
27600 9	GIG HARBOR WATER DEPT	PIERCE	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 002145
KENNETH R. ANDREWS [PW SUPERINTENDENT] 3510 GRANDVIEW ST GIG HARBOR, WA 98335	GIG HARBOR WATER DEPT GREGORY M. FOOTE PW SUPERVISOR 3510 GRANDVIEW ST GIG HARBOR, WA 98335	

STREET ADDRESS IF DIFFERENT FROM ABOVE	STREET ADDRESS IF DIFFERENT FROM ABOVE
ATTN	ATTN
ADDRESS	ADDRESS
CITY STATE ZIP	CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (253) 851-8136		Owner Daytime Phone: (253) 851-8136	
Primary Contact Mobile/Cell Phone: (253) 377-9410		Owner Mobile/Cell Phone: (360) 621-2274	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone:	
Fax:	E-mail: xxxxxxxxxxxxxxxxxxx	Fax:	E-mail: xxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

[x] Agricultural	[x] Hospital/Clinic	[x] Residential
[x] Commercial / Business	[ ] Industrial	[x] School
[x] Day Care	[x] Licensed Residential Facility	[ ] Temporary Farm Worker
[x] Food Service/Food Permit	[x] Lodging	[x] Other (church, fire station, etc.):
[ ] 1,000 or more person event for 2 or more days per year	[ ] Recreational / RV Park	_____

13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
[ ] Association	[ ] County	[ ] Investor	[ ] Special District	
[x] City / Town	[ ] Federal	[ ] Private	[ ] State	4,750,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
27600 9	GIG HARBOR WATER DEPT	PIERCE	A	Comm

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	InAct 11/16/1992 JUDSON ST		X										X									X	246	120	SE NE	08	21N	02E
S02	WELL #2-TOWN PARK (AAF346)		X										X			Y		X					116	280	SW SE	32	22N	02E
S03	WELL #3-HIGH LEVEL (AAF349)		X										X			Y		X					745	500	NE SE	17	21N	02E
S04	WELL #4 HARBOR HEIGHTS (AAF348)		X										X			Y		X					399	200	NE SW	08	21N	02E
S05	WELL #5 NORTH CREEK (AAF347)		X										X			Y		X					705	625	SE NW	07	21N	02E
S06	WELL #6 NORTH CREEK (AAF351)		X										X			Y		X					566	975	SE NW	07	21N	02E
S07	InAct 12/31/1993 PERROW WELL		X										X									X	393	40	SW NW	31	22N	02E
S08	RUSHMORE (AAF350)		X										X			Y						X	231	14	SE SE	17	21N	02E
S09	Well 11 BAL876		X										X			Y						X	599	1000	NW SW	06	21N	02

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
27600 9	GIG HARBOR WATER DEPT	PIERCE	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		3237	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	1992		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	103		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	1245		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	365	365	
28. TOTAL SERVICE CONNECTIONS		3602	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 6636

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?	2200	2200	2200	2200	2200	2800	3300	3300	3300	2800	2200	2200
B. How many days per month is water accessible to the public?	31	28	31	30	31	30	31	31	30	31	30	31

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?	3250	3250	3250	3250	3250	1619	1619	1619	3250	3250	3250	3250
B. How many days per month are they present?	31	28	31	30	31	30	31	31	30	31	30	31

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	10	10	10	10	10	9	9	9	10	10	10	10

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

WS ID	WS Name
27600	GIG HARBOR WATER DEPT

Total WFI Printed: 1

Appendix E

STANDARD SERVICE AGREEMENTS

3510 GRANDVIEW STREET
GIG HARBOR, WASHINGTON 98335
PHONE: (253) 851-6170
www.cityofgigharbor.net

S/B ACCT #: _____
LOT #: _____

UTILITIES SERVICE APPLICATION

Application No. _____ Parcel No. _____ Date _____

Applicant _____ Phone # _____

Mailing Address _____

STORM WATER GENERAL FACILITY CHARGE & CALCULATION:

Impervious Area (sf)	Calculation 2,200 sf = 1 unit	Units
General Facility Charge: $1,770.00 per unit		Total Fees
		$

Connection/Service ADDRESS OR LOCATION: _____

Subdivision _____ Lot No. _____

Date of Hook-Up _____ Meter No. _____ Size _____ Seq # _____

Account No. _____ Meter Location _____

WATER SERVICE GENERAL FACILITY CHARGE & METER INSTALLATION CHARGES:

Meter Size	Capacity Factor(s)	General Facility Charge (Inside City Limits)	General Facility Charge (Outside City Limits)	Meter Charge	Total Fees
3/4"	1.00	$ 7,300.00	$ 10,950.00	$ 486.00	$
1"	1.67	$ 12,191.00	$ 18,286.50	$ 567.00	$
1-1/2"	3.33	$ 24,309.00	$ 36,463.50	$1,130.00	$
2"	5.33	$ 38,909.00	$ 58,363.50	$1,800.00	$
Over 2"	(per AWWA formula)	$ (per City formula)	$ (per City formula)	$ (TBD)	$

IMPACT & WATER LATECOMER FEES:

Park Impact Fees	**Residential** @ $1,500.00	$
Transportation Impact Fees	**Residential** @ $2,124.00 **Commercial/Multi** @ $ _____	$
School Impact Fees	**Residential** @ $3,858.00 **Multi-Family Units** @ $2,035.00 per unit	$
Water Latecomer Fees	**Latecomer Fee Calculation** $_____ **Administration Fee** $_____	$

TOTAL STORMWATER, WATER, IMPACT & LATECOMER CHARGES: $_____.____

BASIC SEWER SYSTEM GENERAL FACILITY CHARGE:

General Facility Charge – Inside City Limits: $ 9,640.00	# ERU's *	Total Fee
General Facility Charge - Outside City Limits: $ 14,460.00		$ _____ .00

- Equivalent Residential Unit Calculation for non-residential service:

* _____ (____ERU's per _____) X (_____) = _____
Class of Service | Conversion rate for appropriate unit (sq. ft., seats, students, etc.) | Number of units | Equivalent ERU's

SPECIAL CHARGES:

Check (X)	Type of Fee	Fee
	Encroachment Permit Application & Fee	$250.00
	Sewer Stub Inspection Fee	$125.00
	House Stub Inspection Fee ($25 in city / $37.50 out - SFR only)	
	As-Built Plans Fee - (Refundable - SFR only)	$150.00
	Sewer Latecomers Fee/Administration Fee	

Total from Side One (Water, Impact & Latecomer): _____

Sewer System Connection Fees: _____

Special Charges: _____

TOTAL _____

Application is hereby made by the undersigned property owner for the above stated utilities in the amount of: _____, at the above stated location, for the following purposes: _____, for which I agree to pay in advance the above estimated charges, the exact charges shall be paid as established by City Resolution, and will be determined at the time a water availability certificate issues and be payable immediately.

I further agree that all rates and charges for water service to the above property shall be paid in accordance with the now-existing ordinances and regulations of the City, or any ordinances and regulations passed hereafter.

I understand that the City will use all reasonable effort to maintain uninterrupted service, but reserves the right to shut off the water at any time without notice for repairs, expansions, nonpayment of rates or any other reason and assumes no liability for any damage as a result or interruption of service from any cause whatsoever.

I understand that if the City issues a water availability certificate to me, such certificate shall be subject to all ordinances and regulations of the City, as they now exist or may hereafter be amended, and that such certificate expires within three (3) years from the date of issuance. If I do not pay the required fees and request an actual hook-up or connection to the above-identified individual parcel of property within this time period, a water availability certificate may be revoked.

I understand that the City shall maintain ownership in such water meters installed by the City and the City shall be responsible for providing reasonable and normal maintenance to such meters.

_____, _____
Applicant's Signature | Date

TO BE COMPLETED BY STAFF ONLY:

Receipt No.	Fees Paid	Date
Receipted By:	Building Official	

ORDINANCE NO. 1181

AN ORDINANCE OF THE CITY OF GIG HARBOR, WASHINGTON, RELATING TO GROWTH MANAGEMENT AND PLANNING, MAKING THE FOLLOWING AMENDMENTS TO THE CITY OF GIG HARBOR COMPREHENSIVE PLAN FOR THE 2009 ANNUAL CYCLE: ADDING A 3.69 ACRE PARCEL LOCATED AT THE SOUTHEAST CORNER OF WOLLOCHET DRIVE AND STATE ROUTE 16 TO THE CITY'S WATER SERVICE AREA (COMP 09-0001); REPEALING THE PARKS RECREATION AND OPEN SPACE ELEMENT (COMP 09-0002); AMENDING THE TRANSPORTATION ELEMENT TO UPDATE THE SHORT-RANGE AND LONG-RANGE TRANSPORTATION IMPROVEMENT PLANS AND ADD POLICIES RELATED TO VEHICULAR AND PEDESTRIAN ACCESS IN THE DOWNTOWN AREA (COMP 09-0003); AMENDING THE COMPREHENSIVE PLAN LAND USE MAP TO CHANGE THE LAND USE DESIGNATION FOR 15.53 ACRES OF PROPERTY LOCATED ALONG BURNHAM DRIVE AND 112TH STREET NW FROM EMPLOYMENT CENTER (EC) TO COMMERCIAL/BUSINESS (C/B) (COMP 09-0004); ADOPTING A NEW STORMWATER COMPREHENSIVE PLAN (COMP 09-0007); ADOPTING A NEW WASTEWATER COMPREHENSIVE PLAN (COMP 09-0008); ADOPTING A NEW WATER SYSTEM PLAN (COMP 09-0009); AMENDING THE CAPITAL FACILITIES ELEMENT TO UPDATE THE SIX-YEAR IMPROVEMENT PROJECT LISTS (COMP 09-0010); AMENDING THE UTILITIES ELEMENT TO BE CONSISTENT WITH THE NEW WATER SYSTEM PLAN (COMP 09-0011); ADDING TWO PARCELS, 4.16 ACRES, LOCATED AT THE SOUTHEAST CORNER OF HUNT STREET AND STATE ROUTE 16 TO THE CITY'S WATER SERVICE AREA (COMP 09-0013) .

WHEREAS, the City of Gig Harbor plans under the Growth Management Act (chapter 36.70A RCW); and

WHEREAS, the Act requires the City to adopt a Comprehensive Plan; and

WHEREAS, the City adopted a revised GMA Comprehensive Plan as required by RCW 36.70A.130 (4) in December 2004; and

WHEREAS, the City is required to consider suggested changes to the Comprehensive Plan (RCW 36.70A.470); and

WHEREAS, except under circumstances not applicable here, the City may not amend the Comprehensive Plan more than once a year (RCW 36.70A.130); and

WHEREAS, the City is required to provide public notice and public hearing for any amendments to the Comprehensive Plan and the adoption of any elements thereto (RCW 36.70A.035, RCW 36.70A.130); and

WHEREAS, on May 11, 2009, the City Council evaluated the comprehensive plan amendment applications submitted for the 2009 annual cycle, and held a public hearing on such applications; and

WHEREAS, on May 26, 2009, the City Council forwarded twelve comprehensive plan amendment applications to the Planning Commission for further processing in the 2009 Comprehensive Plan annual cycle; and

WHEREAS, on July 16, 2009, the City's SEPA Responsible Official issued a Determination of Non-Significance (DNS) for comprehensive plan amendment applications, pursuant to WAC 197-11-340(2), which was not appealed; and

WHEREAS, the Planning Director notified the Washington State Department of Commerce of the City's intent to amend the Comprehensive Plan and forwarded a copy of the proposed amendments on July 16, 2009 pursuant to RCW 36.70A.106; and

WHEREAS, the Planning Commission held work study sessions on to discuss the applications on June, 18, 2009, July 16, 2009, July 30, 2009, August 6, 2009, August 20, 2009, September 3, 2009, September 17, 2009, September 24, 2009 and October 21, 2009; and

WHEREAS, the Planning Commission held public hearings on comprehensive plan amendments on July 16, 2009, July 30, 2009 and September 17, 2009; and

WHEREAS, on October 21, 2009 the Planning Commission voted to recommend approval of all twelve proposed amendments as documented in the Planning Commission's written recommendations signed by Planning Commission Chair, Harris Atkins, all dated October 21, 2009; and

WHEREAS, on November 9, 2009, the Gig Harbor City Council held a public hearing on all twelve proposed amendments to the Gig Harbor Comprehensive Plan for the 2009 annual review cycle; and

WHEREAS, the Gig Harbor City Council had a first reading of an Ordinance amending the Comprehensive Plan on November 23, 2009; and

WHEREAS, the Gig Harbor City Council had a second reading of an Ordinance amending the Comprehensive Plan on December 14, 2009;

Now, Therefore,

THE CITY COUNCIL OF THE CITY OF GIG HARBOR, WASHINGTON, ORDAINS AS FOLLOWS:

Section 1. Comprehensive Plan Text Amendments.

A. **Notice.** The City Clerk confirmed that public notice of the public hearings held by the City Council on the following applications was provided.

B. **Hearing Procedure**. The City Council's consideration of the comprehensive plan text amendments is a legislative act. The Appearance of Fairness doctrine does not apply.

C. **Testimony.** The following persons testified on the applications at the November 9, 2009 public hearing:

(COMP 09-0001) Michael Desmarteau, Paul Cyr; (COMP 09-0004) Walter Smith, Carl Halsan; (COMP 09-0005) Kathryn Jerkovich, Lee Murray, Patricia Manning, Mark Hoppen; (COMP 09-0009) Jim Pasin; (COMP 09-0012) Carl Halsan, Danielle Ittner, John McMillan, Kurt Salmon, Mark Hoppen, Bill Fogarty, Cliff Petersen, William Lynn; (COMP 09-0013) Paul Cyr.

D. **Criteria for Approval.** The process for Comprehensive Plan amendments (Chapter 19.09) states that the City Council shall consider the Planning Commission's recommendations and after considering the criteria found in GHMC 19.09.170 make written findings regarding each application's consistency or inconsistency with the criteria. The criteria found in GHMC 19.09.170 are as follows:

19.09.170 Criteria for approval.

A. The proposed amendment meets concurrency requirements for transportation as specified in Chapter 19.10 GHMC;

B. The proposed amendment will not adversely impact the city's ability to provide sewer and water, and will not adversely affect adopted levels of service standards for other public facilities and services such as parks, police, fire, emergency medical services and governmental services;

C. The proposed amendments will not result in overall residential capacities in the city or UGA that either exceed or fall below the projected need over the 20-year planning horizon; nor will the amendments result in densities that do not achieve development of at least four units per net acre of residentially designated land;

D. Adequate infrastructure, facilities and services are available to serve the proposed or potential development expected as a result of this amendment, according to one of the following provisions:

1. The city has adequate funds for needed infrastructure, facilities and services to support new development associated with the proposed amendments; or

2. The city's projected revenues are sufficient to fund needed infrastructure, facilities and services, and such infrastructure, facilities and

services are included in the schedule of capital improvements in the city's capital facilities plan; or

3. Needed infrastructure, facilities and services will be funded by the developer under the terms of a developer's agreement associated with this comprehensive plan amendment; or

4. Adequate infrastructure, facilities and services are currently in place to serve expected development as a result of this comprehensive plan amendment based upon an assessment of land use assumptions; or

5. Land use assumptions have been reassessed, and required amendments to other sections of the comprehensive plan are being processed in conjunction with this amendment in order to ensure that adopted level of service standards will be met.

E. The proposed amendment is consistent with the goals, policies and objectives of the comprehensive plan;

F. The proposed amendment will not result in probable significant adverse impacts to the transportation network, capital facilities, utilities, parks, and environmental features which cannot be mitigated and will not place uncompensated burdens upon existing or planned services;

G. In the case of an amendment to the comprehensive plan land use map, that the subject parcels being redesignated are physically suitable for the allowed land uses in the designation being requested, including compatibility with existing and planned surrounding land uses and the zoning district locational criteria contained within the comprehensive plan and zoning code;

H. The proposed amendment will not create a demand to change other land use designations of adjacent or surrounding properties, unless the change in land use designation for other properties is in the long-term interest of the community in general;

I. The proposed amendment is consistent with the Growth Management Act, the countywide planning policies and other applicable interjurisdictional policies and agreements, and/or other state or local laws; and

J. The proposed effect of approval of any individual amendment will not have a cumulative adverse effect on the planning area.

E. Applications. The City Council hereby enters the following findings and conclusions for each application:

1. COMP 09-0001 – Wollochet Water System Service Area Amendment

Summary: A water system service area amendment from Stroh's Water Company's service area to the City of Gig Harbor water service area for a 3.69 acre, vacant parcel located at the southeast corner of Wollochet Drive and SR 16.

Findings:

a) The amendment will not adversely impact the city's ability to provide water service. The City currently has water capacity to reserve for future development. The development of the subject parcel would require an

estimated 12,560 to 18,840 gallons per day of water and the City has over 200,000 gallons per day of water available for reservation. The city is also actively pursuing additional water rights from the Department of Ecology.

b) Adequate water service infrastructure is currently in place to serve the parcel with a minor extension of a water main. The City of Gig Harbor water service area exists adjacent to the property along Wollochet Drive. A City water main exists at the intersection of Wollochet Drive and Wagner Way approximately 350 feet south of the subject site. The developer would be required to extend the water main approximately 350 feet to service the site.
c) The water system plan allows limited expansion of the city's water service area. Comprehensive Plan Policy 2.1.3 Serviceable Areas states that urban uses should be allocated to lands which can be provided roads, sewer, water, storm drainage and other basic urban utilities and transportation facilities. Given the location of transportation services and water mains in relation to the subject property, urban development is appropriate. Redevelopment of this vacant property will be a value to the community
d) The water service amendment will not place uncompensated burdens on the existing water purveyor and customers as the developer will pay for the water main extensions and connection fees. With the proposed conditions, any fees incurred by the city for changing the water service area will be reimbursed by the applicant.
e) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
f) The City Council finds that the approval of this amendment will not have a cumulative adverse effect on the City. The City has a finite number of water ERUs to reserve to customers in the current service area, with over 1,000 water ERUs available.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approves** application COMP 09-0001, as identified in Exhibit A attached to this Ordinance with the following **conditions**:

1) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all consultant and legal expenses paid by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment; and
2) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all fees paid to the State of Washington and Pierce County by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment.

2. Parks, Transportation, Utility and Capital Facility Amendments. The Council made findings and conclusions on the following seven (7) amendments together:

Summary:

a) **COMP 09-0002**: **Parks, Recreation and Open Space Element**
   An amendment to repeal the existing PROS element, as identified in Exhibit B attached to this Ordinance
b) **COMP 09-0003: Transportation Element**
   Amendments to create a general short-range and long-range transportation improvement plans that will serve as a basis for the 6-year Transportation Improvement Plan (TIP) adopted each year and add policies related to vehicular and pedestrian access in the downtown area, as identified in Exhibit C attached to this Ordinance
c) **COMP 09-0007**: **Stormwater Comprehensive Plan**
   Adoption of a new Stormwater Comprehensive Plan, as identified in Exhibit D attached to this Ordinance
d) **COMP 09-0008**: **Wastewater Comprehensive Plan**
   Adoption of a new Wastewater Comprehensive Plan, as identified in Exhibit E attached to this Ordinance
e) **COMP 09-0009**: **Water System Plan**
   Adoption of a new Water System Plan for the City's water service area, as identified in Exhibit F attached to this Ordinance
f) **COMP 09-0010: Capital Facilities Element**
   Amendments to update the stormwater, wastewater, water system, parks, recreation and open space, and transportation improvement projects included in the Capital Facilities Plan, as identified in Exhibit G attached to this Ordinance
g) **COMP 09-0011: Utilities Element**
   An amendment to update the Utilities Element to be consistent with the new Water System Plan, as identified in Exhibit H attached to this Ordinance

Findings:

a) The amendments will improve the City's ability to provide sewer, water and other public facilities and services through updated funding mechanisms and new comprehensive utility plans based on existing conditions.
b) The amendments will update the transportation, sewer, park, stormwater, wastewater, water, parks and open space and capital facilities plan so that the City can provide necessary infrastructure to serve the development projected by the Comprehensive Plan.
c) The City's Comprehensive Plan seeks to keep pace with the population and commercial growth through the funding of capital improvements that manage and allow for the projected growth. The amendments will allow the city to better address the planning area's transportation, sewer, park, stormwater, wastewater, water and open space needs through adequate capital facility planning and funding.

d) The amendments are necessary so as not to create significant adverse impacts to the city's infrastructure. Updating the transportation, sewer, park, stormwater, wastewater, water, parks and open space and the capital facilities plan allows the City to plan for and provide the necessary infrastructure to serve the development projected by the Comprehensive Plan.
e) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
f) The approval of the amendments will not have a cumulative adverse effect on the City.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approve** applications COMP 09-0002, COMP 09-0003, COMP 09-0007, COMP 09-0008, COMP 09-0009, COMP 09-0010 and COMP 09-0011, as identified in Exhibits B, C, D, E, F, G, and H respectively attached to this Ordinance:

3. COMP 09-0004 – Sunrise Enterprise Land Use Map Amendment

Summary: A land use designation change from Employment Center (EC) to Commercial Business (C/B) of 15.53 acres located along Burnham Drive NW and 112th Street NW, currently occupied by a contractor's yard.

Findings:
a) The city performed a traffic capacity evaluation for the proposed land use designation change. Given the variety of uses allowed in both designations (EC and C/B), it is not possible to determine if an actual increase in trips will occur with the amendment until the specific use for the property is defined. Some uses allowed in the C/B designation will exceed the trip generation of some uses in the EC designation and vice versa. Given this variability, a change from EC designation to C/B designation is not considered an increase in land use intensity. In addition, the city's traffic modeling assumed this property was in the County and regulated by County zoning, given that the property was annexed to the City in March 2009. The County's zoning for this site prior to annexation was Community Commercial which is equivalent to the city's C/B designation.
b) The draft traffic impact analysis provided by the applicant indicated that more trips may be generated as a result of the redesignation. The city will fully evaluate the project once a project permit application is submitted committing to a particular use. If through that permitting process, deficiencies in the City's transportation system will occur, mitigation will be required by the applicant. The city does not believe the change in land use will result in an adverse impact that cannot be mitigated.

c) After an analysis of the anticipated sewer and service impacts under the existing designation and the proposed designation, no significant increase in services or infrastructure needs were documented and; therefore, no adverse impacts to the city's infrastructure. The subject property is not serviced by city water.
d) Goal 6.2.2 of the Economic Development Element encourages increased economic opportunities through the redevelopment of vacant properties and revitalizing older business districts within the city. The amendment will further this goal given that the subject property is under-utilized with outdated buildings.
e) Prior to annexation of this area on March 23, 2009, the County land use designation and zoning for this property was Community Commercial (CC). The CC zoning is most similar to the city's B-2 zoning. The County selected this designation and zoning as part of the Gig Harbor Peninsula Community sub-area plan adopted in 2002. The County and surrounding property owners have been contemplating a commercial designation and zoning of this property for seven years. This amendment will retain the commercial designation which was deemed compatible with the surrounding land uses and physically suitable for the property in 2002.
f) The Commercial/Business land use designation policy states that *"commercial areas which border residential designations or uses should use available natural features as boundaries."* (GHCP 2.2.3d) Residentially designated and zoned land exists both north and south of the proposal. The applicant has indicated that the mining permit for the current use of the subject property includes a 50 foot buffer to the residential use to the north. In addition along the north boundary, steep slopes rise up to the adjacent residential property. To the south, 112th Street NW separates the subject property from the residential zoning. The City Council finds that the existing road separation to the south and the topography in conjunction with a 40-foot zone transition buffer required by the Design Manual to the north is appropriate buffering from the residential zones.
g) The City Council finds that the amendment will not create a demand for land use designation changes in the surrounding areas. A right-of-way bounds the subject property on the south. The property to the east has commercial designations and uses. To the west is a gravel pit under the same ownership as the subject property. They have indicated that the gravel pit will remain in the near future. To the north, a property owner has indicated they may request a comprehensive plan amendment to redesignate his property from residential to commercial. However, the property owner stated he had considered such amendment at the existing EC designation; the C/B designation request does not change that consideration.
h) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
i) The approval of the amendment will not have a cumulative adverse effect on the City.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approves** application COMP 09-0004, as identified in Exhibit I attached to this Ordinance.

4. **Section 1.E.4 intentionally omitted.**

5. **Section 1.E.5 intentionally omitted.**

6. **COMP 09-0013 – Stroh's Water System Service Area Amendment**
Summary: A water system service area amendment from Stroh's Water Company's service area to the City of Gig Harbor water service area for two parcels, totaling 4.16 acres, located south of Hunt Street just east of SR16 and the existing Cushman Trail, currently occupied by Stroh's Feed & Garden Supplies and United Rentals.

Findings:

a) The water system plan allows limited expansion of the city's water service area. Goal 6.2.2 of the Economic Development Element encourages increased economic opportunities through the redevelopment of vacant properties and revitalizing older business districts within the city. Providing city fire flow to an underdeveloped commercial site will further this goal by allowing redevelopment without Stroh's Water Company incurring significant infrastructure costs.
b) Providing fire flow to the subject parcel will not adversely impact the city's ability to provide water service. A 12-inch City water main exists within Hunt Street along the north property line. A basic hook-up to that main would be required to provide water service. Given that the existing development has domestic water rights allocated to it, any redevelopment of the parcel should yield the transfer of those rights to the City provided the City takes over both domestic and fire flow water service. If only fire flow is provided, the city has adequate pressure to service the site and no additional water rights are needed. The water service amendment will not place uncompensated burdens on the existing water purveyor and customers as the developer will pay for connecting to the city's water main and associated fees. Any fees incurred by the city for changing the water service area will be reimbursed by the applicant.
c) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
d) The City Council finds that the approval of this amendment will not have a cumulative adverse effect. Under condition 3a, the City does not reserve any additional water rights. Under condition 3b, the city allows a connection for fire flow only and an underdeveloped parcel is allowed to redevelop.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approves** application COMP 09-0013, as identified in Exhibit L attached to this Ordinance with the following **conditions**:

1) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all consultant and legal expenses paid by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment.
2) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all fees paid to the State of Washington and Pierce County by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment.

3a. IF THE CITY SUPPLIES BOTH DOMESTIC AND FIRE FLOW TO THE SITE: The applicant shall request the Stroh's Water System assign to the City of Gig Harbor from its existing water rights, the quantity required to serve the proposed development consistent with state law, including Washington State Department of Health water system planning statutes and regulations. Should the Stroh's Water System decline the requested assignment, or advise the City that the assignment cannot occur in a manner consistent with law, the applicant is advised that City of Gig Harbor has no duty to serve the subject property and reserves the right not to provide water service. The applicant's request for assignment and Stroh's Water System response shall be documented in writing and provided to the City of Gig Harbor. The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all consultant and legal expenses necessary for assignment of water rights.

OR

3b. IF THE CITY SUPPLIES ONLY FIRE FLOW SUPPLY TO THE SITE: The applicant shall pay the City's water system connection charge in effect at the time of building permit issuance based on the size of each water main serving the fire sprinkler system for the building(s).

Section 2. Transmittal to State. The Planning Director is directed to forward a copy of this Ordinance, together with all of the exhibits, to the Washington State Commerce Department within ten days of adoption, pursuant to RCW 36.70A.106.

Section 3. Severability. If any portion of this Ordinance or its application to any person or circumstances is held by a court of competent jurisdiction to be invalid or

unconstitutional, such invalidity or unconstitutionality shall not affect the remainder of the Ordinance or the application of the remainder to other persons or circumstances.

Section 4. Effective Date. This ordinance shall take effect and be in full force five (5) days after passage and publication of an approved summary consisting of the title.

PASSED by the Council and approved by the Mayor of the City of Gig Harbor this 14th day of December, 2009.

CITY OF GIG HARBOR

Mayor Charles L. Hunter

ATTEST/AUTHENTICATED:

Molly M. Towslee, City Clerk

APPROVED AS TO FORM:
Office of the City Attorney

Angela S. Belbeck

FILED WITH THE CITY CLERK: 11/18/09
PASSED BY THE CITY COUNCIL: 12/14/09
PUBLISHED: 12/23/09
EFFECTIVE DATE: 12/28/09
ORDINANCE NO. 1181

Exhibit “F”
Application COMP 09-0009:
Water System Plan

A copy of the “Water System Plan – 2008” is located in the Public Works Department.

RESOLUTION NO. 740

A RESOLUTION OF THE CITY OF GIG HARBOR, WASHINGTON, REVISING THE CITY'S WATER SERVICE AREA .

WHEREAS, Top Grade Construction Services submitted a land use application in November 2006 to the City for the construction of a condominium and townhouse development on three separate parcels. The condominiums are proposed on a portion of a parcel which is in the City of Gig Harbor's water service area. The townhomes are proposed on two parcels located in Stroh's water service area; and

WHEREAS, a boundary line adjustment, recorded in September 2007, was performed to include both the condominium building and townhomes on one parcel; and

WHEREAS, City Staff recommends that the development be served by one water purveyor throughout the one parcel created by the boundary line adjustment; and

WHEREAS, the Stroh's water system cannot meet the City's required fire flow requirements at this location; and

WHEREAS, the Stroh's water system has indicated a willingness to relinquishment of the right to provide water to this project in a November 21, 2006 letter to the City of Gig Harbor; and

WHEREAS, the City's water comprehensive plan shows these existing boundaries for the water purveyors, but the City and Stroh's have not yet signed any water service agreements establishing the boundaries of their existing and future water service areas;

WHEREAS, the City requested the owner's engineer to review impacts to the City's water system if these two townhome parcels were to connect to the City's water system. The review resulted in no additional impacts with the installation of a looped water main through the proposed development. The City's engineers concur with this determination; and

WHEREAS, the City will be revising its water comprehensive plan during 2008, and the water service boundaries will be changed in accordance with this Resolution at that time; Now, Therefore,

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF GIG HARBOR, WASHINGTON, AS FOLLOWS:

Section 1 The City of Gig Harbor amends the boundaries of its existing water service area to include the property commonly known as the Hunt Highlands development (3200 block of Hunt Street) which is legally described as:

BEGINNING AT THE INTERSECTION OF THE NORTH LINE OF HUNT STREET AND THE WEST LINE OF THE EAST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 21 NORTH, RANGE 2 EAST OF THE W.M.; THENCE ON SAID WEST LINE N 02°22'58" E 630.77 FEET TO THE NORTH LINE OF SAID SUBDIVISION; THENCE ON SAID NORTH LINE S 88°42'30" E 331.61 FEET TO THE EAST LINE OF SAID SUBDIVISION; THENCE ON SAID EAST LINE S 02°25'18" W 630.36 FEET TO THE NORTH LINE OF SAID HUNT STREET; THENCE ON SAID NORTH LINE N 88°46'53" W 331.19 FEET TO THE POINT OF BEGINNING.

ALSO:

ALL THAT PORTION OF LOT 1 OF PIERCE COUNTY LOT LINE ADJUSTMENT RECORDED APRIL 16, 1990 UNDER RECORDING NUMBER 9004160338 LYING EASTERLY OF THE FOLLOWING DESCRIBED LINE:

COMMENCING AT THE SOUTHEAST CORNER OF SAID LOT 1; THENCE NORTH 88°46'53" WEST ON THE SOUTH LINE OF SAID LOT 1 285.17 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; THENCE NORTH 12°32'54" WEST 268.99 FEET TO A POINT ON THE NORTH LINE OF SAID LOT 1, SAID POINT LYING S 88°41'51" E 508.94 FEET FROM THE NORTHEAST CORNER OF SAID LOT 1, BEING THE TERMINUS POINT OF THIS DESCRIPTION. ALL LYING IN THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 21 NORTH, RANGE 2 EAST OF THE WILLAMETTE MERIDIAN.

SITUATE IN THE COUNTY OF PIERCE, STATE OF WASHINGTON.

Section 2. The City Council directs the staff to present a draft water comprehensive plan amendment for consideration at the next comprehensive plan update showing the above revised boundary of the City's existing water service area.

RESOLVED this 28th day of January, 2008.

APPROVED:

CHARLES L. HUNTER, MAYOR

ATTEST/AUTHENTICATED:

MOLLY M. TOWSLEE, CITY CLERK

FILED WITH THE CITY CLERK: 01/23/08
PASSED BY THE CITY COUNCIL: 01/28/08
RESOLUTION NO. 740

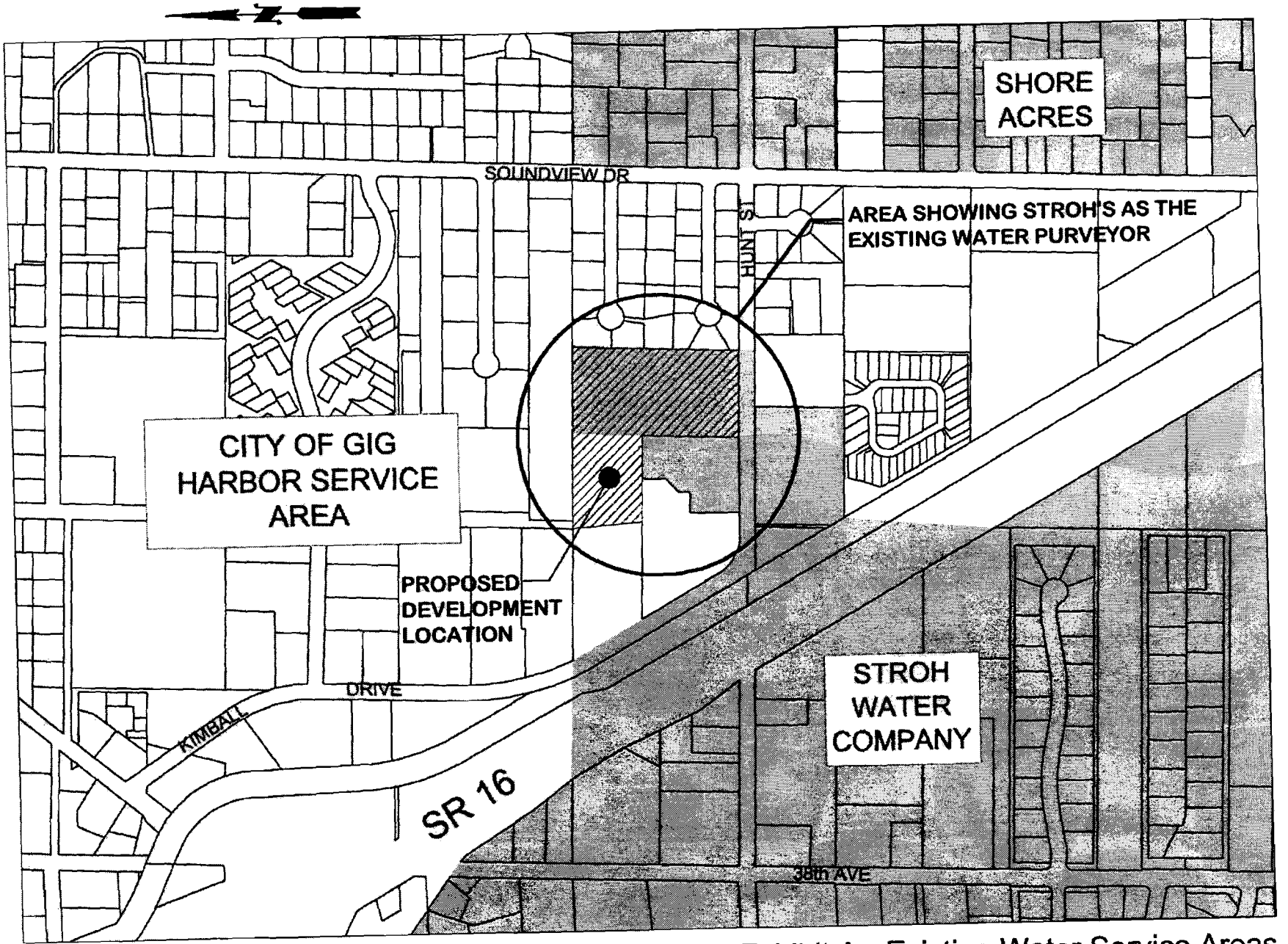


Exhibit A - Existing Water Service Areas

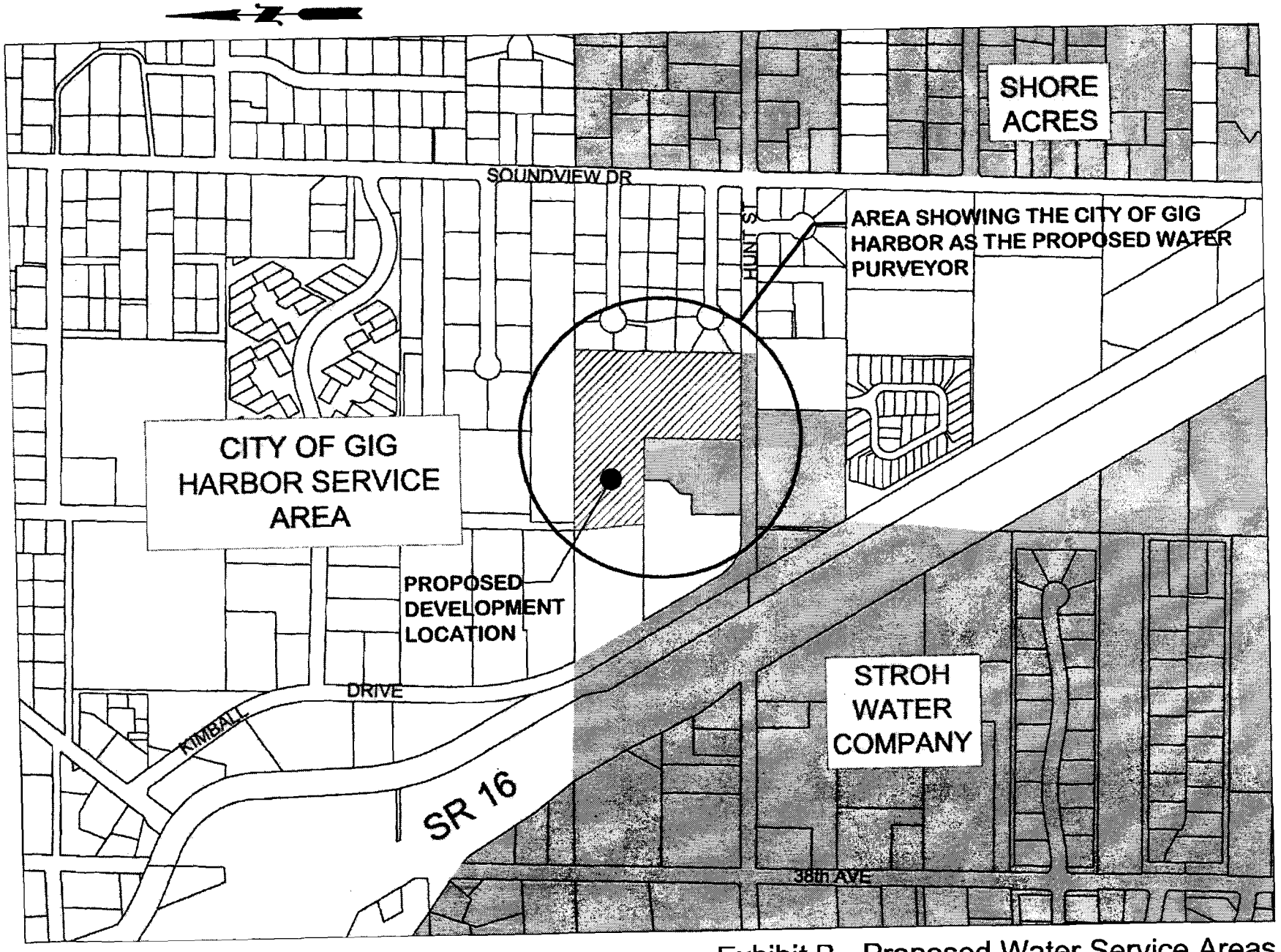


Exhibit B - Proposed Water Service Areas

EXHIBIT 'C'
EN-06-0005

853-7597

Stroh's Water Company, Inc.

3408 Hunt St NW
Gig Harbor, WA 98335
Phone (253) 858-2051
Fax (253) 858-6109

November 21, 2006

To:
Mike Paul and
The City of Gig Harbor

Re: Hunt Highlands Development

To Whom It May Concern:

At this time Stroh's Water Co. does not have the ability to provide water service to the project known as Hunt Highlands Development located on Hunt St (parcels 0221083019 & 0221083040). Therefore, Stroh's Water Co. is willing to relinquish its rights to provide water service to this project.

We are working with DOH to approve our updated CWSP, which we believe will provide additional system capacity. We expect approval sometime in 2007.

If you have any questions, please contact me.

Sincerely,

Kurt Rothenberg, Mgr.

CITY OF GIG HARBOR - HARBOR WATER COMPANY, INC.
WATER SUPPLY AGREEMENT

THIS AGREEMENT, entered into this 14 day of October, 1986 between the City of Gig Harbor, hereafter referred to as "CITY" and Harbor Water Co., Inc., hereafter referred to as "HARBOR".

WITNESSETH:

WHEREAS, HARBOR is a regulated water purveyor under the State of Washington and the rules of the Department of Social and Health Services; and

WHEREAS, CITY services the Woodworth-Mountain View area with water pressure that is just at minimum city standards; and

WHEREAS, HARBOR owns and operates as part of its system two (2) water systems adjacent to the Woodworth-Mountain View area. The first system is Dogwood Estates, State Identification Number 323460 in which HARBOR wishes to have fire flow capacity. The second system is Peacock Hill, State Identification Number 666370 which could supplement the CITY's Woodworth-Mountain View area and HARBOR's Dogwood Estates system during extreme use and fire flow conditions from the existing five (5) wells and two (2) reservoirs.

NOW THEREFORE in consideration of the mutual covenants contained herein, the parties agree as follows:

A. HARBOR WATER CO., INC. agrees to:

1. Install an 8" Cl 200 PVC line from the Plat of North Ridge at 101st St. to 99th St. along Peacock Hill Ave. N.W. and install a 4" PRV and necessary fittings to connect this line to the CITY's 6" water line on 99th St. thus

connecting HARBOR's Peacock Hill system to the CITY's system serving the Woodworth area.

2. Extend an 8" Class 160 PVC line from the HARBOR's Dogwood Estates' system ID# 3232460 along Woodworth Ave. and the CITY's water tank site on Woodworth and Ringgold and connect to the CITY at the tank.

3. Install a check valve at the CITY's North tank site located at 99th St. and Woodworth Ave.

4. Operate the CITY's existing North tank with HARBOR's well that now services Dogwood Estates' system and to the Woodworth area. This will allow the CITY's tank serving the Woodward area to provide fire flow to the Dogwood Estates system and to the Woodworth area.

5. Provide engineering necessary to obtain Department of Social and Health Service's approval of said interities. Engineer to be at the discretion of HARBOR.

6. Own and maintain both proposed water lines.

7. Provide any maintenance required to the valve vaults. Any major repairs over $1,000.00 to be approved by City of Gig Harbor Public Works Director.

8. HARBOR has the right, with the CITY's approval, to expand its Dogwood Estates System so long as said expansion does not affect the quality of service provided to the CITY's customers.

9. Pay all power bills for Dogwood Estates' well pump and Peacock Hill water system.

10. Provide the CITY with copies of the results of all water samples taken from the systems affecting the CITY.

11. Reserve the right to install a booster pump at the CITY's existing north tank located at the intersection of 99th St. and Woodworth Ave. and a waterline which would connect to the 8" line on Peacock Hill at 99th St. to transfer water from Dogwood Estates and if needed, from the CITY to Peacock Hill in emergencies such as pump, well, or power system outages or as other needs may arise. Water will not be transferred from the CITY without prior approval of City of Gig Harbor.

B. CITY OF GIG HARBOR agrees to:

1. Pay to Harbor Water Co., Inc. $12,500.00 upon the completion of the aforesaid said installations and upon the receipt of HARBOR's engineer's approval.

2. Pay one-half of any maintenance required, the total maintenance estimated at $100.00 per year.

3. Maintain existing reservoir.

4. Pay all power bills for controls located within current City limits which would service CITY residents.

5. Reserve the right to transfer water from the Woodworth area to other parts of the City of Gig Harbor for emergency purposes, such as power, well or pump outages, or as other emergency needs may arise. Water will not be transferred without prior approval of HARBOR WATER CO.

6. Provide HARBOR with copies of the results of all water samples taken during the CITY's normal monitoring program.

C. MUTUAL AGREEMENT OF CITY AND HARBOR:

1. Both CITY and HARBOR agree that the only

compensation shall be as defined in this agreement.

2. Both parties reserve the right to terminate or re-negotiate the Agreement with 180 days written notice for termination or intent to re-negotiate.

3. Both CITY and HARBOR shall protect, indemnify, and hold the other party harmless from and against any damage, cost or liability for injury or death to persons or to damage or destruction of property, arising from the acts of the CITY or HARBOR, their employees or contractors in the performance of this Agreement, PROVIDED HOWEVER, neither CITY nor HARBOR agree to guaranty water flow to the other and neither shall be liable or responsible to the other or third parties for lack of such flow except for intentional intervention.

4. This Agreement shall be binding to both parties, their heirs, successors and assigns.

IN WITNESS WHEREOF, this Agreement was executed by the parties as of the day and year first above written.

CITY OF GIG HARBOR
BY:

Mayor, CITY OF GIG HARBOR

HARBOR WATER CO., INC.
BY:

President, Harbor Water Co., Inc.

ATTEST:

MICHAEL R. WILSON
City Administrator/Clerk

11/3/86
Date

AGREEMENT
BETWEEN THE CITY OF GIG HARBOR
AND THE SHORE ACRES WATER COMPANY

THIS AGREEMENT, made and entered into this 14 day of January, 2008, by and between the City of Gig Harbor, an optional code municipal corporation of the State of Washington, hereinafter called the "City," and Shore Acres Water Company, a nonprofit corporation, organized and existing under the laws of the State of Washington, hereinafter called the "Purchaser."

WITNESSETH:

WHEREAS, the Purchaser is the owner of a Water Company, and its customers own property located both inside and outside the City limits; and

WHEREAS, the Purchaser purchases water from the City for the use of its customers, who are billed by the Purchaser, and the Purchaser then pays the City for the water;

WHEREAS, the Purchaser desires to obtain additional hook-ups for property that has not yet been developed; and

WHEREAS, the City desires to provide water to the Purchaser, under the terms and conditions set forth in Title 13 of the Gig Harbor Municipal Code; and

WHEREAS, the City Council held a public hearing on this Agreement on January 14, 2008, during a regularly scheduled Council meeting, and authorized the Mayor to execute this Agreement on behalf of the City; NOW, THEREFORE,

That the parties heretofore and in consideration of the mutual covenants herein contained, agree as follows:

1. Agreement to Sell Water, Agreement to Purchase Water.

The City agrees to sell up to Seventeen Million (17,000,000) gallons of water annually to the Purchaser for the term of this Agreement, under the terms and conditions set forth herein. "Annually" shall mean from January 1st of any year until December 31st of that year. At the time a new connection to the Purchaser's system is added under Section 4 herein, the City agrees to increase this amount by Eighty Thousand (80,000) gallons of water annually to the Purchaser for the remaining term of the Agreement, under the terms and conditions set forth in this Agreement. The Eighty Thousand (80,000) gallons of water annual limit reflects

the amount included in the City's Water Comprehensive Plan used by a single household, multiplied by the number of connections in the Purchaser's system as of the date of this Agreement. The parties agree that if the City's Water Comprehensive Plan (or an ordinance adopted for the same purpose) is amended to reflect a new number for water use by a single household, then this shall thereafter be used in future calculations for the amount of increase for a single connection.

The amounts established in this Section 1 shall not apply during those times in which the City Council declares that there is a drought or other emergency necessitating the adoption of ordinances relating to water conservation. During such times, the Purchaser agrees to comply with the City's water conservation ordinances.

The parties agree that if the Purchaser draws more water from the City's water system than the Seventeen Million (17,000,000) gallon annual limit, payment for any gallons over the Seventeen Million limit shall include a surcharge of twenty-five percent (25%) of the current water rate, as established in the City's ordinances. In addition, if the Purchaser draws more water from the City's water system than ten percent (10%) above the Seventeen Million (17,000,000) gallon limit, the parties shall meet to renegotiate this Agreement, as set forth in Section 17 herein.

2. Term.

This Agreement shall be deemed effective as of January 14, 2008, and shall terminate on December 31, 2011. Without further action by either of the parties hereto, and as long as the Purchaser has not triggered the renegotiation provision of Section 1 above, this Agreement shall be renewed and continued in full force and effect for additional terms of four year periods after the anniversary date, unless the Purchaser or City, on or before three hundred (360) days prior to the termination of this Agreement, or on or before three hundred (360) days prior to the termination of any renewal period, gives written notice that the Agreement will not be renewed.

3. Payment for Water and Connection Fees.

Water delivered under this Agreement shall be billed by the City and paid by the Purchaser bi-monthly. Purchaser shall pay the water rate established by the City in its codes, as they now exist or may hereafter be amended. All conditions of payment which apply to City customers shall apply equally to the Purchaser.

4. New Connections and Payment for Connections.

For purposes of calculating billing from the City to the Purchaser, it shall be conclusively presumed that there are currently **214** connections to the

Purchaser's system. This presumption shall be reviewed and adjusted to reflect actual number of connections on the first day of June of each year this agreement shall remain in force. Currently, the Purchaser is approved by the Department of Health for a total of 357 connections.

Any property owner in the jurisdiction of the Purchaser's water system (up to the 357 approved connections) may apply to the City for a water concurrency certificate. If granted, the individual property owner(s) shall comply with the applicable City codes, as they now exist or as they may be amended in the future.

The individual property owner shall pay to the City for each new connection to the Purchaser's system a connection fee as established by the City Council in an ordinance adopted for this purpose. The individual property owner agrees to pay the connection fee at the rate schedules applicable at the time the individual property owner requests to actually connect to the system.

5. Point of Delivery and Character of Service.

The City will deliver or make available to the Purchaser, at the two master meters serving Shore Acres Water Company near the City's corporate limits or at such other sites as the City and the Purchaser may agree upon, wholesome water for residential and fire extinguishing uses. The water supplied shall be of the same quality as that distributed by the City to its users.

6. Master Meter System.

The City shall bi-monthly read the master meters in existence and the bill sent to the Purchaser from the City shall reflect that reading. The bi-monthly bill shall be computed as follows:

A. First, there shall be a determination of the total water consumed bi-monthly by reading the master meters.

B. Then, the billing shall be computed according to the current ordinance by multiplying the base charge for each 4" meter times the outside City multiplier, plus multiplying usage at the current ordinance rate per 100 cubic feet times the outside City multiplier, plus City taxes as applicable.

7. Load Changes.

The Purchaser shall not extend new service to any structure used for business or commercial purposes, as the same are defined in the City's Zoning Code, without first obtaining written approval from the City.

8. Resale of Water.

The Purchaser agrees that all water delivered by the City hereunder will be used for its own purposes as a distributing utility to distribute water to its members and that none will be delivered or sold to another distributing utility for resale.

9. Flushing.

The City shall notify the Purchaser prior to flushing any lines which affect the quality of the water delivered to the Purchaser, or before intentionally interrupting any water service to the Purchaser.

10. Interruption of Service for Causes Beyond Control of Parties.

If the operation of the City's source of water or means of distribution or the operation of the Purchaser's service is suspended, interrupted, or interfered with for any cause beyond the City's control, including, but not by way of limitation, the failure or breakdown or interruption of electrical power, floods, fires, acts of God or the public enemy, or other causes beyond the control of the parties, but expressly excluding a depression or recession in the economy, the City need not deliver water for such period of time to the extent that such suspension, interruption or interference makes it reasonably impractical to deliver such water; and monthly bills for any such period, including any such suspension, interruption of interference, shall be pro-rated by reducing the billing demand in the ratio of days of suspension of service to the total days in the billing period.

11. Area Served.

The Purchaser shall only serve members within the following described area:

Area Served.

The Purchaser shall only serve members within the following described area:

> Beginning at the Northeast corner of the Southeast quarter of the Southwest quarter of Section 8, Township 21 North, Range 2 East of W.M.;
>
> Thence West 30 feet more or less to the West line of Wickersham County Road;
>
> Thence Southerly along the West line of Wickersham County Road to the North line of the Southwest quarter of Section 17, Township 21 North, Range 2 East W.M.;

Thence Easterly along the North line of the Southwest quarter and the Southeast quarter of Section 17 to the point of intersection with the Government Meander line;

Thence Northwesterly along the Government Meander line to the City limits of the City of Gig Harbor, the current city limits as established on October 23, 1946;

Thence Westerly along said City limits to the point of beginning.

Excluding any area served by the City through the City's distribution lines prior to the 1st day of January, 2007, which has been annexed to the City of Gig Harbor. Nothing in this Agreement shall limit the City's exercise of its authority to annex property served by the Purchaser.

12. Specific Enforcement.

In addition to any other remedy provided by law or this Agreement, the terms of this Agreement may be specifically enforced by a court of competent jurisdiction.

13. Assignment and Assumption.

The Purchaser shall have the right to sell, assign or transfer this Agreement with all their rights, title and interests therein to any person, firm or corporation, provided that, the City shall provide its prior written consent to such sale, assignment or transfer. The Purchaser shall provide the City with written notice of any intent to sell, assign, or transfer, at least 30 days in advance of such action. The City's consent shall not be unreasonably withheld.

14. Amendment to Agreement; Effect of Agreement on Future Actions.

This Agreement may be amended by mutual consent of all of the parties, provided that any such amendment shall follow the process established by law. for the adoption of a development agreement (see, RCW 36.70B.200).

15. Notices.

Notices and correspondence to the City and Purchaser shall be sufficiently given if dispatched by pre-paid first-class mail to the addresses of the parties as designated below. Notice to the City shall be to the attention of both the City Administrator and City Attorney. The parties hereto may, from time to time, advise the other of any new addresses for notice and correspondence.

TO THE CITY: TO SHORE ACRES:

City Adminstrator
City of Gig Harbor
3510 Grandview Street
Gig Harbor, WA 98335

Shore Acres Water Company
3110 Judson St. PMB #232
Gig Harbor, WA 98335

City Attorney
Law Office of Carol A. Morris, P.C.
P.O. Box 948
Seabeck, WA 98380

16. Applicable Law and Attorneys' Fees.

This Agreement shall be construed and enforced in accordance with the laws of the State of Washington. If litigation is initiated to enforce the terms of this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs from the non-prevailing party. Venue for any action shall lie in Pierce County Superior Court or the U.S. District Court for Western Washington.

17. Default and Termination.

A. The occurrence of any one or more of the following events shall constitute a material default and breach of this Agreement by the non-performing Party:

1. The failure to make any payment required to be made hereunder within ten (10) days of the receipt of the notice of such failure to pay;

2. The failure of the City to provide water to the Purchaser, in the amounts agreed to herein, within twenty (20) days of the receipt of the notice of such failure to provide water;

3. The Purchaser's annual use of water in excess of ten percent (10%) over the amount established in Section 1; and

4. The failure to observe or perform any of the covenants, conditions or obligations of this Agreement, within ten (10) days of a notice by the other Party, specifying the nature of the default claimed.

B. With respect to any default under Section 17(A) above, the Purchaser shall be responsible for the default of any individual purchaser of water in the Purchaser's water system.

C. At the end of each year, the City shall calculate the amount of water used by the Purchaser. If the amount used by the Purchaser for the year

exceeds by ten percent (10%) the amount established in Section 1 of this Agreement, the City shall notify the Purchaser in writing that the parties shall meet to renegotiate this Agreement. At such time, the parties shall discuss the deadline for termination of this Agreement, which shall occur within six (6) months of the date the City mails the notice to Purchase for renegotiation. All of the terms of this Agreement may be renegotiated in any subsequent agreement.

D. In the event that the Purchaser fails to comply with any term or condition of this Agreement, the City shall have the right, at any time, to enter on the Purchaser's property, and for that purpose disconnect the water and terminate this Agreement. Such disconnection shall be a remedy available to the City in addition to any other remedy available at law, including, but not limited to, breach of contract.

18. Severability and Integration.

This Agreement and the Exhibits attached hereto constitute the agreement between the parties on this subject matter, and there are no other understandings, verbal or written, that modify the terms of this Agreement. If any phrase, provision, or section of this Agreement is determined by a court of competent jurisdiction to be invalid or unenforceable, or if any provision of this Agreement is rendered invalid or unenforceable according to the terms of any statute of the State of Washington which became effective after the effective date of the resolution or ordinance adopting this Agreement, such invalidity shall not affect the other terms of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the dates set forth below:

CITY OF GIG HARBOR

Charles L. Hunter, Mayor

ATTEST:

Molly Towslee, City Clerk

APPROVED AS TO FORM:

Carol A. Morris, City Attorney

SHORE ACRES WATER COMPANY

SCOTT WAGNER, President

Secretary
DAVID HOPKINS

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

I certify that I know or have satisfactory evidence that Charles L. Hunter is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the Mayor of Gig Harbor to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: 1-15-08

MOLLY M. TOWSLEE NOTARY PUBLIC STATE OF WASHINGTON PIERCE CO., WASHINGTON MY COMMISSION EXPIRES DEC 2 2011

Molly M Towslee

Molly M. Towslee
(print or type name)
NOTARY PUBLIC in and for the State of Washington, residing at:
Gig Harbor
My Commission expires: 12/2/2011

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

I certify that I know or have satisfactory evidence that SCOTT WAGNER is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the President of Shoreacres Water Company to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: 1/10/08

RYAN T. RYAN NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES DECEMBER 7, 2008

Ryan T. Ryan

RYAN T. RYAN
(print or type name)
NOTARY PUBLIC in and for the State of Washington, residing at:
Pierce County
My Commission expires: 12/7/08

FAXED 8/16/99 A. Emery/GBC
RECEIVED
JUL 2 0 1992
CITY OF GIG HARBOR

f: comp. wtr. plan

2/18/99 Jackie Pratt Contacted Lynn Hall - Water Co at Purveyor's Use contact as it is current

AGREEMENT

between

CITY OF GIG HARBOR

and

SHORE ACRES WATER COMPANY

THIS AGREEMENT, made and entered into this 1st day of July, 1992, by and between the City of Gig Harbor, a municipal corporation of the State of Washington, for and on behalf of its Water Division, hereinafter called the "City"; and Shore Acres Water Company, a mutual corporation organized and existing under the laws of the State of Washington, hereinafter called "Purchaser".

WITNESSETH:

That the parties heretofore and in consideration of the mutual covenants herein contained, agree as follows:

1. Agreement to Sell and Purchase.

The City will deliver at the point or points of delivery herein specified, and will sell to the Purchaser, all water required by the Purchaser as a distributing utility for its members, at the rates and otherwise upon and subject to the terms and conditions herein set forth.

2. Term of Contract.

This contract shall be deemed effective as of July 1, 1992, and shall terminate July 1, 1996. Without further action by either of the parties hereto, this contract shall be renewed and continued in full force and effect for additional terms of four year periods, unless the Purchaser or City on or before ninety (90) days prior to the termination of this contract, or on or before ninety (90) days prior to the termination of any renewal period, gives written notice that the contract will not be renewed.

3. Point of Delivery and Character of Service.

The City will deliver or make available to the Purchaser, at the two master meters serving Shore Acres Water Company near the City's corporate limits or at such other sites as the City and the Purchaser may agree upon, wholesome water for residential and fire extinguishing uses. The water supplied shall be of the same quality as that distributed by the City to its users and supplied in sufficient quantities and sufficient pressure for the residential and fire extinguishing uses by the members of Shore Acres Water Company at the point of connection between the City's and the Purchaser's systems. The City will, throughout the term and under the conditions of this contract, deliver or make available to the Purchaser that amount of water needed to adequately supply the members of Shore Acres Water Company.

4. Payment for Water and Connection Fees.

Water delivered under this contract shall be billed by the City and paid by the Purchaser bi-monthly. The rate shall be 150% of the City's residential rate which has been set by City Ordinance #547, or as amended in the future. All conditions of payment which apply to City customers shall apply equally to the Purchaser.

The Purchaser shall pay to the City for each new connection to the Purchaser's system a connection fee equal to 150% of the connection fees charged by the City to its customers at the time of connection to the Purchaser's system.

5. Presumed Number of Connections.

For purposes of calculating billing from the City to the Purchaser it shall be conclusively presumed that there are currently 208 connections to the Purchaser's system. This presumption shall be reviewed and adjusted to reflect actual number of connections on the first day of December of each year this agreement shall remain in force.

6. Master Meter System.

The City shall bi-monthly read the ~~two~~ master meters in existence and the bill payable to the City shall be calculated upon that reading. The bi-monthly bill shall be computed as follows:

A. Determine the total water consumed bi-monthly by reading the master meters.

B. Compute billing according to current ordinance by multiplying base charge for each 4" meter times the outside city multiplier, plus multiplying usage at the current ordinance rate per 100 cubic feet times the outside city multiplier, plus city taxes at 5%.

7. Load Changes.

The Purchaser shall not extend new service to a structure which is larger than a single family dwelling, without prior written approval from the City Council allowing the Purchaser to extend service to the structure or meter serving the structure.

8. Resale of Water.

The Purchaser agrees that all water delivered by the City hereunder will be used for its own purposes as a distributing utility to distribute water to its members and that none will be delivered or sold to another distributing utility for resale.

9. Interruption of Service for Causes Beyond Control of Parties.

If the operation of the City's source of water or means of distribution or the operation of the Purchaser's service is suspended, interrupted, or interfered with for any cause beyond the City's control, including but not by way of limitation, the failure or breakdown or interruption of electrical power, floods, fires, acts of God or the public enemy, or other causes beyond the control of the parties, but expressly excluding business recessions, depressions, strikes, etc., the City need not deliver water for such period of time to the extent that such suspension, interruption or interference makes it reasonably impractical to deliver

such water; and monthly bills for any such period, including any such suspension, interruption of interference, shall be pro-rated by reducing the billing demand in the ratio of days of suspension of service to the total days in the billing period.

The City shall have reasonable time to repair any accident, leaks, or breaks in the plant. Such repairs shall be made with due diligence and dispatch without unnecessary delay.

10. Flushing.

The City shall notify the Purchaser prior to flushing any lines which will effect the quality of the water delivered to the Purchaser.

11. Area Served.

The Purchaser shall only serve members within the following described area:

Beginning at the Northeast corner of thee Southeast quarter of the Southwest quarter of Section 8, Township 21 North, Range 2 East of W.M.;

Thence West 30 feet more or less to the West line of Wickersham County Road;

Thence Southerly along the West line of Wickersham County Road to the North line of the Southwest quarter of Section 17, Township 21 North, Range 2 East W.M.;

Thence Easterly along the North line of the Southwest quarter and the Southeast quarter of Section 17 to the point of intersection with the Government Meander line;

Thence Northwesterly along the Government Meander line to the City limits of the City of Gig Harbor;

Thence Westerly along said City limits to the point of beginning.

Excluding any area which has been annexed to the City of Gig Harbor.

12. Assignment.

This agreement shall inure to the benefit of and be binding upon the respective successors and assigns of the parties hereto; provided, however, that neither this contract nor any interest herein shall be transferred or assigned by the Purchaser without the prior written consent of the City Council.

13. Arbitration.

Any controversy or claim arising out of or relating to this agreement, including any dispute involving an increase in the rates, shall be settled by arbitration in accordance with the rules of the American Arbitration Association.

IN WITNESS WHEREOF, the parties hereto have executed this agreement in triplicate, each by signatures and attest of its duly authorized officers, as of the day and date first above written.

CITY OF GIG HARBOR

Gretchen A. Wilbert, Mayor

SHORE ACRES WATER COMPANY

Jack Wiles, President

ATTEST:

Mark E. Hoppen
City Administrator/Clerk

Secretary

City of Gig Harbor. The "Maritime City."
3105 JUDSON STREET
GIG HARBOR, WASHINGTON 98335
(206) 851-8136

TO: MAYOR WILBERT AND CITY COUNCIL
FROM: MARK HOPPEN, CITY ADMINISTRATOR MH
SUBJECT: CONTRACT WITH SHORE ACRES WATER COMPANY
DATE: JUNE 17, 1996

INFORMATION/BACKGROUND

The city's outside water agreement with the Shoreacres Water Company expires July 1, 1996. Previous contracts were four year agreements. Historically, Shoreacres enjoyed the benefit of a billing rate at 125% of the city's residential rate. During the last four years, this rate has been set at 150%, the typical outside rate multiplier. The city needs to read only three meters to determine this billing, simplifying the administrative costs of this service.

The attached contract is identical to the previously approved 1992 contract, except that the number of connections has declined from 208 to 206 consequent to annexation and to Section 11 of the existing contract.

FISCAL CONSIDERATIONS

Connection fees and rates are currently set at levels which are standard for outside city service.

RECOMMENDATION

Staff recommends approval of the attached contract for signature by the Mayor.

Contract not signed - due to indemnification hang-up
a/o 90 day notice. May amend
the old contract for another 4 years then
Expiration July 2000.

Must give 90 days Notice to change Contract!

9411040379

BK 1075PG0788

Recorded at the Request of,
When Recorded, Return To:

94 NOV -4 PM 2:46

RECORDED
CATHY PEARSALL-STIPEK
AUDITOR PIERCE CO. WASH

The City of Gig Harbor
City Administrator
M/A: P.O. Box 145
Gig Harbor, WA 98335

UTILITY EXTENSION, CAPACITY AGREEMENT AND AGREEMENT WAIVING RIGHT TO PROTEST LID

THIS AGREEMENT is entered into on this 11th day of Oct, 1994, between the City of Gig Harbor, Washington (hereinafter referred to as the "City"), and the Washington State Departments of Natural Resources (hereinafter referred to as "DNR") and Corrections (hereinafter referred to as "DOC").

WHEREAS, DNR is the owner of certain real property located in Pierce County, legally described as set forth in Exhibit "A", attached hereto and incorporated herein by this reference as though set forth in full, and

WHEREAS, DOC leases certain real property from DNR located in Pierce County, legally described as set forth in Exhibit "A", and

WHEREAS, DOC is also the owner of certain real property located in Pierce County, legally described as set forth in Exhibit "B" attached hereto and incorporated herein by this reference as though set forth in full, and

WHEREAS, the properties owned by DNR and DOC are not currently within the City limits of Gig Harbor, and

WHEREAS, DOC, as the leasee on certain real property owned by the DNR as described in Exhibit "A", and the owner of certain real property as described in Exhibit "B", desires to connect to the City water, hereinafter referred to as "the utility", and the City is willing to allow connection only under certain terms and conditions in accordance with Title 13 of the Gig Harbor Municipal Code, as now enacted or hereinafter amended, NOW THEREFORE,

FOR AND IN CONSIDERATION OF the mutual benefits and conditions hereinafter contained, the parties agree as follows:

1. Warranty of Title. DOC and DNR warrant that they are the owners of fee title or a substantial beneficial interest in the properties described in Exhibit "A", and "B" and are authorized to enter into this Agreement.

DOC Contract CCAP3374

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2. Extension Authorized. The City hereby authorizes DOC to extend service to DOC and DNR propety from the existing lines on Skansie Avenue at the following location:

Bujacich Drive

3. Costs. DOC will pay all costs of designing, engineering and constructing the extension. All construction shall be done to City standards and according to plans approved by the City's Public Works Director. Any and all costs incurred by the City in reviewing plans and inspecting construction shall be paid for by the DOC.

4. The City agrees to provide 80,000 gallons per day average use and 210,000 gallons per day peak usage water service to DOC, on DNR property as described in Exhibit A. DOC will connect to the City water via a 16" water line extension on 54th Street from the existing water main on Skansie Avenue. DOC will provide 2" and 8" compound water meters at the point of connection to the City water.

5. Capacity Commitment Payment. The City agrees to reserve the above said capacity for a period of 12 months after execution of this Agreement by all parties, provided that a payment for water capacity commitment is received within 45 days after City Council approval of extending water service to DNR and DOC's properties. Water capacity shall not be committed beyond a three year period.

DOC agrees to pay the City the sum of $790.88 for water capacity reservation for a one year period of 12 months after execution of this Agreement by all parties.

6. Extension of Commitment Period. In the event DOC chooses to permanently reserve water capacity by paying the entire connection fee before the expiration date set forth above, DOC shall be responsible for paying the City's monthly water base charge. The current City water base charge for a 2" meter is $47.52 per month.

7. Permits - Easements. DOC shall secure and obtain, at their sole cost and expense, any necessary permits, easements and licenses to construct the extension, including, but not limited to, all necessary easements, excavation permits, street use permits, or other permits required by state, county and city governmental departments including the DNR, the Pierce County Public Works and Planning Departments, Pierce County Environmental Health Department, State Department of Ecology, Pierce County Boundary Review Board and City of Gig Harbor Public Works and Planning Departments.

8. Turn Over of Capital Facilities. ~~DNR and~~ DOC ~~agree~~ agrees to dedicate to the City an easement of combined length of 5,100 lineal feet, for the purpose of constructing a 16 inch water main. ~~DNR and~~ DOC ~~agree~~ agrees to turn over this utility at no cost, upon completion of construction, approval and acceptance of the same by the City. That portion of this easement, as dedicated by DNR, ~~is further described by separate easement contract between DNR,~~ is further described by separate easement contract between DNR and the City and attached hereto as Exhibit "C".

As a prerequisite to such turn over and acceptance, DNR and DOC, as applicable, will furnish to the City the following:

A. As built plans or drawings in a form acceptable to the City Public Works Department;

B. Any necessary easements, permits or licenses for the continued operation, maintenance, repair or reconstruction of such facilities by the City, in a form approved by the City Attorney;

C. A bill of sale in a form approved by the City Attorney; and

D. A bond or other suitable security in a form approved by the City Attorney and in an amount approved by the Public Works Director, ensuring that the facilities will remain free from defects in workmanship and materials for a period of two (2) years.

9. Connection Charges. DOC agrees to pay the connection charges, in addition to any costs of construction as a condition of connecting to the city utility system at the rate schedules applicable at the time DOC requests to actually connect its property to the system. Any commitment payment that has not been forfeited shall be applied to the City's connection charges as they are levied.

10. Service Charges. In addition to the charges for connection, DOC agrees to pay for utility service rendered according to the rates for services applicable to properties outside the city limits as such rates exist, which is presently at 150% the rate charged to customers inside city limits, or as they may be hereafter amended or modified.

11. Annexation. DOC and DNR understand that annexation of the properties described in Exhibit "A" and "B" to the City will result in the following consequences:

A. Pierce County ordinances, resolutions, rules and regulations will cease to apply to the properties upon the effective date of annexation;

B. City of Gig Harbor ordinances, resolutions, rules and regulations will begin to apply to the properties upon the effective date of annexation;

C. Governmental services, such as police, fire and utility service, will be provided to the properties by the City of Gig Harbor upon the effective date of annexation;

D. The properties as identified in Exhibit "A" and Exhibit "B", may be required to assume all or any portion of the existing City of Gig Harbor indebtedness, and property tax rates and assessments applicable to the property may be different from those applicable prior to the effective date of annexation; This requirement is limited by RCW 79.44 as the statue now exists or may hereafter be amended.

E. Zoning and land use regulations applicable to the properties after annexation may be different from those applicable to the property prior to annexation; and

F. All or any portion of the properties may be annexed and the properties may be annexed in conjunction with, or at the same time as, other property in the vicinity.

With full knowledge and understanding of these consequences of annexation and with full knowledge and understanding of DNR and DOC's decision to forego opposition to annexation of the property to the City of Gig Harbor, DNR and DOC agree to sign a petition for annexation to the City of the properties described on Exhibit "A" and "B" as provided in RCW 35.14.120, as that statute now exists or may hereafter be amended, at such time as DNR and DOC are requested by the City to do so. DNR and DOC also agree and appoint the Mayor of the City as DNR and DOC's attorney-in-fact to execute an annexation petition on DNR and DOC's behalf in the event that DNR and/or DOC shall fail or refuse to do so and agree that such signature shall constitute full authority from DNR and DOC for annexation as if DNR or DOC had signed the petition itself. DNR and DOC further agree not to litigate, challenge or in any manner contest, annexation to the City. This Agreement shall be deemed to be continuing, and if DNR and/or DOC's property is not annexed for whatever reason, including a decision by the City not to annex, DNR and DOC agree to sign any and all subsequent petitions for annexations. In the event that any property described on Exhibit "A" and "B" is subdivided into smaller lots, the purchasers of each subdivided lot shall be bound by the provisions of this paragraph.

12. Land Use. DNR and DOC agree that any development or redevelopment of the properties described on Exhibit "A" and "B" shall meet the following conditions after execution of Agreement:

A. The use of the properties will be restricted to uses allowed in accordance with the City's Comprehensive Plan designation at the time of development or redevelopment.

B. The development or redevelopment of the properties shall comply with all requirements of the City Comprehensive Land Use Plan, Zoning Code and Building Regulations for similar zoned development or redevelopment in effect in the City at the time of such development or redevelopment. The intent of this section is that future annexation of the properties to the City of Gig Harbor shall result in a development which does conform to City standards.

C. It is understood by the City that the property described in Exhibit "A" and "B" is utilized for a correctional facility and this type of use will not be prohibited in the City after the annexation.

13. Liens. If any of the property described in Exhibits "A"and "B" is owned by the State at the time any payment delinquency under this Agreement arises, the City's remedies under this paragraph shall be limited as provided in RCW 79.44.060, as that statute now exists or may hereafter be amended. However, if these properties are sold to persons or entities other than the State, DNR and DOC, then their successors, assigns, and legal representatives agree that delinquent payments under this Agreement shall constitute a lien upon the above described property. If the extension is for sewer service, the lien shall be as provided in RCW 35.67.200, and shall be enforced in accordance with RCW 35.67.220 through RCW 35.67.280, all as now enacted or hereafter amended. If the extension is for water service, the lien shall be as provided in RCW 35.21.290 and enforced as provided in RCW 35.21.300, all as currently enacted or hereafter amended.

14. Termination for Non-Compliance. In the event DNR or DOC fails to comply with any term or condition of this Agreement, the City shall have the right to terminate utility service to DNR and/or DOC's properties, in addition to any other remedies available to it.

15. Latecomers Agreement. DOC has the right to initiate a latecomers agreement, pursuant to RCW 35.91.010, as that statute now exists or may hereafter be amended, with the City after the construction completion of the project. DOC's request is already approved by the City Council to initiate such. DOC will be responsible for providing all necessary documentation and recording such documents with the Pierce County Auditor's office.

16. Specific Enforcement. In addition to any other remedy provided by law or this Agreement, the terms of this Agreement may be specifically enforced by a court of competent jurisdiction.

17. Covenant. This agreement shall be recorded with the Pierce County Auditor and shall constitute a covenant running with the land described on Exhibit "A" and "B" and shall be binding on the DNR, DOC, their heirs, lessees, successors and assigns. All costs of recording this Agreement with the Pierce County Auditor shall be borne by the DOC.

18. Attorney's Fees. In any suit or action seeking to enforce any provision of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees and costs, in addition to any other remedy provided by law or this Agreement.

DATED this 11th day of October, 1994.

CITY OF GIG HARBOR

Gretchen Wilbert

Mayor Gretchen Wilbert

9411040379

ATTEST/AUTHENTICATED:

City Clerk, Mark Hoppen

APPROVED AS TO FORM:

City Attorney

WASHINGTON STATE DEPARTMENT
OF NATURAL RESOURCES

Name: R BRUCE MACKEY
Title: DIVISION MANAGER

WASHINGTON STATE DEPARTMENT
OF CORRECTIONS

Name: CHASE RIVELAND
Title: SECRETARY

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

On this 11th day of October, 1994, before me personally appeared Mayor and City Clerk of the municipal corporation described in and that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said municipal corporation, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS THEREOF, I have hereto set my hand and affixed by official seal the day and year first above written.

Molly M Towslee

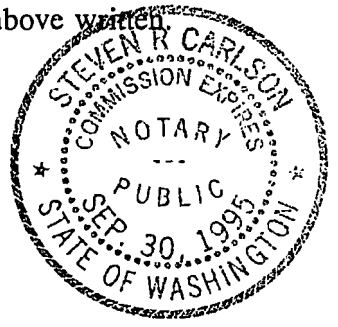
Molly M. Towslee
(print or type name)
NOTARY PUBLIC for the State
of Washington, residing at
Gig Harbor.
My commission expires 12/2/95.

9411040379

STATE OF WASHINGTON)
) ss.
COUNTY OF ~~PIERCE~~ THURSTON)

On this 21st day of October, 1994, before me personally appeared R. BRUCE MACKEY described in and that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of the Department of Natural Resources for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS THEREOF, I have hereto set my hand and affixed by official seal the day and year first above written.



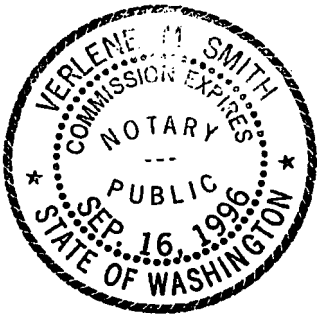
Steven R. Carlson

STEVEN R. CARLSON
(print or type name)
NOTARY PUBLIC for the State of Washington, residing at Olympia.
My commission expires 9/30/95.

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

On this 14th day of October, 1994, before me personally appeared Chase Pueland described in and that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of the Department of Corrections for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS THEREOF, I have hereto set my hand and affixed by official seal the day and year first above written.



Verlene M. Smith

VERLENE M. SMITH
(print or type name)
NOTARY PUBLIC for the State of Washington, residing at Olympia.
My commission expires 9/16/96.

EXHIBIT 'A'

Legal Description of Premises

That portion of the south 1/2 of the southeast 1/4 of Section 36, Township 22 North, Range 1 East, Willamette Meridian, County of Pierce, State of Washington, lying east of the thread of the west fork of McCormick Creek; containing an area of 62.6 acres, more or less.

EXHIBIT 'B'

PARCEL "A":

That portion of the South half of the South half of the Southwest quarter of Section 31, Township 22 North, Range 2 East of the Willamette Meridian, lying West of the West line of State Highway No. 16 (Primary State Highway No. 14), in Pierce County, Washington.

EXCEPT the South 510 feet thereof.

TOGETHER with an easement for ingress, egress and utilities over, under and across the West 30 feet of the South 510 feet of the South half of the South half of the Southwest quarter of Section 31, Township 22 North, Range 2 East of the Willamette Meridian.

EXCEPT the South 60 feet thereof.
ALSO EXCEPT 54th Avenue N.W.

PARCEL "B":

That portion of the North half of Government Lot 4 of Section 31, Township 22 North, Range 2 East of the Willamette Meridian lying West of the Westerly right of way line of Primary State Highway No. 16, in Pierce County, Washingtron.

EXCEPT the West 10 feet thereof conveyed to Pierce County for 54th Avenue N.W. by Deed recorded under Auditor's No. 2497083.

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95 OCT 27 PM 3:01

RECORDED
CATHY PEARSALL-STIPEK
AUDITOR PIERCE CO. WASH

AGREEMENT FOR CONSTRUCTION OF WATER EXTENSION AND JOINT USE OF FACILITIES BETWEEN GIG HARBOR AND PIERCE COUNTY FIRE DISTRICT NO. 5

THIS AGREEMENT is made and executed this 25th day of October, 1995, between the City of Gig Harbor, a Washington municipal corporation (hereinafter the "City"), and Pierce County Fire District No. 5, a Washington municipal corporation (hereinafter the "District");

W I T N E S S E T H:

WHEREAS, both parties are located in an area designated a Critical Water Supply Service Area under Chapter 70.166 RCW, the Public Water System Coordination Act (hereinafter the "Act"); and

WHEREAS, both parties have adopted coordinated water system plans in accordance with the Act; and

WHEREAS, the Act requires that all water purveyors constructing or proposing to construct water system facilities within an area covered by the Act must comply with their plans (RCW 70.166.060(3)(a); and

WHEREAS, the District desires to construct a transmission main extension from the City's water system to its property at Emergency Operations Center on Bujacich Road NW in order to provide fire flow to its site; and

WHEREAS, the City agrees to allow construction of such extension under the terms and conditions of an agreement which apportions the cost of the extension, requires transfer of a portion of the newly constructed extension to the City, and also requires the District to replenish water usage from the City's system to the City in an equal amount from the District's Class "A" on-site system; and

WHEREAS, the parties further desire to enter into an agreement for the District's construction of water extension facilities from 96th Street / Bujacich Road Intersection to Station 5.8 Driveway / Bujacich Road Intersection, which will eventually be owned, maintained and operated by the City, and for the District's construction of water extension facilities from within the Fire District #5 site, will be owned, maintained and operated by the District; and

WHEREAS, the City's water system plan shows the area where the portion of the extension to be constructed and transferred to City ownership, or between 96th Street / Bujacich Road

9510270475

Intersection to Station 5.8 Driveway / Bujacich Road Intersection as within the City's future water service area; and

WHEREAS, the District's water system plan shows the area where the portion of the extension to be constructed and retained in District ownership, or between 96th Street / Bujacich Road Intersection to Station 5.8 Driveway / Bujacich Road Intersection as within the District's existing water service area; and

WHEREAS, the City has revised its water system plan to show the area where the extension will be constructed between 96th Street / Bujacich Road Intersection to Station 5.8 Driveway / Bujacich Road Intersection as within its existing service area, and such plan has been approved by the Department of Health; and

WHEREAS, the City Council considered the proposed extension at its regular meeting of October 9, 1995, and pursuant to Ordinance No. 697, adding a new section 13.34.070 to the Gig Harbor Municipal Code, the Council determined that (1) the requested service, for fire flow only, is financially supportable at rural densities and does not permit urban development; (2) the extension is necessary to protect basic public health, safety and/or the environment; (3) the extension is consistent with the goals of the City's Comprehensive Water Plan; and (4) the applicant shall be responsible for the portion of the extension outside the City's Urban Growth Area, and shall after construction relinquish ownership of the portion of the extension within the City's Urban Growth Area to the City;

NOW, THEREFORE, in consideration of the mutual covenants contained herein it is hereby agreed as follows:

Section 1. Definition of Terms. Whenever the following terms are used in this Agreement, they shall have the following meaning unless specifically indicated otherwise from the context in which they appear:

A. **"City's Facilities"** shall mean those water extension facilities which are or will be owned, maintained or operated by the City as part of the City's water system, and are/will be shown on the City's Comprehensive Water System Plan.

B. **"District's Facilities"** shall mean those water extension facilities which are or will be owned, maintained or operated by the District as part of the District's water system, and are/will be shown on the District's Comprehensive Water System Plan.

C. **"Construction Cost"** shall, unless otherwise specified, mean the contract construction cost, sales tax, surveying, testing, engineering design and inspection costs, permit fees, road and property restoration costs, damage claim costs, legal costs, annual interest costs during the period of construction and direct overhead costs of the constructing agency attributable to the construction of the facility described, exclusive of any costs attributable to franchises, easements and rights-of-way.

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Section 2. Construction of Extension.

A. **City's Costs**. The City and the District agree that the City shall provide and install a twelve inch valve on the existing water main at the intersection of 96th Street/Bujacich Road NW. The City shall provide an 8" turbine meter for installation by the District at the intersection of Station 5.8 Driveway and Bujacich Road NW.

B. **District's Costs**. The City and District agree that the District shall bear all construction costs relating to the extension from 96th Street / Bujacich Road Intersection to Station 5.8 Driveway / Bujacich Road Intersection. This will include the construction and installation of approximately five thousand (5,000) linear feet of twelve (12) inch diameter C-900 class 150 water main with isolation valves installed each one thousand (1,000) feet and terminating with a valve and blow-off assembly. The District will pay all permit fees other than City fees.

C. **Competitive Bidding and Construction**. In the construction of this extension, which includes advertisement for competitive bids, bid consideration and contract award, the District acknowledges that it must observe the legal requirements for competitive bidding of public works contracts, as the same apply to both the District and the City.

D. **Plans, Inspections, and Testing**. Plans for the complete extension shall be reviewed and approved by the City. The City shall also furnish an inspector for the construction of the complete extension, in order to confirm compliance with the City's standards and the approved plans. Any costs incurred by the City related to such inspections and testing shall be borne by the City.

E. **Construction**. The District shall communicate with the City during the course of construction, and report its progress. Although the District will have control over completion of the work described in the approved plans, the District acknowledges that the City may refuse to accept dedication of any construction which does not comply with the approved plans or standards.

F. **Dedication**. The District shall notify the City upon completion of construction of the entire extension, and of the District's intent to dedicate the City's facilities to the City. The City shall have a final opportunity to inspect the construction, and if the water line is constructed in conformance with the approved plans and City standards, the City shall accept ownership of the portion of the extension from 96th Street / Bujacich Road Intersection to Station 5.8 Driveway / Bujacich Road Intersection. The District shall require its contractor to execute the City's maintenance bond forms for the City's facilities, and the bond shall be written to allow the City to make claims under the bond for a two year period after completion of construction, to the same extent and in the same manner as the District.

Section 3. District's Replenishment of City Water. The extension will be constructed for the purpose of providing fire flow to the District only, in an amount of approximately 320,000 gallons per year. The District agrees to replenish the water used by the District to the City, upon demand of the City.

Section 4. Insurance. The District shall secure and maintain adequate insurance for the construction, maintenance and operation of the extension, against loss or damage, or injuries to persons or property, during the period of time prior to the City's acceptance of the City's facilities. Any liability incurred as a result of the operation of the District of the extension prior to the time of acceptance by the City shall be the sole liability of the District.

Section 5. Assignment. The District shall not have the right to assign this Agreement or any of its rights and obligations hereunder either by operation of law or by voluntary agreement, without the written consent of the City, and neither party may terminate its obligations hereunder by termination of this Agreement without obtaining the written consent of the other party.

Section 6. Effective Date. This Agreement shall be in full force and effect and binding upon the parties hereto upon execution of this Agreement.

Section 7. Dept. of Health Approval. This agreement shall be null and void if the Dept. of Health does not approve the revision of the parties service area agreement, and such approval is required for contruction of the extension.

Section 8. Notice. Notice to the parties shall be given at the following addresses:

The City of Gig Harbor	Fire District No. 5
3105 Judson Street	6711 Kimball Drive
Gig Harbor, WA 98335	Gig Harbor, WA 98335

Section 9. Waiver. No waiver by either party of any term or condition of this agreement shall be deemed or construed to be a waiver of any other term or condition, nor shall a waiver of any breach be deemed to constitute a waiver of any subsequent breach.

Section 10. Indemnification. The District hereby releases, covenants not to bring suit and agrees to indemnify, defend and hold harmless the City, its officers, officials, employees, agents and representatives from any and all claims, costs, judgments, losses or suits including attorney's fees, awards or liabilities to any person, including claims by the District's own employees to which the District might otherwise be immune under Title 51 RCW, arising out of or in connection with the performance of this contract, except for injuries and damages caused by the sole negligence of the City. The District shall also release, covenants not to bring suit and agree to indemnify, defend and hold harmless the City, its officers, officials, employees and agents from any damages, losses, costs, fees, penalties or liabilities of any kind arising out of the District's failure to comply or its inadequate compliance with the State Environmental Policy Act, (chapter 43.21C RCW) or any laws relating to the construction of public works, including but not limited to, laws relating to competitive bidding and payment of prevailing wages. Such indemnification obligations shall extend to claims which are not reduced to a suit and any claims which may be compromised prior to the culmination of any litigation or the institution of any litigation.

The City's inspection or acceptance of the District's work when completed shall not be grounds to avoid any of these covenants of indemnification. It is further specifically and expressly understood that the indemnification provided herein constitutes the District's waiver of immunity under Title 51 RCW, solely for the purpose of this indemnification. This waiver has been mutually negotiated by the parties.

No agent, employee, representative or subcontractor of the District shall be or shall be deemed to be the employee, agent, representative or subcontractor of the City. None of the benefits that the City provides to its employees, including, but not limited to, compensation, insurance, unemployment insurance, are available from the City to the employees, agents, representatives or subcontractors of the District. The District will be solely and entirely responsible for its acts and for the acts of the District's agents, employees, representatives and subcontractors during the performance of this Agreement.

Section 11. Latecomers Agreement. Pursuant to chapter 35.91 RCW, the City will contract with the District for the District's reimbursement of its costs of construction of the water extension to be constructed as described in this agreement, from the owners of real estate who did not contribute to the original cost of the extension, and who subsequently tap into the same.

Section 12. Complete Agreement. This agreement merges and supersedes all prior negotiations, representations, and agreements between the parties hereto relating to the subject matter hereof and constitutes the entire contract between the parties.

IN WITNESS WHEREOF, the parties have executed this agreement as of the day and year first above written.

CITY OF GIG HARBOR:

By Gretchen A. Wilbert
Its Mayor

ATTEST:

Mark E. Hoppen
City Clerk

Approved as to Form:

City Attorney

FIRE DISTRICT NO. 5:

Glen R. Stenbak
By Glen R. Stenbak
Its Assistant Chief/Support Services

9510270475

STANDARD SERVICE AGREEMENT
ESTABLISHING WATER UTILITY
SERVICE AREA BOUNDARIES

PREAMBLE

THIS AGREEMENT establishing water utility service area boundaries is entered into this day for purposes of identifying the external boundaries of the service area for which this water purveyor has assumed water service responsibility.

WHEREAS, service area agreements are required by WAC 246-293-250 to help assure that water reserved for public water supply purposes within Pierce County will be utilized in the future in an efficient and planned manner; and

WHEREAS, the designation of retail water service area and future service planning areas, together with the cooperation of other utilities, will help assure efficient planning to accommodate growth, avoid duplication of service, and facilitate the best use of resources; and

WHEREAS, The responsibilities applicable to water purveyors are outlined in the Pierce County Coordinated Water System Plan (CWSP) and by the adopted rules and regulations of the Washington State Department of Health (DOH); and

WHEREAS, It is not the intent of this Agreement to give new authority or responsibilities to the water purveyor or to the County or State regulatory agencies, in addition to those requirements imposed by law; and

NOW, THEREFORE, the undersigned party, having entered into this Agreement by its signature, concurs with and will abide by the following provisions:

Section 1. The terms used within the contract shall be as defined in the implementing regulations of Chapter 70.116 RCW, except as identified below.

A. Lead Agency shall mean the department or organization within Pierce County that has been designated by the Pierce County Executive as being administratively responsible for the coordination and filing of the Pierce County Water Service Area map, Standard Service Agreement Establishing Water Utility Service Area Boundaries, Agreements for Retail Service Areas, Utility Service Policies, and other administrative documents necessary for the implementation of the Pierce County CWSP.

B. Pierce County Coordinated Water System Plan (CWSP) shall mean the plan adopted by the Pierce County Council for public water systems within critical water supply service areas within Pierce County which identifies the present and future needs of the systems and sets forth means for meeting those needs in the most efficient manner possible.

C. Pierce County Water Service Area Map shall mean the map referenced in this Agreement for the retail service area signed by the water purveyor, except as amended in accordance with the CWSP procedures and with the concurrence of the affected water purveyors.

D. Retail Service Area shall mean the designated geographical area within Pierce County in which the undersigned water purveyor assumes full responsibility for providing water service to individual customers.

E. Utility Service Policies shall mean those policies and conditions of service that are attached to the provision of water service for individual customers. The identified policies and conditions of service are those conditions incorporated within the water purveyor's water system improvement and expansion plans required under the provisions of the Public Water Systems Coordination Act and DOH.

Section 2. Lead Agency. The lead agency for administering the Pierce County Water Utility service area agreements shall be the Pierce County Department of Public Works and Utilities unless otherwise established by the Pierce County Executive. The lead agency shall function only as a coordination center. The lead agency will maintain the original documents and will be responsible for updating the water system map and agreements as provided for in the CWSP.

Section 3. Authority The authority for this Agreement is granted by the Public Water Systems Coordination Act of 1977, Chapter 70.116 RCW.

Section 4. Service Area Boundaries. The undersigned Water Purveyor acknowledges that the Pierce County Water Service Area Maps identifying its retail service area boundaries, dated _____ and included as Attachment A to this Agreement, identify the Water purveyor's present and future service area. The undersigned further acknowledges that there are no service area conflicts with an adjacent water utility or purveyor, or, if such a conflict exists, agrees that no new water service will be extended within disputed areas except as stipulated in an adjudication by DOH.

This agreement shall apply to service areas existing as of August, 1994, and to the service area boundaries identified in the above referenced maps, or as shown on current revisions thereof, provided that no revisions of service areas shown on these maps shall be made without prior written concurrence of the water utilities/purveyors involved and such written concurrence is filed with the Lead Agency. Revisions may also require an amendment to the purveyor's or utility's service plans.

Section 5. Boundary Adjustments. If, at some time in the future it is in the best interest of the undersigned parties to make service area boundary adjustments, such modifications must be by written concurrence of all involved utilities and the proper legislative authority(ies), and must be noted and filed with the designated Pierce County lead agency and DOH. It is understood by the undersigned utility that it may decline to provide service within its designated service area boundary, but in that case, an applicant may be referred to other adjacent purveyors or utilities or a new utility may be created and the original service area boundary will be adjusted accordingly.

Section 6. System Extension Policies. The undersigned utility agrees that in order to expand its existing water service area, (other than by addition of retail customers to existing water mains), or to serve in the capacity of a pre-qualified satellite system management agency (SSMA), it shall have adopted design standards and Utility Service extension policies. The

design standards shall meet or exceed the Pierce County Water System Minimum Standards and Specifications.

A water utility anticipating expansion of retail service in unincorporated areas of Pierce County, or intending to operate as an SSMA, shall identify utility service policies in its updated water system plan. The undersigned utility agrees to identify, for information, its utility service policies or provide a copy of the updated water system plan to the Lead Agency prior to application for extension of its existing water system into new service areas within the unincorporated areas of Pierce County.

Municipalities further agree that if they identify a service area outside of their existing municipal corporate boundaries, the municipality will assume full responsibility for providing water service equivalent to the level of service provided for their customers inside the city limits with similar service requirements, and must also meet or exceed Pierce County's minimum design standards.

Section 7. Special Working Agreements. Special working agreements, if they exist and are relevant, between this water purveyor and any adjacent water purveyor shall be attached to this Agreement as Attachment B and incorporated herein by this reference.

Section 8. Compliance with the CWSP. Nothing in this Agreement shall waive any requirement of the state, federal or local government regarding the provision of water service. This Agreement shall comply with the interlocal agreement requirement of the CWSP.

IN WITNESS WHEREOF, the undersigned party has executed this Agreement as of

4-14-11.

Date

City of Gig Harbor

Water Purveyor

Representative

Water Department Superintendent

Title

Receipt Acknowledged:

Pierce County Public Works and Utilities Department

Date

STANDARD SERVICE AGREEMENT
ATTACHMENT B

Utility shall include copies of separate agreements, relating to common service areas, transfer arrangements, special working agreements, and/or retail service agreements with adjacent utilities. These agreements will be included by reference in this Interlocal Agreement.

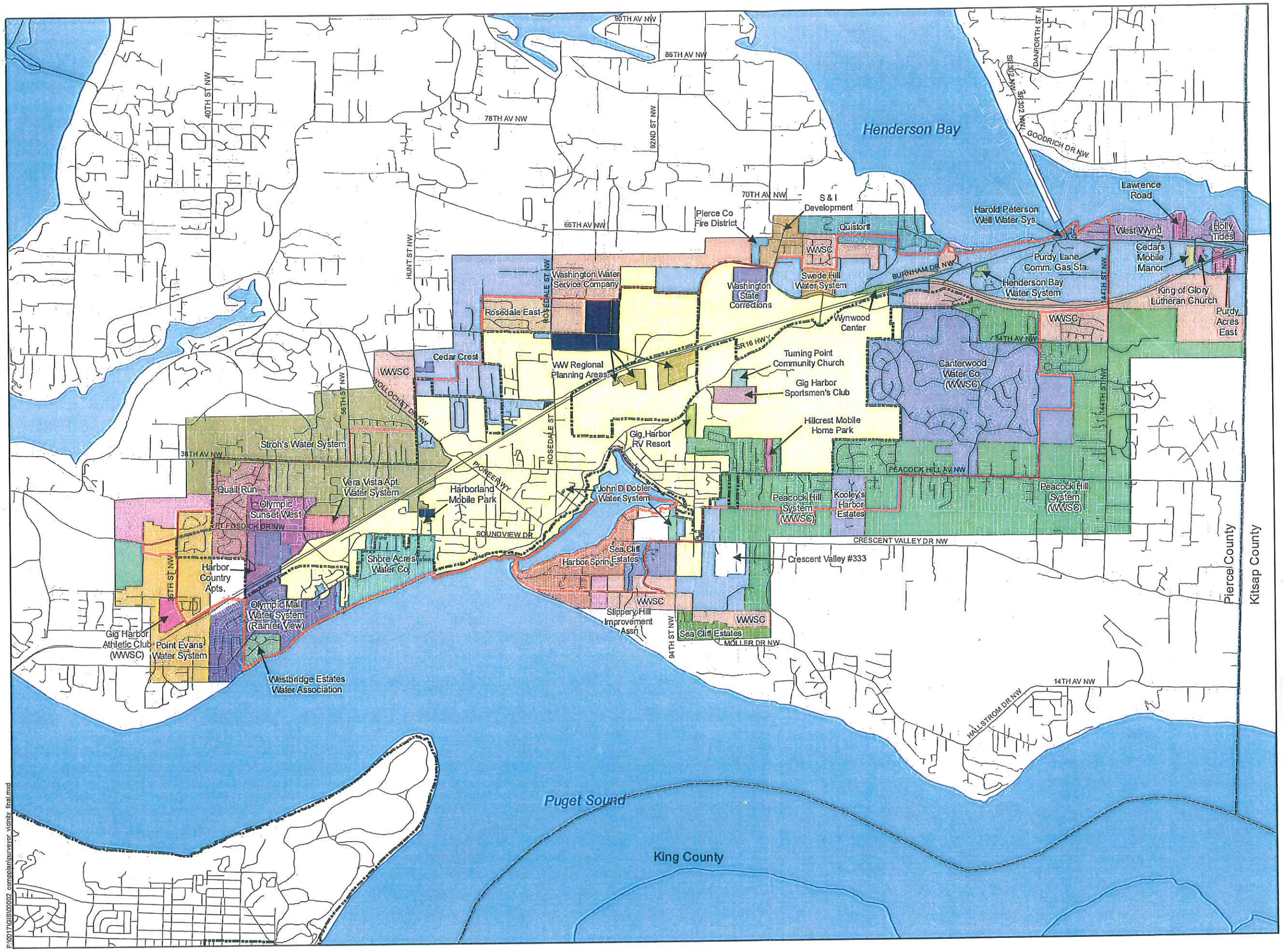
No separate agreements exist.

GIG HARBOR
"THE MARITIME CITY"

CITY OF GIG HARBOR

WATER COMPREHENSIVE PLAN

RETAIL WATER SERVICE AREA AND ADJACENT WATER PURVEYORS FIGURE 1.2



F:\0017\GIS\00002_comprelantsurveyor_vicinity_final.mxd

0 0.3 0.6 1.2 Miles

ATTACHMENT A

DRAFT

Legend

- Gig Harbor City Limits
- Gig Harbor UGA
- Retail Water Service Area
- Proposed Gig Harbor Service Area

RothHill

RESOLUTION NO. 1046

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GIG HARBOR, WASHINGTON, AMENDING THE WATER SYSTEM PLAN BY REVISING THE BOUNDARY BETWEEN THE CITY'S RETAIL WATER SERVICE AREA AND THE WASHINGTON WATER SERVICE COMPANY'S RETAIL WATER SERVICE AREA.

WHEREAS, Washington Water Service Company (WWSC) was requested by the property owner of two parcels located along Crescent Valley Drive (APN 0222324039 and 0222324040) to provide water service to the two parcels, however, the two parcels are located in the City's Retail Water Service Area (RWSA) along the northern boundary; and

WHEREAS, WWSC provides water service immediately north of these two parcels and currently has the ability to serve these two parcels while the closest City water main to these two parcels is approximately 400 ft. to the south; and

WHEREAS, the City owns a parcel (APN 0222323031) in the same vicinity that is located in WWSC's RWSA, which abuts the City's Crescent Creek Park and is located in the City's RWSA; and

WHEREAS, the City has requested WWSC release the City's parcel from WWSC's RWSA so the City's parcel can be incorporated into the City's RWSA; and

WHEREAS, neither WWSC nor the City are requesting to transfer any water rights associated with the proposed transfer of RWSA; and

WHEREAS, The City's Public Works Department finds the proposed transfer to have minimal impact to the City's water system; and

WHEREAS, Chapter 2 of the City of Gig Harbor Water System Plan allows minor changes to the RWSA to be considered as technical amendments to the Plan and requires technical amendments to be adopted through resolution by the City Council; and

WHEREAS, on August 8, 2016, the Public Works Committee heard this request by WWSC and the City for a technical amendment to the City's Water System Plan and recommended the request move forward to the City Council; and

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Gig Harbor, Washington:

Section 1. Figure 1.2 in the City's Water System Plan shall be amended to remove APN 0222324039 and 0222324040 from the Gig Harbor Retail Water Service Area and add APN 0222323031 to the Gig Harbor Retail Water Service Area as provided in the attached Exhibit "A".

PASSED this 26th day of September, 2016.

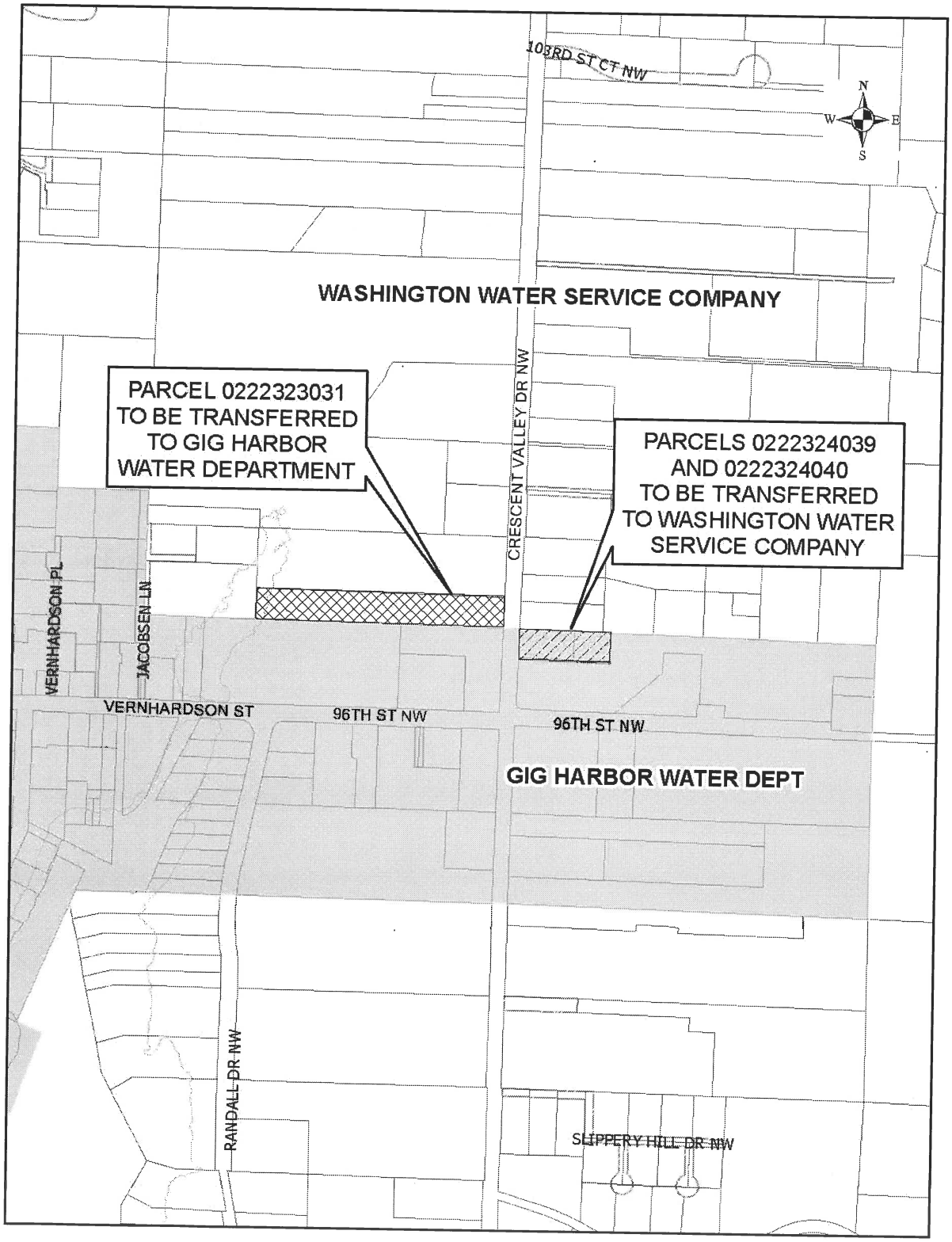
Jill Guernsey, Mayor

ATTEST:

Shawna Wise, Assistant City Clerk

FILED WITH THE CITY CLERK: 09/19/16
PASSED BY THE CITY COUNCIL: 09/26/16
RESOLUTION NO. 1046

EXHIBIT A
LOCATION MAP



RESOLUTION NO. 1008

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GIG HARBOR, WASHINGTON, AMENDING THE WATER SYSTEM PLAN BY REVISING THE BOUNDARY OF THE RETAIL WATER SERVICE AREA SO THE HARBOR WINDS PLAT WILL BE ENTIRELY WITHIN THE CITY'S SERVICE AREA.

WHEREAS, the Harbor Winds Preliminary Plat (Permit No. PL-PPLAT-09-0004) was approved on August 14, 2012; and

WHEREAS, Gig Harbor Property Investment, LLC, the applicant of the Harbor Winds Preliminary Plat, proposed a Development Agreement with the City (Permit No. PL-14-0002), to allow for phased development, and the Development Agreement is currently under review; and

WHEREAS, the City of Gig Harbor Water System Plan (Plan) indicates the Harbor Winds Preliminary Plat is partially within the boundary of the City's Retail Water Service Area (RWSA) and partially within the boundary of the Washington Water Regional Planning Area; and

WHEREAS, by way of correspondence to the City dated March 26, 2014, Washington Water Service Company provided notice to the City that they do not have water connections available to provide service to the Harbor Winds Preliminary Plat and they do not object to the City of Gig Harbor providing water services to the plat; and

WHEREAS, the Harbor Winds Preliminary Plat is owned by Gig Harbor Homesites, LLC; and

WHEREAS, Gig Harbor Homesites, LLC submitted an application to amend the boundaries of the RWSA shown in the Plan so the entire plat will be within the City's RWSA; and

WHEREAS, the City's Public Works Department recognizes the benefit to having a single water service provider within the Harbor Winds Preliminary Plat boundaries; and

WHEREAS, the Harbor Winds Preliminary Plat development has been tested in the City's water model which indicates that with mitigation, water can be provided to the plat; and

WHEREAS, Gig Harbor Homesites, LLC has voluntarily agreed to construct the required mitigation, including water system improvements to provide a redundant transmission main, consistent with the Plan; and

WHEREAS, to bring all of the Harbor Winds plat into the RWSA, the Public Works Department requests the RWSA boundary be expanded to include Tax Parcel Nos. 0221062015, 0221062016 and 0221062098 in their entirety; and

WHEREAS, Chapter 2 of the City of Gig Harbor Water System Plan allows minor changes to the RWSA to be considered as technical amendments to the Plan and requires technical amendments to be adopted by resolution by the City Council; and

WHEREAS, the Public Works Director believes the information provided sufficiently justifies a technical amendment to the Plan; and

WHEREAS, on September 14, 2015, the Public Works Committee heard the City's requested Water System Plan amendment and recommended the request move forward to the City Council; and

WHEREAS, on October 12, 2015, the Gig Harbor City Council held a public meeting on requested Water System Plan amendment

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Gig Harbor, Washington:

Section 1. Upon recording of the Harbor Winds final plat, or if recorded in phases, the recording of the first of the Harbor Winds final plat phases, Figure 1.1 in the Water System Plan shall be amended to reflect the revisions to the Gig Harbor Retail Water Service Area as provided in the attached Exhibit "A".

PASSED this 12th day of October, 2015.

Jill Guernsey, Mayor

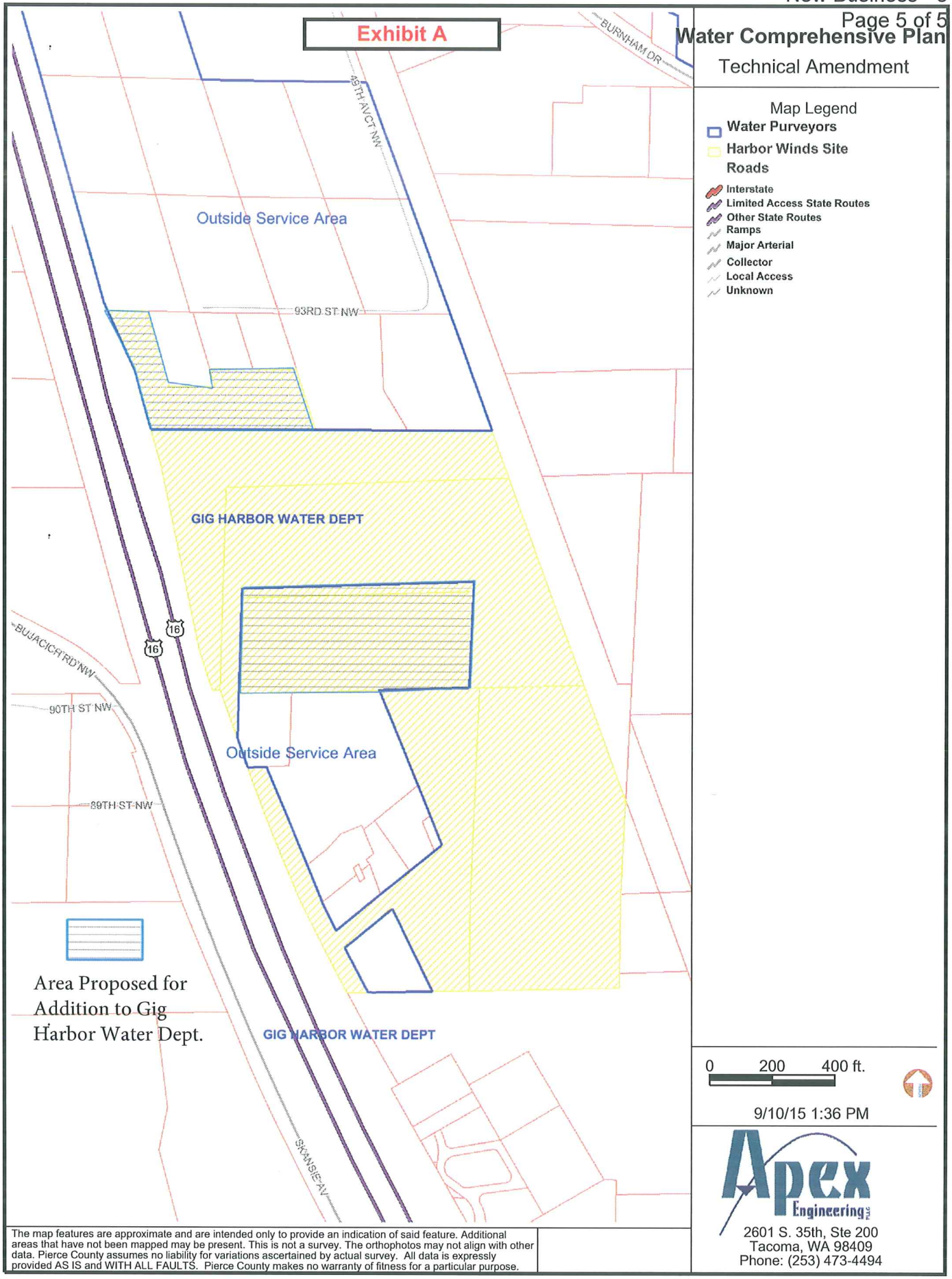
ATTEST:

Molly M. Towslee, City Clerk

FILED WITH THE CITY CLERK: 10/08/15
PASSED BY THE CITY COUNCIL: 10/12/15
RESOLUTION NO. 1008

Exhibit A

Water Comprehensive Plan
Technical Amendment



Map Legend
- Water Purveyors
- Harbor Winds Site
- Roads
  - Interstate
  - Limited Access State Routes
  - Other State Routes
  - Ramps
  - Major Arterial
  - Collector
  - Local Access
  - Unknown

0 200 400 ft.

9/10/15 1:36 PM

The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The orthophotos may not align with other data. Pierce County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. Pierce County makes no warranty of fitness for a particular purpose.

Apex Engineering PLLC
2601 S. 35th, Ste 200
Tacoma, WA 98409
Phone: (253) 473-4494

Appendix F

STANDARD UTILITY EXTENSION AGREEMENT

AFTER RECORDING RETURN TO:

The City of Gig Harbor
Attn: City Clerk
3510 Grandview Street
Gig Harbor, WA 98335

WASHINGTON STATE COUNTY AUDITOR/RECORDER'S INDEXING FORM

Document Title(s) (or transactions contained therein):
Utility Extension, Capacity Agreement and Agreement Waiving Right to Protest LID

Grantor(s) (Last name first, then first name and initials)

Grantee(s) (Last name first, then first name and initials)
City of Gig Harbor

Legal Description (abbreviated: i.e., lot, block, plat or section, township, range)

Assessor's Property Tax Parcel or Account Number:

Reference Number(s) of Documents assigned or released:

UTILITY EXTENSION, CAPACITY AGREEMENT
AND AGREEMENT WAIVING RIGHT TO PROTEST LID

THIS AGREEMENT is entered into this _____ day of _____, 20___, between the City of Gig Harbor, Washington, a municipal corporation of the State of Washington (the "City"), and _____, a _____ (the "Owner").

RECITALS

WHEREAS, the Owner is the owner of certain real property located in Pierce County which is legally described as set forth in Exhibit "A" and shown in the location map in Exhibit "B" attached hereto and incorporated herein by this reference; and

WHEREAS, the Owner's property is not currently within the City limits; and

WHEREAS, the Owner desires to connect to the City's water utility system, hereafter referred to as the "utility," and the City is willing to allow connection only upon certain terms and conditions in accordance with Title 13 of the Gig Harbor Municipal Code, as now enacted or hereinafter amended; and

WHEREAS, on _____, the City Council held a public hearing on this Utility Extension Capacity Agreement; NOW, THEREFORE,

FOR AND IN CONSIDERATION of the mutual benefits and conditions hereinafter contained, the parties agree as follows:

TERMS

1. Warranty of Title. The Owner warrants that Owner is the owner of the property described in Exhibit 'A', which is attached hereto and incorporated herein by this reference, and is authorized to enter into this Agreement.

2. Extension Authorized. The City hereby authorizes the Owner to extend service to Owner's property from the existing utility line on _____ (street or right-of-way) at the following location: _____.

3. Costs. Owner will pay all costs of designing, engineering and constructing the extension. All construction shall be done to City standards and according to plans approved by the City Engineer. Any and all costs incurred by the City in reviewing plans and inspecting construction shall be paid for by the Owner.

4. Water Capacity Commitment. The City agrees to provide to the Owner water utility service and hereby reserves to the Owner _____ ERU's; provided however, that the City retains the authority to temporarily suspend such capacity where it is necessary to comply with other permits required by any agency with jurisdiction. These capacity rights are allocated only to the Owner's system as herein described. Any modification to this system must first be approved by the City. Capacity rights acquired by the Owner pursuant to this Agreement shall not constitute ownership by the Owner of any facilities comprising the City's water system. The City agrees to reserve to the Owner this capacity as set forth in GHMC 13.34.030.

5. Capacity Commitment Payment.

A. The Owner agrees to pay the City within 30 days of execution of this Agreement and prior to the recording of this agreement the sum of $_____, which is fifteen percent (15%) of the current general facilities charge, to reserve the above specified capacity. This payment shall reserve the specified capacity for a period of up to three years from the date of payment.

B. In the event the Owner has not made connection to the City's utility system by the date set forth above and no extension of the commitment period occurs as outlined below, such capacity commitment shall expire and the Owner shall forfeit one hundred percent (100%) of this capacity commitment payment to cover the City's administrative and related expenses.

C. In the event the Pierce County Boundary Review Board should not approve extension of the City's water system prior to the expiration of the commitment period, the Owner shall be entitled to a refund of the capacity commitment payment (without interest), less a five percent (5%) administrative fee.

6. Extension of Commitment Period. The Owner may extend the capacity commitment period for the life of the underlying development application or the underlying development approval upon payment of a capacity commitment payment of 100% of the value of the current general facilities charge. At the time of actual connection, per GHMC 13.34.040(7), if the water general facilities charge has increased, the Owner shall pay the difference between what was paid for the capacity commitment payment and the actual cost of the current general facilities charge.

7. Permits; Easements. Owner shall secure and obtain, at Owner's sole cost and expense, any and all necessary permits, easements, approvals, and licenses to construct the extension, including, but not limited to, all necessary easements, excavation permits, street use permits, or other permits required by state, county and city governmental departments including, but no limited to, the Pierce County Public Works Department, Pierce County Environmental Health Department, State Department of Ecology, Pierce County Boundary Review Board, and City of Gig Harbor.

8. Turn Over of Capital Facilities. If the extension of utility service to Owner's property involves the construction of water or sewer main lines, pump stations, wells, and/or other City required capital facilities, the Owner agrees if required by the City to turn over and dedicate such facilities to the City, at no cost, upon the completion of construction and approval and acceptance of the same by the City. As a prerequisite to such turn over and acceptance, the Owner will furnish to the City the following:

A. Record drawings in a form acceptable to the City Engineer;

B. Any necessary easements, permits or licenses for the continued operation, maintenance, repair or reconstruction of such facilities by the City, in a form approved by the City Attorney;

C. A bill of sale in a form approved by the City Attorney; and

D. A bond or other suitable security in a form approved by the City Attorney and in an amount approved by the City Engineer, ensuring that the facilities will remain free from defects in

workmanship and materials for a period of two years.

9. General Facilities Charges. The Owner agrees to pay the applicable general facilities charges, in addition to any costs of construction, as a condition of connecting to the City utility system at the rate schedules applicable at the time the Owner physically connects his/her property to the system. Any commitment payment that has not been forfeited shall be applied to the City's general facilities charges. Should the Owner not connect 100% of the Water Capacity Commitment, the Capacity Commitment payment shall be credited on a prorated percentage basis to the general facilities charges as they are levied.

10. Service Charges. In addition to the general facilities charges, the Owner agrees to pay for utility service rendered according to the rates for services applicable to properties outside the city limits as such rates exist (which is presently at 150% the rate charged to customers inside city limits) or as they may be hereafter amended or modified.

11. Annexation.

A. Owner understands that annexation of the property described on Exhibit 'A' to the City will result in the following consequences:

i. Pierce County ordinances, resolutions, rules and regulations will cease to apply to the property upon the effective date of annexation;

ii. City of Gig Harbor ordinances, resolutions, rules and regulations will apply to the property upon the effective date of annexation;

iii. Governmental services, such as police, fire and utility service will be provided to the property by the City of Gig Harbor upon the effective date of annexation;

iv. The property may be required to assume all or any portion of the existing City of Gig Harbor indebtedness, and property tax rates and assessments applicable to the property may be different from those applicable prior to the effective date of annexation;

v. Zoning and land use regulations applicable to the property after annexation may be different from those applicable to the property prior to annexation; and

vi. All or any portion of the property may be annexed and the property may be annexed in conjunction with, or at the same time as, other property in the vicinity.

B. With full knowledge and understanding of these consequences of annexation and with full knowledge and understanding of Owner's decision to forego opposition to annexation of the property to the City of Gig Harbor, Owner agrees to sign a petition for annexation to the City of the property described on Exhibit “A” as provided in RCW 35.14.120, as it now exists or as it may hereafter be amended, at such time as the Owner is requested by the City to do so. The Owner also agrees and appoints the Mayor of the City as Owner's attorney-in-fact to execute an annexation petition on Owner's behalf in the event that Owner shall fail or refuse to do so and agrees that such signature shall constitute full authority from the Owner for annexation as if Owner had signed the petition himself. Owner further agrees not to litigate, challenge or in any manner contest, annexation to the City. This Agreement shall be deemed to be continuing, and if Owner's property is

not annexed for whatever reason, including a decision by the City not to annex, Owner agrees to sign any and all subsequent petitions for annexations. In the event that any property described on Exhibit 'A' is subdivided into smaller lots, the purchasers of each subdivided lot shall be bound by the provisions of this paragraph.

12. Public Works Standards and Utility Regulations. Owner agrees to comply with all of the requirements of the City's public works standards relating to water and utility regulations when developing or redeveloping all or any part of the property described on Exhibit "A", and all other applicable water standards in effect at the time.

13. Liens. The Owner understands and agrees that delinquent payments under this agreement shall constitute a lien upon the above-described property. The lien shall be as provided in RCW 35.67.200, and shall be enforced in accordance with RCW 35.67.220 through RCW 35.67.290, all as now enacted or hereafter amended.

14. Termination for Noncompliance. In the event Owner fails to comply with any term or condition of this Agreement, the City shall have the right, at any time, to enter onto the Owner's property and for that purpose disconnect the water, in addition to any other remedies available to the City.

15. Waiver of Right to Protest LID. (If applicable)

A. Owner acknowledges that the entire property legally described in Exhibit 'A' would be specially benefited by the following improvements (specify):

[Insert any required improvements here]

B. Owner agrees to sign a petition for the formation of an LID or ULID for the specified improvements at such time as one is circulated and Owner hereby appoints the Mayor of the City as his attorney-in-fact to sign such a petition in the event Owner fails or refuses to do so.

C. With full understanding of Owner's right to protest formation of an LID or ULID to construct such improvements pursuant to RCW 35.43.180, Owner agrees to participate in any such LID or ULID and to waive his right to protest formation of the same. Owner shall retain the right to contest the method of calculating any assessment and the amount thereof, and shall further retain the right to appeal the decision of the City Council affirming the final assessment roll to the superior court. Notwithstanding any other provisions of this Agreement, this waiver of the right to protest shall only be valid for a period of ten (10) years from the date this Agreement is signed by the Owner.

16. Specific Enforcement. In addition to any other remedy provided by law or this Agreement, the terms of this Agreement may be specifically enforced by a court of competent jurisdiction.

17. Covenant. The conditions and covenants set forth in this Agreement and incorporated herein by the Exhibits shall run with the land and the benefits and burdens shall bind and inure to the benefit of the parties. The Owner, and every purchaser, assignee or transferee of an interest in the Property, or any portion thereof, shall be obligated and bound by the terms and conditions of this Agreement, and shall be the beneficiary thereof and a party thereto, but only with respect to the Property, or such portion thereof, sold, assigned or transferred to it. Any such purchaser, assignee or transferee shall observe and fully perform all of the duties and obligations of the Owner contained in this Agreement, as such duties and obligations pertain to the portion of the Property sold, assigned or transferred to it. All costs of recording this Agreement with the Pierce County Auditor shall be borne by the Owner.

18. Attorney's Fees. This Agreement shall be construed and enforced in accordance with the laws of the State of Washington. In any suit or action seeking to enforce any provision of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees and costs, in addition to any other remedy provided by law or this agreement. Venue of such action shall lie in Pierce County Superior Court or the U.S. District Court for Western Washington.

19. Notices. Notices and correspondence to the City and Owner shall be sufficiently given if dispatched by pre-paid first-class mail to the addresses of the parties as designated below. Notice to any person who purchases any portion of the Property from the Owner shall be required to be given by the City only for those property purchasers who provide the City with written notice of their address. The parties hereto may, from time to time, advise the other of any new addresses for notice and correspondence.

TO THE CITY:	TO THE OWNER:
City Clerk	_____
City of Gig Harbor	_____
3510 Grandview Street	_____
Gig Harbor, WA 98335	

20. Severability and Integration. This Agreement and the Exhibits attached hereto constitute the agreement between the parties on this subject matter, and there are no other understandings, verbal or written, that modify the terms of this Agreement. If any phrase, provision, or section of this Agreement is determined by a court of competent jurisdiction to be invalid or unenforceable, or if any provision of this Agreement is rendered invalid or unenforceable according to the terms of any statute of the State of Washington which became effective after the effective date of this Agreement, such invalidity shall not affect the other terms of this Agreement.

DATED this _____ day of _____, 20___.

OWNER:	CITY OF GIG HARBOR
By:_____	By:_____
Its_____	Its Mayor
(Owner, President, Managing Member)	

Attest:

City Clerk, Molly Towslee

Approved as to form:
Office of the City Attorney

STATE OF WASHINGTON)
) ss.
COUNTY OF _____)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the _____ of _____ _____, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: _____

Printed: _____
Notary Public in and for Washington
Residing at: _____
My appointment expires: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF P I E R C E)

I certify that I know or have satisfactory evidence that Jill Guernsey is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the Mayor of Gig Harbor, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: _____

Printed: _____
Notary Public in and for Washington
Residing at _____
My appointment expires: _____

EXHIBIT A
PROPERTY LEGAL DESCRIPTON

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CHAPTER 4

4.000 WATER

4.010 General

These standards apply only to the City of Gig Harbor Water Department's Water System. Any extension of the Gig Harbor Water System must be approved by the City Engineer. All extensions must conform to these standards, the Department of Health (DOH) requirements and the most current Gig Harbor Water System Plan. In the event of any conflict between the Public Works Standards and the *Water System Plan,* the *Water System Plan* will govern.

In designing and planning for any development, it is the developer's responsibility to see that adequate water for both domestic use and fire protection is attainable. The developer must show in the proposed plans how water will be supplied and whether adequate water flow and pressure will be attained in case of fire. A water hydraulic analysis of the system will be required.

Prior to the release of any water meters, all public works improvements must be completed and approved including granting of right-of-way or easements, and all applicable fees must be paid.

4.020 Design Standards

The design of any water extension/connection shall conform to City Standards and any applicable standards as set forth herein and in Section 1.010 and 1.040.

The layout of extensions shall provide for the future continuation and/or "looping" of the existing system as determined by the City. In addition, main extensions shall be extended as required in Section 1.130.

The General Notes on the following page shall be included on any plans dealing with water system design.

GENERAL NOTES (WATER MAIN INSTALLATION)

1. All workmanship and material shall be in accordance with City of Gig Harbor standards and the most current copy of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction*. In cases of conflict, the most stringent standard shall apply.

2. The Contractor shall be in compliance with all safety standards and requirements as set forth by OSHA, WISHA and the Washington State Department of Labor and Industries.

3. The Contractor shall be responsible for all traffic control in accordance with Section 2B.130 of the *Gig Harbor Public Works Standards*, the *WSDOT Standard Plans for Road, Bridge and Municipal Construction* and/or the *Manual on Uniform Traffic Control Devices* (MUTCD). Prior to disruption of any traffic, a traffic control plan shall be prepared and submitted to the City for approval. No work shall commence until all approved traffic control is in place.

4. All approvals and permits required by the City of Gig Harbor shall be obtained by the Contractor prior to the start of construction.

5. If construction is to take place in the County and/or Washington State Department of Transportation right-of-way, the Contractor shall notify the City. The City shall obtain all the required County and WSDOT permits. The Contractor shall adhere to all the permit requirements. The Contractor shall reimburse the City for associated permit fees.

6. A pre-construction meeting shall be held with the City of Gig Harbor Construction Inspector prior to the start of construction.

7. The Contractor shall be fully responsible for the location and protection of all existing utilities. The Contractor shall verify all utility locations prior to construction by calling the Underground Locate line at 811 a minimum of 48 hours prior to any excavation.

8. It shall be the responsibility of the Contractor to have a copy of an approved set of plans on the construction site at all times.

9. All surveying and staking shall be performed per the corresponding chapter of the *City of Gig Harbor Public Works Standards*.

10. Temporary erosion control/water pollution measures shall be required in accordance with Section 1-07.15 of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* and the *Gig Harbor 2010 Stormwater Management and Site Development Manual*. At no time will silts and debris be allowed to drain into an existing or newly installed facility unless special previsions have been designed.

11. All pipe for water mains shall comply with one of the following types:

    Ductile Iron Pipe: Ductile iron pipe may be used on mains up to ten in. diameter. Ductile iron pipe shall be used on mains over ten in. in diameter. Ductile iron pipe shall conform to AWWA C 151 Class 52 and have a cement mortar lining conforming to AWWA C 104. All pipes shall be joined using non restrained joints which shall be rubber gaskets, push on type or mechanical joint, conforming to AWWA C 111.

    PVC Pipe: PVC pipe may be used on mains eight in. through 10 in. in diameter. All PVC pipe shall conform to the latest revision of AWWA C900 Class 200 standards, and shall be blue in color. See Section 4.030B for more detailed specifications.

12. Gate valves shall be epoxy coated resilient wedge, NRS (Non Rising Stem) with O-ring seals. Valve ends shall be mechanical joint or ANSI flanges. Gate valves shall conform to AWWA C515 Standard. Valves shall be Mueller, M & H, Kennedy, Clow R/W or Waterous Series 500. Gate Valves shall be used for all valves: 2 in. to 12 in.: the design, materials and workmanship of all gate valves shall be ductile iron body resilient wedge valves conforming to AWWA C515 latest revision. Gate valves shall be resilient wedge non-rising stem (NRS) with two internal O-ring stem seals. Butterfly Valves shall be used for all valves larger than 12 in. Butterfly valves shall conform to AWWA C504, Class 150B, with cast iron short body, O-ring stem seals, geared operator designed for underground installation, and a 2 in. square operating nut. Butterfly valves shall be Mueller, Linseal III, Kennedy, M & H, Pratt Groundhog, or Allis Chalmers.

13. Existing valves shall be operated by City employees only.

14. Hydrants shall be Mueller Super Centurion 250, or Clow Medallion 929 or MH EJIW 5CD250. Hydrants shall be bagged until system is approved.

15. All lines shall be disinfected and tested in conformance with the above referenced specification (Note 1) and Section 4.190 of the *Public Works Standards*. Microbiological testing of disinfected water mains shall be conducted only by laboratories that have been certified by the state Department of Health (DOH) for drinking water analysis. The City will only accept results from samples analyzed using method number 9221D or 9222B from *Standard Methods for the Examination of Water and Wastewater, 19th Ed.* (APHA et al. 1995), or corresponding methods from later editions. The City of Gig Harbor Construction Inspector will obtain water samples for microbiological testing and no main will be put into service until a passing test is achieved. It is the contractors/developers responsibility to achieve a passing test. If the initial microbiological test fails, contractor/developer shall flush and disinfect lines again, and a second test will be taken by the City. If this second test should fail, additional disinfection and flushing will be required along with any other means of cleaning the lines that is required by the City Engineer. All expenses incurred following the second failing bacterial test will be paid for by the contractor/developer.

16. All pipe and services shall be installed with continuous tracer tape installed 12 in. to 18 in. under the final ground surface. The marker shall be plastic non-biodegradable, metal core or backing marked water which can be detected by a standard metal detector. Tape shall be Terra Tape "D" or approved equal. In addition to tracer tape, install direct bury, U.S.E.14 gauge blue coated copper wire, wrapped around or taped to the pipe, as shown on Detail 4-08. Low voltage grease-type splice kits shall be used on tracer wire. Continuity testing of the wire will be done by the Contractor.

17. All service line locations shall be marked on the face of the curb with an embossed "W" 3 in. high and 1/4 in. into concrete.

18. The Contractor will provide the City 72-hours' notice prior to scheduling a main shutdown. Where connections require "field verification", connection points shall be exposed by the Contractor and fittings verified 72 hours prior to distributing shut down notices.

19. All water mains shall be staked for grades and alignment by a professional land surveyor capable of performing such work.

20. Separation between water and sewer shall be maintained per Department of Ecology (DOE) standards.

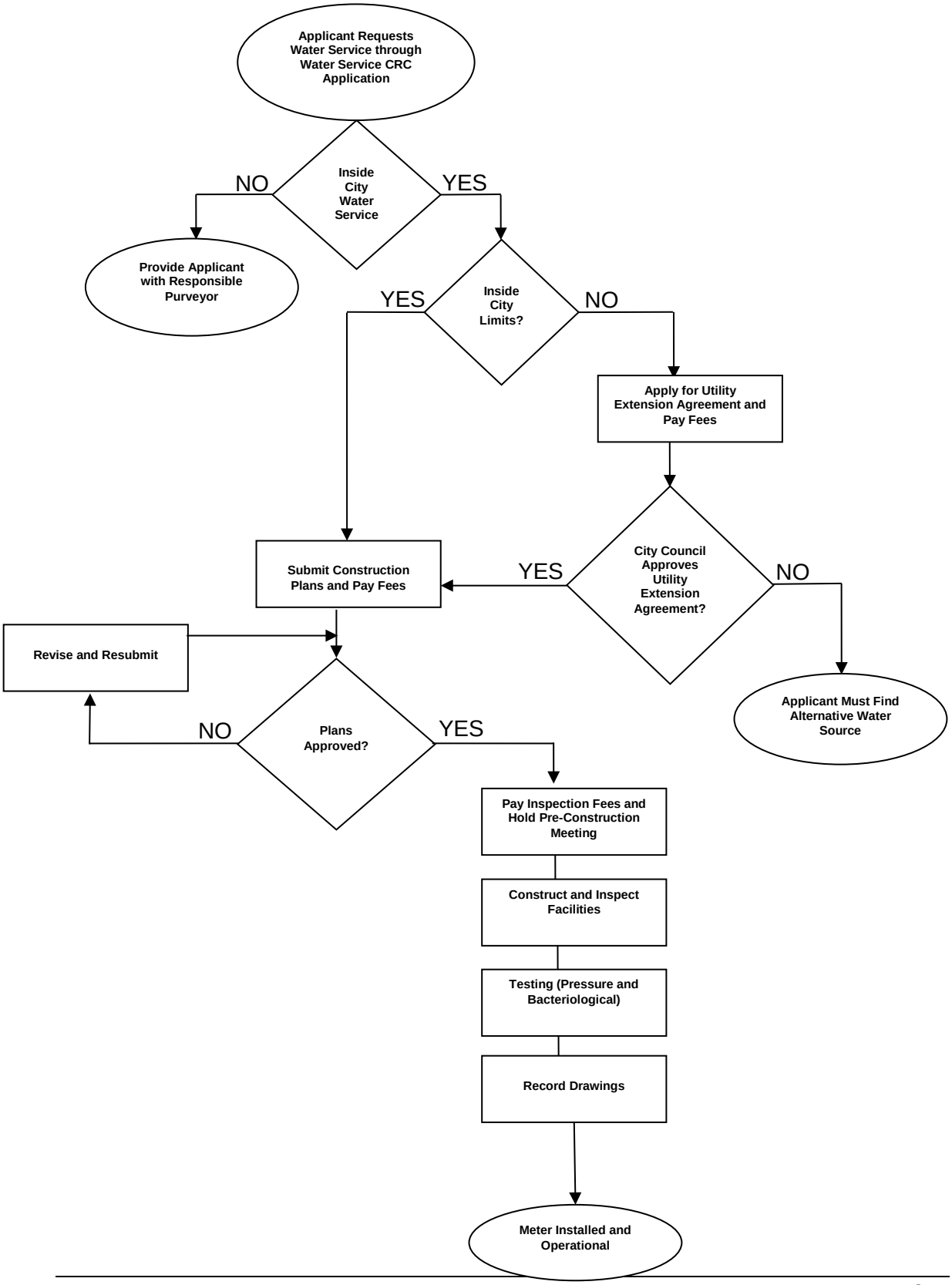
21. A concrete pad per detail 4-08 shall be installed around all valve boxes and blow-offs that are not in a pavement area.

22. No physical connection to the existing water system will be allowed until the new water main has passed a hydrostatic pressure test and microbiological test.

23. The minimum cover depth over all water lines shall be 36 in. unless otherwise noted on the plans.

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Figure 4-1 Process to Obtain Water Service



4.025 Wellhead Protection Areas

Private wells within the City of Gig Harbor shall comply with Department of Health and Department of Ecology standards.

The wellhead protection area designated for each of the City's wells is an irregular boundary determined by topography, water flow patterns (both above and below ground) soil types, flow rates and other criteria. Please contact the Public Works Plan review staff or the Tacoma-Pierce County Health Department to determine if your project is situated within a wellhead protection area. In order to protect the public water supply, the following criteria shall apply to any project or portion of a project which is partially or completely located within a wellhead protection area.

- All storm water shall be directed away from the well's 100-foot sanitary setback.

- A storm and erosion control plan requiring treatment of storm water is required. Depending on the individual characteristics of the project, and the susceptibility of the particular wellhead to contamination, more stringent treatment requirements than those required in the *City of Gig Harbor Stormwater Management and Site Development Manual* (most current addition) may be imposed by the City.

- If the project is to be platted, it must be noted within the covenants of the plat and in the General Notes of any engineering plans that the project is located within the one, five, or ten year time-of-travel zone wellhead protection area.

- All garbage bins and dumpsters, except in single family subdivisions, shall be covered in a manner that prevents rainwater from entering the containers. A sanitary drain shall be provided for compaction-style dumpsters that may generate leachate.

- In commercial projects, where hazardous products are stored or used, a spill and containment plan shall be implemented. Depending on the nature of a project, more stringent spill and containment requirements than those required in the *Gig Harbor Management and Site Development Manual* may be imposed by the City.

4.030 Main Line

A. Water mains shall be sized in accordance with Chapter 2 of the Water System Plan. Water mains sizes shall be verified by hydraulic analysis to provide adequate domestic flow plus fire flow at the required residual pressure. Fire flow requirements will be determined by the Gig Harbor Fire Marshal and the City of Gig Harbor Water System Plan. Check with Gig Harbor Fire Marshal for Class U requirements. Fire hydrants shall be located on water mains 8 in. diameter or larger.

B. All pipe for water mains shall comply with the City's General Notes for water main installation.

C. All fittings shall be ductile iron compact fittings conforming to AWWA C 153 or Class 250 gray iron conforming to AWWA C 110 and C 111. All shall be cement mortar lined conforming to AWWA C 104. Plain end fittings shall be ductile iron if mechanical joint retainer glands are installed on the plain ends. All fittings shall be connected by flanges or mechanical joints.

D. All pipe and services shall be installed with continuous tracer tape installed 12 to 18 in. under the final ground surface. The marker shall be plastic non-biodegradable, metal core or backing which can be detected by a standard metal detector. Tape shall be Terra Tape "D" or approved equal. In addition to tracer tape, install 14 gauge, direct bury, U.S.E. blue coated copper wire, wrapped around or taped to the top of pipe, brought up and tied off at valve body as shown on detail 4-08.

E. The minimum cover for all water mains from top of pipe to finish grade shall be 42 in. unless otherwise approved. If the pipe is offset to the edge of the road, the actual roadway cross grade shall be projected out and used to measure cover to top of pipe.

4.040 Connection to Existing Water Main

The developer's engineer shall be responsible for determining the scope of work for connection to existing water mains. Cut-in tees may be allowed only with the approval of the City Engineer. See detail number 4-07.

It shall be the Contractor's responsibility to field verify the location and depth of the existing main and the fittings required to make the connections to the existing mains.

No tap shall be made to an existing main on a Friday without City approval.

A City representative shall be present throughout the entire connection or tapping procedure.

No physical connection to the existing City water system will be allowed until the new main has passed a hydrostatic pressure test, and a microbiological test. Temporary blocking and blow offs will need to be incorporated into the new main construction until these tests have been passed. At that point connecting fittings and pipe will need to be thoroughly cleaned and disinfected prior to the connection to the existing system. The City Construction Inspector must be present to witness all tie-ins.

4.050 Service Interruption

The Contractor shall give the City a minimum of 72-hours' notice of any planned connection to an existing pipeline. This includes all cut-ins and live taps. Notice is required so any disruptions to existing services can be scheduled. The City will notify customers involved or affected by the water service interruption. The Contractor shall make every effort to schedule water main construction with a minimum interruption of water service. In certain situations, the City may dictate scheduling of water main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers.

4.060 Hydrants

A. The lead from the service main to the fire hydrant shall be as specified on detail 4-01.

B. Fire Hydrants shall have two, 2-1/2 in. outlets and one, 4-1/2 in. pumper port outlet fitted with a 5 in. Stortz adapter. All outport threads shall be national standard thread. The hydrant operating nut shall always open counter-clockwise. The valve opening shall be 5-1/4 in. diameter. The hydrant shall have a positive and automatic barrel drain. Hydrant shall be of the "safety" or break-away style. All exposed portions of the hydrants shall be field painted with one coat of paint approved by the City Engineer prior to final acceptance.

C. The Public Works Department and the Gig Harbor Fire Marshal shall work together to insure that adequate hydrant spacing and installation are achieved.

Unless otherwise required by the governing authority, the following guidelines shall apply for hydrant number and location. Spacing shall be measured to the pathway required for the Pierce County Fire District 5 to lay the fire hose. This spacing shall be determined by the Gig Harbor Fire Marshal.

1. At least one hydrant shall be installed at all intersections.

2. Fire hydrant spacing shall conform to the City of Gig Harbor Fire Marshal requirements and Appendix C of the International Fire Code.

3. Where a cul-de-sac or dead end exceeds 200 feet from the center of the intersection to the end of the cul-de-sac, a hydrant shall be located at the intersection and additional hydrants shall be required in accordance with Appendix C of the International Fire Code.

4. Where hydrants are located on private property, easements shall be provided. Easements shall be to the benefit of the City of Gig Harbor and Pierce Co. Fire District #5.

5. A two-way, blue reflective hydrant marker shall be required perpendicular to each hydrant. Hydrant markers shall be placed six in. from the centerline on the same side of the road as the hydrant.

6. In addition to any approvals by the City Engineering Department, installation of all private fire service mains serving fire sprinkler and/or standpipe systems shall require a permit and inspections from the building and fire safety department.

   A scaled down plan view of the proposed water system shall be included on the plans. The scale shall be appropriate to show the entire proposed system. This plan view shall show the location of all the proposed hydrants plus the location of the appropriate existing hydrants adjoining the project. If the project only includes the addition of one or two new hydrants, the location of at least two existing hydrants in the project vicinity need to be shown on the plan view.

E. Fire hydrants shall be set as shown in standard detail number 4-01.

F. For requirements regarding use, size and location of a fire department connection (FDC) and/or post indicator valve contact the Gig Harbor Fire Marshal. Location of FDC shall be shown on water plans.

G. Where needed, the Engineering Department or the Gig Harbor Fire Marshal may require hydrants to be protected by two or more bollards. See detail 4-12.

H. Fire hydrants meeting required fire flow must be installed, tested, and accepted prior to the issuance of a building permit in new subdivisions and short plats. Fire hydrants must be installed, tested, and accepted prior to bringing combustible materials on to the site for other construction.

4.062 Hydrant Meters

The City of Gig Harbor requires that Contractors and Developers use a hydrant meters to monitor the usage of construction water. The Contractor/developer is required to provide their own hydrant meter and backflow preventer that is to be approved for use by the City of Gig Harbor Construction Inspector. The Contractor/developer shall set up an account with the Public Works Department Utility Billing Clerk for the water that is to be use on the construction site. Charges for the amount of water used will be assessed on a bi-monthly time period or when the project is requesting final inspection. All water usage fees shall be paid prior to project final approval.

The Contractor shall insure that measures to prevent backflow, cross connections and contamination of the City system comply with the Cross Connection Control Procedures and Practices. The Contractor will be required

to install, at a minimum, a double check valve on the hydrant meter being used. The Contractor will also be required to have the check valve tested by an independent certified back flow assembly tester and shall provide a passing test report on the back flow device to the City Construction Inspector prior to using the hydrant meter for construction water. When using the hydrant meter to fill a vehicle, the vehicle must be equipped with an approved anti-siphon air gap. The air gap shall be at least twice the diameter of the inlet pipe.

4.065 Sprinkler Underground Line

This section refers to building fire sprinkler lines and not irrigation or landscape sprinkler lines.

A. A permit is required from the building and fire safety department prior to installation of any fire sprinkler or standpipe mains, valves, or other system appurtenances.

B. The City Fire Marshal will witness all testing and flushing of underground sprinkler and standpipe piping. Underground piping shall be installed in accordance with the Gig Harbor Municipal Code and NFPA Standards13 and 24.

C. The sprinkler underground line shall not be tested until the City has tested and approved the distribution main up to the City valve. See drawing 4-28 for a map clarifying the location of the City valve and the sprinkler or standpipe underground piping.

D. If a double check valve assembly (DCVA) is not located in a public right – of-way, easements for the DCVA to the benefit of the City and Pierce Co. Fire District #5 shall be required. The sprinkler/standpipe underground line shall be that portion of the line located behind the City valve.

E. In no instance shall domestic or irrigation service connections be made to the sprinkler underground line.

F. See Section 4.110 “Backflow Prevention” for additional information.

4.070 Valves

All valves and fittings shall be ductile iron with ANSI flanges or mechanical joint ends. **All existing valves shall be operated by City employees only.**

Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall there be less than one valve every 1000 feet. Generally, there shall be three valves on each tee and four valves on each cross. Valves installed with tees and crosses shall be flanged together. All valves shall open in a counter-clockwise direction when standing on the ground surface. Specific requirements for valve spacing will be made at the plan review stage.

A. Valve Box: All valves shall have a valve box set to grade with a slip type cast iron base from valve to within 5 in. of valve box top. If valves are not set in paved area, a concrete pad shall be set around each valve box at finished grade. In areas where valve box falls in road shoulder, the ditch and shoulder shall be graded before placing asphalt or concrete pad. See detail 4-08.

B. Valve Marker Post: Valve marker posts shall be 4 in. x 4 in. reinforced concrete or schedule 40 steel posts 5 feet long stamped with "W" and distance to valve. Post shall be painted with 1 base coat and 2 coats white oil base enamel. The need for valve marker posts will be determined during plan review. See detail 4-12.

4.080 Air and Vacuum Release Valve

Air and vacuum release valves (ARV) shall be as shown on detail 4-15 and 4-16 for mains up to 12 in. in diameter. The engineer shall size the ARV for mains 14 in. in diameter and larger.

ARV's must be installed so as not to create a cross connection situation.

The installation shall be set at the high point of the line when required. ARV's shall not be installed in areas subject to high ground water or flooding. Drains may be required to insure that no standing water will accumulate in the air release manhole. Where possible, pipes are to be graded to prevent the need for an air release valve.

4.090 Blowoff Assembly

Blowoff assemblies will not be allowed at the end of dead-end mains unless approved by the City Engineer. Hydrants will be set at the end of all dead-end mains and will act as the blowoff. See Section 4.060 for hydrant requirements.

4.100 Backflow Prevention

Backflow prevention shall be installed in accordance with Title 13.06 GHMC, Ordinance No. 1331.

The installation of required backflow devices is necessary to protect the existing water system and users from possible contamination. All water system connections to serve newly constructed and existing buildings; properties with domestic potable water; sprinkler underground lines or irrigation systems shall comply with the minimum backflow prevention requirements as established by the Department of Health (DOH), the American Water Works Association (AWWA) Standards, and the City of Gig Harbor. When a backflow prevention assembly is required, plans must be submitted to the City of Gig Harbor for review prior to installation.

All backflow devices must be inspected and approved by a certified backflow device tester prior to use. Cross connections with the City of Gig Harbor water system shall be prohibited under all circumstances.

The City shall be provided with a successfully completed test report of any backflow prevention device before releasing the certificate of occupancy on any building. See Section 4.065 for additional information regarding sprinkler underground lines.

Refer to Section 4.062 for requirements when filling vehicles with a hydrant meter.

4.110 Service Connection

A. All service connections relating to new development shall be installed by the developer at the time of mainline construction. Services shall not be connected to a hydrant lead or the sprinkler underground line. After all the public works improvements are approved, the owner may apply for a water meter. Bonding may be allowed for commercial projects only. The City will install a water meter after the application has been made and all applicable fees have been paid. Water meters will be set only after the system is inspected and approved.

B. When water is desired to a parcel fronting an existing main but not served by an existing service line, an application must be made to the City. Upon approval of the application and payment of all applicable fees, the City will tap the main, and install the meter, saddle, service line, box, and setter.

Service taps larger than 2 in., connecting to an existing main, shall be made by the Contractor per Section 4.040. Service taps that require crossing an arterial street in excess of two-lane widths shall be made by the Contractor. These types of services shall be denoted on the plans.

C. Service lines shall be as specified herein. No glued joints will be accepted. Service lines shall be installed perpendicular to and 22 ½° above horizontal of the main. Tracer tape and wire wrapped around the pipe shall be installed on all service lines. Service line locate wire will be spliced into main line locate wire using low voltage grease type direct bury splice kits.

One inch diameter service lines shall be pressure class 200, polyethylene plastic pipe manufactured from all virgin material, category 5, grade P34, class C high density polyethylene ID ASTM D2239-SDR7 PE3408; cell classification 335434C to 355434C from Philips Driscopipe, Eagle Pacific (3408), Superlon Plastics, or approved equal and **shall be BLUE in color**.

1½ in. to 2 in. diameter service lines shall be pressure class 200, polyethylene plastic tubing manufactured from all virgin material category 5, grade P34, class C high density weight polyethylene OD ASTM D2737-SDR7 PE3408 or ASTM D2239-SDR7 PE3408; cell classification 335434C to 355434C, from Philips Driscopipe, Eagle Pacific (3408), Superlon Plastics, or approved equal and **shall be BLUE in color**. 2 in.

service lines shall have a 2 in. gate valve set on main at point of connection. Pressure Reducing Valves may be required per the National Plumbing Code and the Building Officials requirements. Pressure reducing valves (PRV's) shall be installed on the customer's side of the water meter. Operation and maintenance of the PRV will be the responsibility of the property owner.

D. Master meters will not be allowed for service to more than one per building. Deviations to this may be granted by the City Engineer. An approved backflow prevention assembly must be installed in conjunction with any master meter.

E. When connection to the public water system is desired by a residential customer connected to an existing well, a physical disconnect from the well must be made. This is necessary to assure that an unapproved auxiliary water supply (the customer's well) will not contaminate the City's water supply. The customer's well may be kept serviceable for irrigation purposes provided it is in compliance with DOE setback standards. If the well is not decommissioned per DOE standards upon connection to the City water supply, the customer is required to install an approved reduced pressure (RP) backflow device on the customer side of the meter. No water meter will be installed until a cross connection inspection has been completed to the satisfaction of the City.

When connection to the public water system is desired by a commercial customer connected to an existing well, or with a well on site, a physical disconnect from the well must be maintained. The customer's well may be kept serviceable for irrigation purposes only, provided it is in compliance with DOE setback standards. If a well is going to be used for irrigation, an RP device as approved by DOH shall be required. If an existing well is not going to be used for irrigation purposes, it must be decommissioned per DOE standards. No water meter will be installed until the RP device is installed and a cross connection inspection has been completed to the satisfaction of the City.

F. Lots or pads created by plats, re-plats, short plats, or binding site plans shall have a water service installed as required below.

In single family subdivisions (including mobile home and manufactured home subdivisions), a service shall be provided to each lot or pad, including open tracts and landscaping in the right-of-way. If a domestic and an irrigation meter are desired at a particular lot or tract, additional services shall be installed.

Duplexes shall have a separate service installed for each living unit regardless of how many duplexes are on a single lot. Example: One duplex on one lot shall have two services, two duplexes on one lot shall have four services and so on. A subdivision of duplexes shall have at least one service installed at all open tracts.

Multi-family and commercial complexes shall have at least one meter installed per separate building and a separate irrigation meter(s) for open spaces and landscaping. Additional meters to a multi-family or commercial building may be installed if desired. At least one service shall be installed at all open tracts. Master meters shall meet the criteria as outlined in 4.120D above.

G. Sample stations per detail 4-19 may be required. The requirement for the location of the sample station will be determined by the City during the plan review. Sample stations shall be located behind the walk, in an open space, or in a utility easement whenever possible and shall generally be centrally located in the project at a low point if possible.

H. Service configuration shall be as shown on details at the end of this chapter. Water meters 4 in. and larger shall not be placed in a traffic bearing location. For services larger than 4 in., the engineer shall submit a detail for approval that addresses the following:

- Meter type (turbine, compound, magnetic etc.) and size.
- A valve shall be located on both sides of the meter.
- A lockable bypass is required.
- Check valves shall be required on the bypass and the meter.
- Supports (jack stands) are required under the meter and bypass.
- The vault specified shall provide an 18” clear space from the vault wall to the closest edge of the meter, valves, or pipe.
- The vault shall have a double lid with a reader lid insert or have a remote readout display.
- The distance from the top of the meter to the bottom of the lid shall be 24 in. minimum and 30 in. maximum.
- A ladder shall be provided in the vault.
- Drainage must be provided for the meter pit.

4.120 Construction Water Policy

The goal of this section is to assure a consistent, fair and equitable approach for allowing potable City water to be used for construction purposes. It is the further intent of this policy to ensure the City’s water distribution system is not compromised due to construction practices.

Construction water is not to be used for irrigation purposes.

The use of construction water shall not create a backflow, cross connection or contamination potential with the City water supply.

If the site to be served by construction water is on a STEP sewer system, the STEP sewer system must be installed, tested, and approved prior to the City installing the water meter. Construction water may be used to fill and test the STEP tank provided that it does not create a cross connection potential.

A. Single Family Residential Construction Requirements:

1. The subject parcel is within the City's water service area.

2. All required Public Works improvements have been completed.

3. Construction water for each individual lot or parcel is required. The City will charge a flat fee for this service for a period not to exceed 90 days.

4. Each individual lot or parcel will pay utility connection charges for water services in addition to the construction water charge. These charges must be paid before a water meter will be dropped. Connection charges include but are not limited to: sewer, stormwater, tap, drop, general facility charges, and latecomer's fees. The City will require at least 48 hours' notice prior to dropping meters. All charges must be paid at City Hall.

5. The contractor/developer will supply their own construction bib to obtain water from the setter. A vacuum breaker is required on all construction bibs and must be in place at all times.

B. Commercial Construction Requirements:

1. The subject parcel is within the City's water service area.

2. All public works improvements have been completed.

3. Construction water may only be obtained through a hydrant meter and backflow preventer supplied by the contractor/developer and inspected by the City prior to use. The contractor/developer is required to supply a backflow device on all construction meters and must provide a current inspection certification for all backflow devices. All water used for construction must be metered.

4. The City will charge the Contractor/Developer for construction water based on "before and after" meter readings. (See Section 4.062 Hydrant Meters.)

4.125 Marking Service Lines

The location of all service lines shall be marked on the face or top of the cement concrete curb with a "W" 3 in. in height and 1/4 in. into the concrete. When an asphalt rolled curb is allowed, the water shall be marked with a tag secured with a "PK" nail one-foot toward centerline from the gutter. The tag shall be a minimum 1 1/4 in. diameter, 0.050 in. thick aluminum disk stamped "W" or an unstamped blue plastic equivalent.

4.130 Potable Water/ Non- Potable Crossings

Potable water mains are recommended to maintain 10 feet horizontal and 18 in. vertical separation (Note: separation distance should be measured as the distance from the closest sides of the outside of the two pipes) above non-potable pipelines (i.e., sanitary sewers, reclaimed water piping, irrigation lines, etc.) If site conditions do not allow such minimum separations, pipelines may be located closer to each other provided additional precautions are identified and instituted to assure protection of the potable line. At a minimum, potable water mains should maintain a minimum 5 feet horizontal and 12 in. vertical separation clearance from non-potable conveyance systems.

Potable and non-potable pipelines may be located in a common trench if the horizontal spacing between outer pipe walls is at least 5 feet and the vertical spacing is at least 18 in. from the invert wall of the potable line to the crown wall of the non-potable line. The non-potable line should be below the potable line on a 'bench' of undisturbed soil. If the minimum separation distances cannot be maintained, one or both of the pipelines should be encased with a structurally sound material such as concrete, CDF, or a larger pressure rated pipe (sleeve). Pressure rated pipe (sleeve) shall be at a minimum C900 PVC when protecting PVC or HDPE pipe, and Ductile Iron when protecting steel or ductile iron pipe.

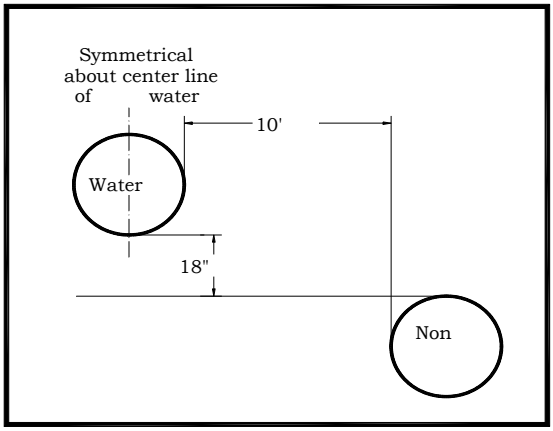
For pipe crossings where the potable line is closer than 18 vertical in. from the non-potable line or the potable line must cross under the non-potable line, the potable line should be cased with pressure- rated pipe extending a minimum of 10 feet to either side of the crossing. To accommodate crossings, the minimum cover for a water main of 36 in. may be reduced to 24 in. upon approval by the City to provide for as much vertical separation as possible. When a reduced depth is allowed, ductile piping and/or casings may be required.

The longest standard length of water pipe shall be installed so that the joints will fall equidistant from any sewer crossing. In some cases where minimum separation cannot be maintained, it may be necessary to encase the water pipe and/or the sewer service per DOE Criteria for Sewage Works Design. No concrete shall be installed unless specifically directed by the City.

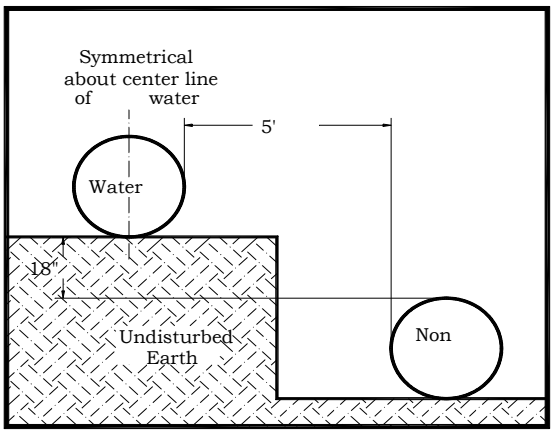
Situations not addressed below shall follow the criteria as outlined in the above mentioned document, most current edition.

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Figure 4-2 Potable Water/ Non- Potable Crossings



Required Separation between Water Lines and Non Potable Pipe,
Parallel Construction



Required Separation between Water Lines Non Potable Pipe,
Unusual Conditions Parallel Construction

4.145 Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust blocks shall comply with detail number 4-17 and 4-18. Thrust blocks shall consist of Class B concrete poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings. The addition of restrained joint fittings may not eliminate the need for thrust blocking.

4.150 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a professional land surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of waterlines shall be as directed by the City Engineer or as follows:

A. Stake centerline alignment every 50 feet with cut or fill to invert of pipe maintaining 36 in. of cover over pipe.

B. Stake location of all fire hydrants, hydrant flange elevations, tees, water meters, setters and other fixtures and mark with cut or fill to finished grade.

4.160 Trench Excavation

A. Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or Contractor in accordance with the terms of all applicable permits.

B. Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 42 in. of cover over the pipe, as shown in detail 4-05. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The owner shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.

C. The Contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 4 in. below water main grade. Where materials are removed from below water main grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.

D. Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the City and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA), Washington Department of Labor and Industries (L & I) and the Office of Safety and Health Administration (OSHA) Safety Standards.

E. The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

4.170 Backfilling

Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City. Pea gravel shall NOT be used as bedding or backfill of water piping or structures.

4.175 Street Patching and Restoration

See Section 2 for requirements regarding street patching and trench restoration.

4.180 Testing and Disinfection

Microbiological testing of disinfected water mains shall be conducted only by laboratories that have been certified by the state DOH for drinking water analysis. The City will only accept results from samples analyzed using method number 9221D or 9222B from *Standard Methods for the Examination of Water and Wastewater, 19th Ed.* (APHA et al 1995), or corresponding methods from later editions.

The water main pipes shall be disinfected and tested before being placed in service. Water for testing and disinfecting shall be obtained by the developer by arrangement with the City. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the developer. Feed for the pump shall be from a barrel or other container, wherein the actual amount of "makeup" water can be measured periodically during the test period. The section to be disinfected shall be thoroughly flushed at maximum flow prior to chlorination.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the developer shall furnish and install temporary blocking. No physical connection to the City's existing water system will be allowed until a passing microbiological test is acquired. The contractor/developer will be responsible for all cost associated with bacterial testing per the City's Construction Fee Schedule. Two tests will be conducted on any hydrant, double check valve assembly, pressure reducing valve installed on main lines or section of water main up to 500' in length. An additional sample will be taken for every 500' of main installed if mainline installation that exceeds 500'. Additional samples may be required at the discretion of the City's Construction Inspector. In the event that a sample fails microbiological testing, all retesting costs and reimbursement for City Construction Inspectors wages shall be paid for by the contractor/developer.

4.181 Hydrostatic Pressure

Prior to the acceptance of the work, the installed pipeline shall be subjected to a hydrostatic pressure test per Section 7-09.3 of the WSDOT Standard, latest

edition. The main shall be pumped up to 150 psi over static line pressure but in no case shall the test pressure be less than 225 pounds per square in. for a period of not less than 15 minutes for all lines. All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrostatic tests shall be performed on every complete section of water main between two valves and each valve shall withstand the same test pressure as the pipe with no pressure active in the section of pipe beyond the closed valve. No physical connection to the City's existing water system will be allowed until the new line passes hydrostatic test.

Defective materials or workmanship, discovered as a result of the tests, shall be replaced. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be rerun at the developer's own expense, until a satisfactory test is obtained.

The pipe shall also be disinfected when being tested. As each length of pipe is laid, calcium hypochlorite or other disinfecting agent, having an available chlorine content of about 45 percent shall be placed in the pipe in sufficient quantities to give a dosage of about 50 ppm available chlorine, calculated on the volume of water which the pipe will contain.

The disinfectant may be placed in the upstream or high pressure end of the pipe. The following table shows the amount of high test calcium hypochlorite which should be used in each 20 foot length of pipe of various sizes:

Figure 4-3 Hydrostatic Pressure

PIPE SIZE (Inside Diameter in In.)	**HIGH TEST HYPOCHLORITE REQUIRED** (Ounces per 20-foot length to give 50 ppm available chlorine)
2, 3, 4 & 4	0.4
8	0.7
10 & 12	1.0
14	2.0

The calcium hypochlorite or other disinfecting agent used for this purpose shall be furnished by the developer.

When the line is complete and ready to disinfect, water shall be allowed to flow in slowly so not to displace the chlorine agent, until it appears at the far end of the line. The system shall then be flushed through the fire hydrants or into the next section, until a test shows no more than 0.2 ppm available chlorine. If any of the materials need to be replaced, the line shall again be disinfected and tested. The line may be pressure tested. The line may be pressure tested at the same time it is disinfected.

The water system will not be acceptable to the City until a receipt of a satisfactory report from the County or State Department of Health on water samples submitted to that office for bacteriological analysis. Should the initial

treatment result in an unsatisfactory bacteriological test, the original chlorination procedure shall be repeated by the Contractor until satisfactory results are obtained. The sample can only be taken on Mondays, Tuesdays, and Wednesdays until noon. Testing and sampling shall take place after all underground utilities are installed and compaction of the roadway section is complete.

The Contractor shall provide all necessary equipment and shall perform all work connected with the tests. The test pump shall be clean and disinfected and shall only be used on potable water supplies. Tests shall be made after all water main and service connections have been made and the roadway section is constructed to subgrade. The Contractor shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition and the air in the line has been released before requesting the City to witness the test.

See Section 4.110 for testing responsibilities for backflow prevention devices.

4.185 Irrigation

All irrigation systems located within the public right-of-way shall be designed by a State of Washington registered landscape architect or City approved design firm. Parts lists shall be submitted with each project.

The general notes on the following pages are required on all plans for City operated or maintained irrigation systems or on any owner association operated or maintained irrigation systems located within the public right-of-way.

Irrigation systems shall be installed with an approved backflow prevention assembly in accordance with Section 4.110 of this manual and approved by AWWA and the Department of Health. Backflow devices will be required to be tested by a certified tester prior to the setting of irrigation meter and before final acceptance is granted.

The irrigation system shall be installed after the area has been properly prepared. See Section 2B.125 for soil preparation requirements. The pipe trenches shall be no wider than is necessary to lay the pipe or install equipment. The top 4 in. of topsoil shall be kept separate from the subsoil and shall be replaced as the top layer when backfill is made.

Irrigation sprinklers shall be situated so as to not wet any public street or sidewalk. Turf heads shall be 1/2 in. above finished grade as measured from the top of the sprinkler. Shrub heads shall be placed on risers approximately 12-in. above finished grade unless otherwise specified. Drip irrigation emitters shall be installed in accordance with the manufacturer’s recommendations.

Installation and maintenance of irrigation systems in roadway planter strips shall be as shown in the table below. The system maintainer shall be responsible for the on-going water and power expenses incurred.

Figure 4-4 Irrigation

	Single Family Residential Zones	Multi-Family & All Other Zones
Arterial Boulevard	Developer installs, Homeowners Association maintains.	Developer installs. Owner or Owners Association maintains.
Arterials	Developer installs, Homeowners Assn. maintains.	Developer installs. Owner or Owners Association maintains.
Collectors	Developer installs, Homeowners Assn. maintains	Developer installs, Owners Association maintains
Residential	Builder installs & homeowner maintains	Owner installs, owner maintains

GENERAL NOTES (IRRIGATION SYSTEMS)

1. All workmanship, material and testing shall be in accordance with the City of Gig Harbor Public Works Standards, the National Electrical Code and the most current copy of the *WSDOT Standard Specifications for Road, Bridge and Municipal Construction* unless otherwise specified below. In cases of conflict, the most stringent standard shall apply.

2. The Contractor shall be in compliance with all safety standards and requirements as set forth by OSHA, WISHA and the Washington State Department of Labor and Industries.

3. The Contractor shall be responsible for all traffic control in accordance with Section 2B.126 of the *Gig Harbor Public Works Standards*, the *WSDOT/APWA Standard Plans for Road, Bridge and Municipal Construction* and the *Manual on Uniform Traffic Control Devices* (MUTCD). Prior to disruption of any traffic, a traffic control plan shall be prepared and submitted to the City for approval. No work shall commence until all approved traffic control is in place.

4. All approvals and permits required by the City of Gig Harbor shall be obtained by the Contractor prior to the start of construction.

5. If construction is to take place in the County and/or Washington State Department of Transportation right-of-way, the Contractor shall notify the City 10 working days in advance of construction. The City shall obtain all the required County and WSDOT permits. The Contractor shall adhere to all the permit requirements. The Contractor shall reimburse the City for associated permit fees.

6. A pre-construction meeting shall be held with the City of Gig Harbor Construction Inspector prior to the start of construction.

7. The Contractor shall be fully responsible for the location and protection of all existing utilities. The Contractor shall verify all utility locations prior to

construction by calling the Underground Locate line at 811 a minimum of 48 hours prior to any excavation.

8. It shall be the responsibility of the Contractor to have a copy of an approved set of plans on the construction site at all times.

9. Temporary erosion control/water pollution measures shall be required in accordance with Section 1-07.15 of the *WSDOT Standard Specifications for Road, Bridge and Municipal Construction* and the *Stormwater Management and Site Development Manual for Gig Harbor*. At no time will silts and debris be allowed to drain into an existing or newly installed facility unless special provisions have been designed.

10. Electrical permits and inspections are required for all irrigation services within the City of Gig Harbor. The Contractor is responsible for obtaining all the required permits prior to any type of actual construction. Any materials purchased or labor performed prior to such approval shall be at the Contractor's own risk.

11. A clearly marked service disconnect shall be provided for every automatic irrigation installation unless otherwise stated on a City approved set of plans. The location and installation of the disconnect shall conform to the National Electrical Code (NEC) and City of Gig Harbor Public Works Standards. The service disconnect shall be Labor and Industries approved.

12. All low voltage wire shall be a minimum size of #14 UF from each control valve to the terminal interface.

13. All low voltage splices shall be of a type equal to a 3-M-BY-054007-09053 or a Labor and Industries approved equal. All splices shall be done in valve control boxes. Direct burial splicing will not be allowed.

14. The automatic controller components shall be approved by the City.

15. The City will be given 72 hours' notice prior to scheduling a shutdown. Where connections require "field verification", connection points will be exposed by the Contractor and the fittings verified 48 hours prior to distributing shut-down notices.

16. All irrigation main line and lateral lines shall be sch. 40 PVC piping or better.

    A. Layout of Irrigation System

       The Contractor shall stake all irrigation heads and mark all proposed trenches within the irrigation system per the approved plans prior to installing the system. Alterations in layout may be expected, i.e., to conform to ground conditions and to obtain full and adequate coverage to the landscaping. However, no alterations shall be made without prior authorization by the City.

    B. Excavation

All soil shall be prepared as specified in 2B.125 prior to trenching. Trenches shall be no wider at any point than is necessary to lay pipe or install equipment. Trench bottoms shall be relatively smooth and of sand or other suitable material free from rocks, stones, or other material which could damage the pipe. Trenches in rock or similar characteristic ground shall be excavated to 4 in. below the required depth and shall be backfilled to the required depth with sand or other City approved material.

Detectable marking tape shall be placed in the trench 4 in. directly above, parallel to, and along the entire length of all non-metallic water line and non-metallic conduit. The width and depth of the tape shall be as recommended by the manufacturer or the City. Locate wire shall be placed with all nonmetallic water lines. Locate wire will terminate in all control valve boxes and shall be placed in ditch before water lines are backfilled.

C. Piping

The irrigation main line is the line containing the supply usually situated between the irrigation meter and the irrigation control valves. The irrigation lateral lines are the lines between the irrigation control valves and the connections to the irrigation heads. Swing joints, thick walled poly pipe, flexible risers, rigid pipe risers, and associated fittings are not considered part of the lateral line but incidental components of the irrigation heads. All PVC pipe used for irrigation main line or irrigation lateral lines shall be schedule 40 or better.

All water lines shall be a minimum of 18 in. below finished grade as measured from the top of the pipe. Where possible, mains and laterals or section piping shall be placed in the same trench.

If water lines are to be installed under existing pavement, the main shall be installed within a minimum 4-in. diameter conduit. All non-metallic water lines to be installed under areas to be paved shall be placed within a minimum 4-in. diameter conduit. The irrigation conduit shall extend a minimum of 1 foot beyond the structure under which conduit is being jacked or bored.

D. Pipe Connections

During construction, pipe ends shall be plugged or capped to prevent entry of dirt, rocks, or other debris.

PVC pipe, couplings and fittings shall be handled and installed with care and in accordance with the manufacturer's recommendation. The outside of the PVC pipe shall be chamfered to a minimum of 1/14 in. at approximately 22 degrees. Pipe and fittings shall be joined by solvent welding. Solvents used must penetrate the surface of both pipe and fittings which will result in complete fusion at the joint. The solvent and cement shall be of a type recommended by the pipe manufacturer.

Threaded PVC joints shall be assembled using Teflon tape as recommended by the pipe manufacturer.

On plastic-to-metal connections, work the metal connection first. Use a non-hardening compound on threaded connections. Connections between metal and plastic are to be threaded utilizing female threaded PVC adapters with a threaded schedule 80 PVC nipple only.

E. Electrical Wire Installation

The electrical controller shall be located in an open space or in a utility easement whenever possible.

Wiring between the automatic controller and the automatic valves shall be placed inside a 3/4 in. irrigation conduit, #14 wire and may share a common neutral. A spare #14 UF yellow wire shall be installed from the controller to the furthest valve in each direction, looping through each control valve box. There shall be a 2-foot loop left in each control valve box. Separate control conductors shall be run from the automatic controller to each valve. When more than one automatic controller is required, a separate common neutral shall be provided for each controller and the automatic valve which it controls. Wire shall be installed adjacent to the irrigation pipe. Plastic tape or nylon ty-wraps shall be used to bundle wires together at 10-foot intervals. Detectable marking tape shall be placed over the top of the irrigation conduit.

Wiring placed under pavement and walls or through walls, shall be placed in irrigation conduit. This conduit shall be PVC class 200 and shall not be less than 4 in. in diameter.

Splices will be permitted only at junction boxes, valve boxes, or at control equipment. A minimum of 2-feet of excess conductor wire shall be left at all splices and terminal and control valves to facilitate inspection and future splicing.

F. Material Specifications

As a means of keeping our parts inventory to a minimum and our maintenance personnel familiarized and knowledgeable about product operation, the following is a list of approved products to be used on all jobs in which the City will be responsible for maintenance and operations. Requests for approved equals need to be submitted to the City for review.

Figure 4-5 Material Specifications

Description	Approved Device
Pop Up Spray Heads	Rainbird or Hunter products • minimum of 4" pop up • check valves on all heads • pressure regulated spray on pressure over 40 psi • installed on Toro or Rain Bird Funny Pipe
Gear Driven Rotary Heads	Rain Bird or Hunter • installed on Funny Pipe or swing joints • check valves on all heads
Remote Control Valve	Rain Bird or Hunter products
Quick Coupling Valves	West Ag 4V100-R-Y • Rainbird 44RC
Double Check Backflow Preventer	• Wilkins 950XLT installed with schedule 80 PVC, or brass union • Back flow preventors must be tested and passed prior to setting of irrigation meter
Flow Sensing Device	Data Industrial IR series • installed with master control valve
Automatic Controller	• Rain Bird or Hunter with VRA low profile antenna, install with Data Retrieval Board • installed in vandal resistant pedestal
Valve Boxes	• Carson 910-12B for Quick Coupler • Carson 1419B for remote control valve
Shut-Off Valves	Wilkins 215 ball valve
Pressure Reducing Valve	Wilkins 600l or approved equal • Required if water static pressure exceeds 75 psi

G. Flushing

All main supply lines shall receive two fully open flushings to remove debris that may have entered the line during construction. The first flushing shall be completed prior to installing valves or testing.

All lateral lines shall receive one full-open flushing prior to placement of sprinkler heads, emitters, and drain valves. Note, drain valves on main lines are not recommended. It is the City of Gig Harbor's preference to have quick couplers installed on the downstream side at the cross connection device and at each terminus of the main line from the cross connection device. The flushing shall be of sufficient duration to remove any dirt and debris that have entered the lateral lines during construction.

H. Testing

All gauges used for testing water pressure shall be certified correct by an independent testing laboratory immediately prior to use on the project. Gauges shall be retested when ordered by the Inspector.

Automatic controllers shall be tested by actual operation for a period of two weeks under normal operating conditions. Should adjustments be required, the Contractor shall do so according to the manufacturer's recommendation or under the City's direction until the operation is satisfactory to the City.

All main lines shall be purged of air and tested with a minimum static water pressure of 150 psi for 40 minutes without introduction of additional service or pumping pressure. Testing shall be done with one pressure gauge installed on the line in a location determined by the City Inspector. Lines which show loss of pressure exceeding 5 psi after 40 minutes will be rejected.

All lateral lines shall be purged of air and tested in place at operating line pressure with a pressure gauge and with all fittings capped or plugged. The operating line pressure shall be maintained for 30 minutes with valves closed and without introduction of additional pressure. Lines which show leaks of loss of pressure exceeding 5 psi at the end of specified test period will be rejected.

The Contractor shall correct rejected installations and retest for leaks as specified herein.

I. Backfill

Backfill shall not be started until all piping has been inspected, tested and approved by the City Inspector, after which, backfilling shall be completed as soon as possible. All backfill material placed within 4 in. of the pipe shall be free of rocks, roots, or other objectionable material which might cut or otherwise damage the pipe.

Backfill from the bottom of the trench to approximately 4 in. above the pipe shall be by continuous compacting in a manner that will not damage pipe or wiring and shall proceed evenly on both sides of the pipe. The remainder of the backfill shall be thoroughly compacted, except that heavy equipment shall not be used within 18 in. of any pipe. The top 4 in. of the backfill shall be of topsoil material.

J. Adjusting System

Before final inspection, the Contractor shall adjust and balance all sprinklers to provide adequate and uniform coverage. Spray patterns shall be balanced by adjusting individual sprinkler heads with the adjustment screws or replacing nozzles to produce a uniform pattern.

K. System Operation

The irrigation system shall be completely installed, tested and operable prior to planting unless otherwise specified in the plans or as approved by the City. The Contractor shall be responsible for all maintenance, repair, testing, inspecting and automatic operation of the system until all work is considered complete as determined by the final inspection. Developer is responsible for all water service connection and meter installation charges associated with irrigation water meter.

L. Record Drawings

Upon final acceptance of the work, the Contractor shall submit two record drawings per Section 1.065.

4.190 Inspection of Work

In no event shall the work or any portion thereof, be covered up until the Construction Inspector has completed inspection and approved the same. If any work should be covered up without prior inspection and approval by the Construction Inspector, it must, if required by the City Engineer, be uncovered for examination at the developer/contractor's expense. The Construction Inspector shall at all times have access to the work wherever it is in preparation of progress and the developer/contractor shall provide facilities for such access and for such inspection.

If the specifications, laws, ordinances, or any public authority shall require any work to be specially tested or approved, the Construction Inspector shall be given timely notice of its readiness for inspection and, if the inspection is by other authority than the City, the date fixed for such inspection.

All inspections by the Construction Inspector will be made with all reasonable promptness, but in no event shall the lack of prompt inspections be construed to allow the cover up of the work or any portion of it without inspection.

Re-examination of questioned work may be ordered by the City Engineer and, if so ordered, the work must be uncovered by the developer/contractor.

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Appendix H

2014 BUILDABLE LANDS REPORT, EXCERPTS / WATER FACILITIES INVENTORY STATISTICS

Appendix H-1

2014 BUILDABLE LANDS REPORT, EXCERPTS

Buildable Lands Report

June 30

2014

Pierce County

Planning and Land Services

A Monitoring and Evaluation Analysis of Urban Growth and Development Capacity for Pierce County and its Cities and Towns.

Pierce County Planning and Land Services Department

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Jessica Gwilt, Assistant Planner

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Bill Kingman, City of DuPont

Doug Beagle, Town of Eatonville

Eric Phillips, City of Edgewood

Chris Pasinetti, City of Fife

Angelie Stahlnecker, City of Fircrest

Lindsey Sehmel, City of Gig Harbor

David Bugher, City of Lakewood

Chris Larson, City of Milton

Roger Wagoner, City of Orting

Katie Baker, City of Puyallup

Karen Yates, City of Roy

Rob White, City of Ruston

Mart Kask, Town of South Prairie

Doug Fortner, Town of Steilacoom

Ryan Windish, City of Sumner

Ian Munce, City of Tacoma

David Swindale, City of University Place

Robert Walker, City of Wilkeson

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Pierce County:

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Executive Summary

The Washington State Growth Management Act (RCW 36.70A), enacted in 1990, requires all counties with a population of 50,000 or more with a high rate of population growth to designate urban growth areas (UGAs). The Act requires that these UGAs be of sufficient size to accommodate the anticipated population growth during the 20-year period following the adoption of the UGA. In accordance with the Act, the Pierce County Council has adopted UGAs for Pierce County and its incorporated cities and towns.

In designating these UGAs, the Pierce County Council worked closely with the individual cities and towns to ensure that the UGAs were consistent with local comprehensive plans, urban population forecasts, and population capacity analyses. As a policy choice, each jurisdiction conducted its own independent residential capacity analysis through their GMA comprehensive plan. The County's analysis encompassed the unincorporated lands associated with the Comprehensive Urban Growth Area. The cities' and towns' analyses encompassed the lands within their respective municipal boundaries. Satellite cities' and towns' analyses also included the unincorporated lands within their respective urban growth areas. The methods, definitions, and assumptions incorporated in the analyses differed by jurisdiction and were not uniform or coordinated.

The jurisdictional variations in capacity analysis and the lack of specificity in the GMA led to state-wide debate. Much of this debate focused on determining whether or not there were errors in the assumptions used by local governments in sizing their UGAs. This debate resulted in the Washington State legislature amending the Growth Management Act in 1997 to require certain counties and their cities and towns develop local programs aimed at improving confidence and coordination in their capacity analyses. Pierce County was one of the counties required to develop such a program.

Since 1997, Pierce County and its 23 cities and towns have worked collaboratively in a program to collect annual development permitting data, inventory developable land, and enhance information relating to wetlands and steep slopes. Commonly referred to as the Buildable Lands Program, this collaborative program is aimed at satisfying the 1997 amendments to GMA and improving accuracy in the information used to determine the capacity of the County's UGAs. Pierce County published its first consolidated residential/employment capacity analysis in August 2002, and its second in September 2007. This 2014 Report represents the third published documentation of Pierce County and its Cities and Town's ability to accommodate future growth.

The results of 2014 residential and employment capacity analysis concludes that there continues to be an abundant amount of vacant and underutilized land to accommodate the adopted urban housing and employment targets for the County and its cities and towns. This report details the methodology, assumptions, and calculations that substantiate this assertion.

The Report is divided into five sections:

I. Overview of the Pierce County Buildable Land Program

- General description and historical perspective of state and county legislation addressing development of the program.
- Housing and employment benchmarks established for the County's UGAs that are monitored by the program.

II. Data Collection

- Information collected through the monitoring procedures and describes the inventory conducted for the capacity analyses.

III. Residential and Commercial Capacity Analysis

- Methodology applied to calculate a residential and employment capacity
  - Factors/assumptions incorporated in the calculations.
- Individual chapters for each of the 23 jurisdictions and urban unincorporated Pierce County participating in the program.
  - Background information about each City and Town's Comprehensive Plan.
  - Annual development data.
  - Capacity calculations.

IV. Conclusions

- Summary of the results of the monitoring and capacity for growth within the designated urban growth areas.

V. Consistency Evaluation

- Long-term capacity caparison.
- Identifying whether or not each jurisdiction has sufficient land to accommodate future growth.

Section I: Overview

Introduction

Pierce County and 23 of its cities and towns began developing the Buildable Lands Program in 1997 in response to amendments to the Washington State Growth Management Act enacted that same year. The program seeks to establish a coordinated system for collecting and monitoring data regarding growth and development occurring in Pierce County and its cities and towns.

The program primarily focuses on evaluating two aspects of growth management -- accommodation of projected population growth during the 20-year planning period and the availability of commercial and industrial land for employment purposes. The program is aimed at ensuring greater consistency between local planning efforts under GMA and the growth and development patterns actually occurring in the urban areas of the County and its cities and towns.

Why the Program Was Created

The Washington State Legislature enacted the Growth Management Act (GMA) in 1990. This Act required local governments to develop rational policies to manage growth in the state. All urban counties and their cities and towns were required to plan under the Act. This planning must address issues in land use, transportation, housing, capital facilities, utilities, and rural lands, and must ensure that the forecasted growth in population for the next 20 years can be accommodated in an efficient manner. An essential component of planning under the Act is the designation of urban growth areas (UGAs).

Each county required to plan under GMA must designate an urban growth area or areas within which urban growth shall be encouraged and outside of which urban growth shall not be allowed. These urban growth areas are to be based upon the projected 20-year population growth forecast for the County and its cities and towns as generated by the Washington State Office of Financial Management. In order to properly size these UGAs such that this population could be accommodated, each jurisdiction planning under the Act conducted a population capacity analysis. These capacity analyses sought to determine how much population could be accommodated in a given area based upon availability of developable land.

The jurisdictional variations in capacity analysis and the lack of specificity in GMA led to statewide debate on the subject, with much of the debate focused on determining whether or not there were errors in the assumptions used by local governments in sizing their UGAs. In 1997, this debate resulted in GMA being amended through Senate Bill 6094, commonly referred to as the "Buildable Lands" amendment. The amendment requires certain counties and their cities and towns to monitor development activities through five-year periods and conduct a coordinated housing unit and employment capacity analysis for each of the jurisdictions. Pierce County and its cities and towns are required by state law to participate in this "Buildable Lands" monitoring program.

In July of 2001, the Pierce County Regional Council responded to Senate Bill 6094 by recommending the adoption of proposed amendments to Pierce County's Countywide Planning Policies that incorporate monitoring and evaluation policies related to "Buildable Lands." These policies primarily require jurisdictions to abide by the guidelines specified in a report entitled, "Pierce County Buildable Lands, Procedures for Collecting and Monitoring Data, April 1999."

Local and Regional Framework

While the Growth Management Act was silent on the details of urban density, sizing and analyzing the sufficiency of urban growth areas, local planning policies and decisions by the Central Puget Sound Growth Management Hearings Board (GMHB) have established specific guidance on some of these issues. Additional guidance is provided through a document entitled "Buildable Lands Program Guidelines," published by the Washington State Department of Community, Trade and Economic Development.

Pierce County Countywide Planning Policies (CPPs)

The Pierce County Countywide Planning Policies are written statements that establish a countywide framework for the development of growth management guidelines adopted by the County and its cities and towns. The framework is intended to ensure consistency among all jurisdictions in addressing certain growth management issues. Pierce County adopted its County-wide Planning Policies on June 30, 1992 with additional amendments in 1996 and 2005.

The section of the CWPPs entitled "Countywide Planning Policy on Urban Growth Areas, Promotion of Contiguous and Orderly Development and Provision of Urban Services to Such Development," includes various policies associated with the Buildable Lands program. The related policies primarily address the sizing of the urban growth boundary, the allocation of the projected housing need, and appropriate average density within the urban growth area.

As stipulated in policy UGA 2.1.1, "Urban growth areas must be of sufficient size to accommodate the urban growth projected to occur over the succeeding 20-year planning period." In determining the appropriate size of the urban growth area, various components must be taken into account, such as critical areas, open space, and a market safety factor, i.e., maintaining a supply of developable land sufficient to allow market forces to operate.

Policy UGA 6 directs the County and cities and towns to plan for efficient land use patterns while conserving natural resources. Policy UG 6-1 further defines efficient land use as development with at least an average net density of four units per acre. Associated policies also support the need for in-fill and compact development in achieving an efficient land use pattern.

Policy UGA 8 directs the County and cities and towns to adopt plans that encourage concentrated development within the urban growth area which will accommodate the twenty year projected population and employment growth.

Pierce County Comprehensive Plan

The Pierce County Comprehensive Plan contains various policies that address the designated urban growth areas. Most noteworthy, the policies limit the safety factor (referenced as a market factor in policy) to no greater than 25 percent for urban Pierce County.

Housing and Employment Targets

Evaluating whether or not sufficient capacity exists in Pierce County's UGAs to accommodate the 20-year population target is one of the central components of the Buildable Lands Program. Adopted

housing and employment targets are used in evaluating the success of growth management efforts. Pierce County Council adopted the 2030 housing and employment targets through Ordinance No. 2011-36s. For this Report, the adopted 2008 housing and employment estimates were updated with the 2010 Census data. The total employment allocations are reduced by 12.1 percent during the commercial/industrial land needs analysis in order to account for mobile workers and work-at home employees, as directed by Ordinance No. 2011-36s. Figures 1 and 2 show the 2010 estimates and 2030 targets.

Figure 1: Pierce County 2030 Housing Targets

Municipality	2010 Housing Units[1]	2030 Housing Target[2]
Auburn	3,146	3,634
Bonney Lake	6,394	8,498
Buckley	1,669	2,930
Carbonado	218	298
DuPont	3,241	5,291
Eatonville	1,059	1,353
Edgewood	3,801	6,003
Fife	3,895	4,457
Fircrest	2,847	3,351
Gig Harbor	3,560	5,431
Lakewood	26,548	34,284
Milton	2,724	2,779
Orting	2,361	3,121
Pacific	45	0
Puyallup	16,171	22,611
Roy	326	487
Ruston	430	775
South Prairie	174	281
Steilacoom	2,793	3,385
Sumner	4,279	5,743
Tacoma	85,786	129,030
University Place	13,573	18,698
Wilkeson	175	238
Unincorporated Urban Pierce County[3]	72,091	99,563
Urban Total	**257,306**	**362,241**

[1]2010 Census.
[2]Pierce County Council Resolution No. 2011-36s.
[3]Does not include Joint Base Lewis McChord.

Figure 2: Pierce County 2030 Employment Targets		
Municipality	**2010 Employment[1]**	**2030 Employment Target[2]**
Auburn	590	834
Bonney Lake	4,505	5,448
Buckley	2,089	3,033
Carbonado	52	68
DuPont	2,937	9,078
Eatonville	905	2,335
Edgewood	1,352	3,094
Fife	12,504	19,300
Fircrest	1,369	1,544
Gig Harbor	9,155	9,954
Lakewood	25,259	38,336
Milton	1,855	2,337
Orting	1,134	2,370
Pacific	2,071	6,505
Puyallup	22,208	34,267
Roy	158	342
Ruston	141	494
South Prairie	66	307
Steilacoom	659	788
Sumner	9,825	20,135
Tacoma	104,399	176,930
University Place	6,074	9,593
Wilkeson	63	153
Unincorporated Urban Pierce County[3]	36,336	65,893
Urban Total	**241,376**	**404,958**

[1]PSRC Land Use Targets 2010 Estimates.
[2]Pierce County Council Resolution No. 2011-36s minus 12.1% to account for mobile and work-at-home employees.
[3]Does not include Joint Base Lewis McChord.

Section II: Data Collection

The development data provides information in three key areas. First, the data reveals if the urban growth area has been or is beginning to be developed at urban densities. Secondly, it assesses the integrity of assumptions incorporated in the past capacity analyses. Lastly, the development data can be used to guide/revise build-out assumptions incorporated into 2014 capacity analyses.

It should be noted that while in theory the use of development trend information in future capacity analyses is a prudent measure (required by the "Buildable Lands" legislation), there could be some potential problems with doing this. Many jurisdictions have not experienced a sufficient level of development to establish a statistically valid trend. Accordingly, use of such data may not truly represent how development will occur in future years. In addition, a certain amount of "new" development being tracked in each jurisdiction is vested under pre-GMA regulations. This vested development may be built to standards different than that occurring under post-GMA regulations and may skew the trend information. These two potential problems should be considered in reviewing the development trend information.

Annual Development Data Reporting

Jurisdictions are required to submit the identified data sets in Figure 3. They must submit permit data including the parcel number, plan designation, zoning district, parcel size, and site address. For residential development they must include the permitted units or lots, area used to calculate permitted number of units, and, if applicable to density calculations, the number of acres with environmental constraints, roads, other land uses. For commercial development they must include the total building size, and building use. The data that is required for Data on 100 percent of development activity occurring in each jurisdiction is sought. However, if a jurisdiction does not submit complete information for an individual project, that project is not incorporated in the reported information. It should be noted that the density information should not be compared among different jurisdictions. Density calculations from the developments reflect locally adopted regulations.

Figure 3: Data Sets

Residential Building Permits	Residential Platting Activity	Commercial Building Permits
• Calculate multi-family density by zoning district. • Single-family permit reporting is optional. • Limitations: none.	• Calculate the gross and net residential density by zoning district • Calculate the consumption of land for non-residential purposes, (critical areas, roads, and other uses) • Limitations: single parcel tracts accommodate more than one non-residential facility/activity.	• Calculate the amount of land consumed by commercial and industrial activity. • Track the amount of non-residential uses permitted in residential zoning districts. • Limitations: disconnect between commercial permits and available employment statistics.

Buildable Lands Inventory

Conducting an inventory of buildable lands is an integral component of the housing and employment capacity analyses. Accordingly, the Buildable Lands Program establishes a standard methodology to be used by all jurisdictions. Jurisdictions abided by standard definitions and procedures to ensure reasonable accuracy and consistency. The inventory represents the status of property as of, November 30, 2010.

Vacant and underutilized lands are identified by the inventory and reviewed by the local jurisdictions. This review was used to further improve the accuracy of the inventory by taking advantage of local knowledge, field visits, and the review of digital orthographic photography.

Vacant and Underutilized Land

The inventory of vacant and underutilized lands provides the underlying basis for the housing and employment capacity analyses. Queries of the Pierce County Assessor-Treasurer (ATR) parcel database generate a preliminary inventory.

The inventory identifies three categories of land as having additional employment or housing capacity, "Vacant", "Vacant (single-unit)", and "Underutilized."

All Included Parcels Must:

- Meet the minimum parcel size (3,000 SF)
- Not be adjacent to marine shorelines



Vacant

Vacant lands include parcels without an established structure or land use activity, including agricultural and resource lands, but excluding those enrolled in a current use tax program. Properties that are identified as being enrolled in a current use tax program are included in the underutilized inventory because of the extra difficulties that are associated with developing those lands.

Vacant parcels are categorized as either "Vacant" or "Vacant (single-unit)." Vacant parcels owned by a government entity are flagged for local review. Figure 32 in Appendix F shows the ATR land use descriptions that are considered as potentially vacant.

- "Vacant" represents those parcels that are assumed to be further subdivided and accommodate more than one housing unit. These parcels are included in the full capacity calculations
- "Vacant (single-unit)" represents an individual building lot that is assumed to accommodate only one housing unit. These parcels are separated from the "acreage" capacity calculations and added in as one unit per parcel to the final "acreage" capacity.

Underutilized

Underutilized lands include parcels that have an existing structure(s) or land use activity and have the ability to accommodate additional employment (jobs) or housing units. These lands include parcels in which excess space is available to build a new structure(s), or it is assumed that an existing structure(s) will be demolished and replaced with a larger structure or more structures. Not all parcels that can theoretically accommodate additional growth are categorized as "Underutilized." A specific ratio between the existing jobs or housing to the calculated assumed future build-out must be met. The ratio is different between housing units and jobs. Figure 33 in Appendix F shows the ATR land use descriptions that are considered as potentially underutilized.

Underutilized Existing Residential Use

Parcels with an existing residential use may be categorized as "underutilized" if it meets one of the following:

1) Residential or Mixed Use zoning classification:
   - The ATR use code is single family/mobile home, multi-family, or mobile home park.
     - For existing single-family housing units, the improvement value is less than $500,000.
     - For multi-family and mobile home parks, the improvement value is less than $1,000,000.
   - The ratio of assumed housing build-out to existing housing units is greater than or equal to 2.5.
2) Commercial/industrial zoning classifications that prohibits residential units:
   - An existing single family housing unit, excluding parcels that are within platted subdivisions.
3) Commercial or mixed use zoning classification:
   - An existing single family housing unit which has an ATR land value greater than its improvement value.



Calculation of Existing-to-Build-Out Housing Density Ratio

1. Determine the existing net housing units per acre for each parcel using ATR data for existing buildings/units.
2. Calculate the assumed housing units per acre using the established density assumptions (listed in Table 4 for each jurisdiction).
3. Divide the assumed build-out density by the existing density (this is the existing density to build-out ratio).
4. If the existing housing unit to build-out ratio is 2.5 or greater, the property is categorized as "underutilized." If the build-out ratio is less than 2.5, the property is assumed not to have additional housing capacity and is identified as "built out."

Underutilized Existing Commercial/Industrial Use

Parcels with an existing commercial or industrial use may be categorized as "Underutilized" if it meets the following:

1) Parcels within commercial, industrial, or mixed use zoning classifications:
   - The ATR use code is non-residential.
   - The parcel has an improvement value less than $1,000,000.
   - The ratio of assumed future job build-out to estimated existing jobs is greater than or equal to 5.



Calculation of Existing-to-Build-Out Employment Density Ratio

In order to determine underutilized commercial and industrial uses, the employment capacity of the parcel is compared to the employment capacity of the buildings on the parcel.

Calculation of assumed future job build-out and application of ratio:

1. Determine the existing employment density for each parcel by dividing the square footage of the existing building(s) by the industry standard square footage assumption to estimate the existing number of employees using ATR data for existing building square footage.
2. Calculate the assumed future employment build-out for the parcel by multiplying the gross acreage of the parcel by the assumed employment density.
3. The assumed future employment build-out figure is divided by the estimated existing number of jobs (this is the existing employment to build-out ratio).
4. If the existing employment to assumed build-out ratio is 5 or greater, the property is categorized as "underutilized." If the build-out ratio is less than 5, the property is assumed not to have additional employment capacity and is counted as "built out" in the inventory.

The employment estimate for existing commercial/industrial buildings is derived from industry standard:

- 500 ft^2 per employee within a commercial retail/service building(s).
- 900 ft^2 per employee within a warehouse/industrial building(s).

The employment capacity of a parcel is derived from previous surveys:

- 19.37 employees per gross acre for commercial and service zoned parcels
- 8.25 employees per gross acre for warehousing and industrial zoned parcels

Undevelopable/Built Out

Parcels with existing uses that are categorized as "undevelopable" or "built out" are removed from the inventory outright. It is assumed that certain uses, such as utilities, cemeteries, drain fields, religious services, and other protected uses will not develop further or contribute to housing or employment capacity. Figure 34 in Appendix F shows the ATR land use descriptions that are considered as "undevelopable" or "built out."



Pipeline Projects and Known Development

Pipeline and Major Projects

Projects that are currently in the "pipeline" may be counted separately from the vacant and underutilized land. Pipeline projects include those projects that have an active development application. For parcels that have pipeline projects, the number of units applied for are counted toward the capacity. "Major Projects" are large scale planned development projects. The project acreages and number of units are listed separately in Tables 6 and 9 and the full project information is listed in Appendix C.



Known Development

The capacity targets for the analysis take into account the 20 year period of 2010 to 2030. Recognizing that parcels were developed between 2010 and 2014, the analysis categorizes the parcels associated with these projects as "pipeline."

Section III: Residential and Commercial Capacity Analysis

Methodology

The methodology used to calculate the residential and commercial/industrial capacity in this Report is similar to the methodology that was utilized in the 2002 and 2007 analysis. The exception is the consolidation of "underdeveloped" and "redevelopable" categories into one "underutilized" category and the criteria utilized to identify parcels within this category. The modification is an effort to achieve inter-departmental consistency between the County's land use and transportation models.

The methodology employed for the analysis includes various factors and assumptions. Each component directly influences the estimated capacity and needs' statistics. The assumptions reflect a conservative approach; therefore the reported estimates are not maximum capacity or full build-out estimates. The analysis is based on the total gross acreage associated with each of the buildable land categories (vacant and underutilized) by zoning district. The estimated residential capacity is generated through acreage deductions to account for factors identified below and the application of an average residential density.

If a parcel is categorized vacant (single unit), the parcel acreage is deducted from the gross acreage and incorporated in the analysis as one dwelling unit. In addition, parcels within master planned communities, pipeline projects, or known development (referred to as pipeline projects in the inventory) are deducted from the buildable lands inventory and replaced in the analyses with the remaining housing unit or employment build-out number as documented in an approved developer agreement or other such approval. The number of units associated with "vacant (single unit)" parcels and "pipeline" projects are added in at the end of the analysis to the assumed capacity in Table 8 in order to determine the total capacity.

General Factors/Assumptions

Mixed Use Zoning

Mixed use zoning allows residential and commercial activity on the same parcel or on separate parcels within the same zoning classification. To account for this mixture of activity in both the residential and commercial/industrial capacity analyses, a percentage of zoning classification's acreage is split between the housing and employment capacity calculations. This assumption is referred to as the "residential split" in Table 6 and the "commercial split" in Table 9.

In some instances where a vertical mixed use is anticipated, 100 percent of the land area is assumed as both residential and commercial. This recognizes buildings where the first floor is commercial and the additional stories are residential. In other cases, it is assumed that a specific mixed use zone will produce 100 percent commercial on the first floor, but a only a percentage of the land in that zone will produce residential on the second and above floors. A 100 percent commercial and smaller percent residential assumption, depending on the jurisdiction and zone, is applied to accommodate this trend. If a jurisdiction uses this type of assumption it will be referenced in Table 4.

Land Unavailable for Development

Although individual properties met the criteria for vacant and underutilized lands, not all properties are assumed available for development during the 20 year planning period. Property owners may not

pursue development due to personal use, economic/investment, constraints associated with properties on private roads, or sentimental relationship with their surrounding environment. To account for the market availability and other factors, a specific percent of the net acreage is deducted from the inventory on Tables 6 and 9. A higher percentage is deducted for properties categorized as underutilized. This correlates with a higher uncertainty for the redevelopment of properties with existing improvements.

Future Capital Facilities

The acreage associated with anticipated/planned public capital facilities is deducted from the total gross residential and commercial/industrial acreage. If the documented needs specify a parcel(s), all identified parcels are considered "undevelopable" or "built out" in the inventory and are subsequently excluded from the capacity calculations. In some instances, local jurisdictions choose to incorporate a specific percentage of future land to deduct from the gross acreage in each zone or specific zones for future public capital facilities.

Residential Factors/Assumptions

Residential Density

The net buildable acreage calculated in Table 6 is converted to housing unit capacity in Table 8 through the application of assumed density. Table 8 identifies the density applied to each zoning district. Individual jurisdictions established the density assumptions with recognition of past trends and recent regulatory modifications.

Plat Deductions

Individual jurisdictions apply different methods to calculate the maximum number of housing units permitted within a project. While some calculate units with a project's gross acreage, others employ a net acreage. The plat deductions incorporated in Table 6 reflect the type of approach the respective jurisdiction implements. These deductions may include land reserved for roads, critical areas, parks and recreation, or storm water facilities.

Critical Areas:

- Percent deduction based on observed trends; or an
- Acreage deduction based on GIS layers of critical areas (only if used to calculate allowed density; varies by jurisdiction).
  - The mixed use assumption is also applied to the critical area acreages derived from GIS layers, when applicable, in order to prevent from over-deducting.

Non-Residential Uses

Zoning codes permit various types of non-residential development within residential districts, such as churches and day-care centers. To account for future non-residential development a percentage of the net residential acreage is deducted from the available buildable lands. The specific percentage differs between each jurisdiction.

Displaced Units

In the analysis, existing housing units located on underutilized parcels are categorized as displaced units. The existing number of units is derived from ATR data. For residential units on a property that is only considered in the commercial capacity calculations, the displaced unit calculation is performed at the bottom of both Tables 6 and 9. Not all of the gross acreage is considered to be developable; accordingly, the total number of displaced units per zone is adjusted down to reflect the same percent of deductions that was applied to the gross acreage. As a consequence, the existing units assumed to be displaced are accounted for by adding them to the total need in Table 7.

Commercial Factors/Assumptions

Commercial/Industrial Intensity and Planned Employment Densities

The buildable acreage calculated in Table 9 is converted to employee capacity in Table 11 through the application of assumed gross employees per acre. An assumption for employment density (employees per acre) is necessary to calculate the capacity of the commercial and industrial lands. Although the Buildable Lands legislation directs the County to utilize the average employment densities generated through the trending period, this approach is problematic because employment statistics are not readily available and many commercial/industrial buildings/complexes may not be 100 percent occupied within the first year of completion.

For the 2014 Report, partners in the Traffic Division of Pierce County Public Works and Utilities Department provided a survey review of employment trends for the entire County. It was determined that the previous assumption of 19.37 employees per acre for commercial and services was consistent with their findings, however the 11.15 employees per acre for industrial warehousing and manufacturing was closer to 8.25 employees per acre. This revised assumption is incorporated in the 2014 analysis to reflect best available information.

Displaced Employees

The underutilized land category may include existing businesses and employees that if redeveloped as another business is assumed to be displaced. Accordingly, the employment growth figure is increased to account for the assumed displaced employees. To calculate the displaced employees, the locally observed density of 500 ft^2 per employee for commercial and 900 ft^2 per employee for industrial/warehousing is applied to the existing building square footage. Since not all of the gross acreage is considered to be developable, the total number of displaced employees per zone is adjusted down to reflect the same percent of deductions that was applied to the gross acreage to derive the net developable acreage. For commercial or industrial buildings on a property that is considered only redevelopable as a residential use, the calculation is done in both the residential and commercial/industrial capacity tables. As a consequence, the existing employees assumed to be displaced are accounted for by adding them to the total need in Table 10.

City of Gig Harbor

The City's GMA Comprehensive Plan was adopted on November 28, 1994 and implementing regulations were adopted on January 22, 1996. The City of Gig Harbor's Comprehensive Plan contains eight land use designations and the regulations create 20 implementing zones. The City of Gig Harbor implements densities using net calculations, subtracting out streets, roads, access easements, wetlands, ravine sidewalls, bluffs and tideland except for the RLD zone which is calculated using gross acreage.

Table 1 - City of Gig Harbor: Summary of Building Permits for Multi-Family Development

Land Use Designation	Zoning District	Density[1]/ Units	2006	2007	2008	2009	2010	2011	2012
C/B	B-2	Gross	N/A	N/A	12.35	N/A	N/A	N/A	N/A
		Net			12.35				
		Units			60				
	RB-2	Gross	N/A	N/A	22.12	N/A	13.16	N/A	N/A
		Net			22.12		18.56		
		Units			115		124		
RM	RB-2	Gross	N/A	N/A	N/A	N/A	N/A	7.62	N/A
		Net						7.62	
		Units						8	
	R-2	Gross	N/A	N/A	N/A	N/A	N/A	N/A	11.21
		Net							11.99
		Units							204

[1]Dwelling units per acre.

Table 2 - City of Gig Harbor: Summary of Parcel-Specific Residential Platting Activity

Land Use Designation	Zoning District	Density[1]/ Lots	2006	2007	2008	2009	2010	2011	2012
RL	R-1	Gross	2.05	N/A	N/A	3.65	3.17	3.72	N/A
		Net	3.66			3.94	4.06	3.97	
		Lots	12			5	23	14	
RMD	RMD	Gross	N/A	6.21	6.21	N/A	N/A	N/A	N/A
		Net		8.25	7.56				
		Lots		182	120				
WF	WR	Gross	N/A	2.50	N/A	N/A	N/A	N/A	N/A
		Net		4.17					
		Lots		2					
RM	R-2	Gross	N/A	N/A	N/A	1.70	N/A	N/A	N/A
		Net				1.70			
		Lots				3			

[1]Dwelling units per acre.

Table 3 - City of Gig Harbor: Summary of Parcel-Specific Commercial and Industrial Development Activity									
Land Use Designation	**Zoning District**		**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
C/B	B-2	Gross Acres	0.43	5.08	18.82	N/A	N/A	N/A	12.83
		Bldg. SF	6,599	97,654	142,652				140,048
		FAR[1]	0.35	0.44	0.17				0.25
	C-1	Gross Acres	N/A	N/A	N/A	N/A	1.65	N/A	4.08
		Bldg. SF					17,360		34,050
		FAR[1]					0.24		0.19
	RB-1	Gross Acres	N/A	0.31	N/A	N/A	N/A	N/A	N/A
		Bldg. SF		3,346					
		FAR[1]		0.24					
	RB-2	Gross Acres	N/A	N/A	0.29	1.49	N/A	7.83	N/A
		Bldg. SF			8,154	22,743		27,083	
		FAR[1]			0.65	0.35		0.08	
EC	ED	Gross Acres	0.52	N/A	N/A	N/A	N/A	1.94	N/A
		Bldg. SF	4,358					24,940	
		FAR[1]	0.19					0.30	
PCD-BP	PCD-BP	Gross Acres	N/A	11.17	N/A	40.72	N/A	N/A	N/A
		Bldg. SF		74,036		333,637			
		FAR[1]		0.15		0.19			
PCD-C	PCD-C	Gross Acres	N/A	17.22	N/A	5.95	3.46	N/A	N/A
		Bldg. SF		151,376		93,549	13,354		
		FAR[1]		0.20		0.36	0.09		
PI	PI	Gross Acres	N/A	N/A	N/A	15.56	N/A	5.68	N/A
		Bldg. SF				34,062		2,241	
		FAR[1]				0.05		0.01	
RL	RB-1	Gross Acres	N/A	N/A	N/A	N/A	N/A	1.29	N/A
		Bldg. SF						14,902	
		FAR[1]						0.27	
RM	RB-1	Gross Acres	N/A	N/A	0.62	N/A	N/A	N/A	N/A
		Bldg. SF			7,200				
		FAR[1]			0.27				
WF	WM	Gross Acres	N/A	N/A	N/A	N/A	N/A	N/A	0.80
		Bldg. SF							7,371
		FAR[1]							0.21

[1]Floor area ratio.

Table 4 - City of Gig Harbor: Development Assumptions and Trends			
		2006-2012 Average	**2030 Assumptions**
Residential Density		Refer to Tables 1 and 2.	R-1, RB-1, WR, WM, WC, MUD, PCD-RLD[2]: 4 du/na R-2: 6 du/na R-3, RB-2, PCD-RMD[2]: 8 du/na
Residential/Commercial Split		B-2: 12%/88% RB-1: 89%/11% RB-2: 39%/61% RMD: 100%/0% WM: 0%/100%	RB-1, RB-2: 30/70% MUD: 50/50% WM,WC: vacant 100% residential, not vacant 100% commercial DB, B-2, PCD-C: 0/100%
Plat Deductions	**Roads**	21.6%	15%
	Critical Areas	0.5%	GIS data: Wetlands, ravine sidewalls/bluffs and Tidelands
	Recreation/Park	0.2%	N/A
Public Facilities/Institutions		7.5%	Parcel Specific
Land in Residentially Zoned Districts for Non-Residential Uses		N/A	R-1: 2.5% R-2: 3.5% R-3: 16% RLD, RMD[2]: 0%
Land Unavailable for Development		N/A	Vacant 10%, Underutilized 50% RLD, RMD[2]: 0%
Employees per Gross Acre[1]		N/A	Manufacturing/Warehousing: 8.25 Commercial/Services: 19.37

[1]Pierce County Employment Survey. See Appendix E.
[2]PCD-RLD and PCD-RMD are under developer agreements that have specific acreages and number of units attributed to them. These numbers are reflected in Table 6.

Table 5 - City of Gig Harbor: Assumptions for Vacant, Vacant Single Unit Lots, and Underutilized Parcels			
Zoning District	**Vacant**	**Vacant (Single Unit)**	**Underutilized**
R1	>= .625 acres	< .625 acres	>= .625 acres
R2	>= .42 acres	< .42 acres	>= .42 acres
R3	-	-	>= .32 acres
RB1	-	-	>= .625 acres
RB2	-	-	>= .32 acres
WR	>= .625 acres	< .625 acres	>= .625 acres
WM	-	-	>= .625 acres
WC	-	-	>= .625 acres
RLD	>= .625 acres	< .625 acres	>= .625 acres
RMD	-	-	>= .32 acres

Table 6 – Gig Harbor: Supply of Land/Lots for Residential Development									
Zoning District		**R-1**				**R-2**			
Land Type		Underutilized	Vacant	Vacant (Single Unit)	Pipeline[5]	Underutilized	Vacant	Vacant (Single Unit)	Pipeline[5]
Gross Acres		198.33	165.98	0.52	65.37	48.54	133.97	1.32	12.37
Residential Split[1]		198.33	165.98			48.54	133.97		
Plat Deductions[3]	**Roads**	29.75	24.90			7.28	20.10		
	Critical Areas[2]	5.11	11.72			1.28	2.45		
	Parks and Open Space	-	-			-	-		
Net Acres		163.47	129.35			39.98	111.43		
Non-Residential Uses[3]		4.09	3.23			1.40	3.90		
Adjusted Net Acres		159.38	126.12			38.58	107.53		
Land Unavailable for Development[3]		79.69	12.61			19.29	10.75		
Final Adjusted Net Acres		79.69	113.51			19.29	96.78		
Total Adjusted Net Acres		193.20		N/A		116.07		N/A	
One Dwelling Unit per Vacant (Single) Lot				2	2.13			9	100
Displaced Units[4]		52				8			
Displaced Jobs[4]		0				0			

[1]The percentage of land assumed for residential uses. See Table 4 "Development Assumptions and Trends."
[2]The critical areas acreage for mixed use zones represents the percentage of land assumed for residential uses.
[3]See Table 4 "Development Assumptions and Trends" for deduction assumptions.
[4]Existing housing units and employees associated with underutilized parcels are adjusted down to reflect the mixed use and "unavailable to develop" assumptions.
[5]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Table 6 – Gig Harbor: Supply of Land/Lots for Residential Development									
Zoning District		**R-3**				**RB-1**			
Land Type		Underutilized	Vacant	Vacant (Single Unit)	Pipeline[5]	Underutilized	Vacant	Vacant (Single Unit)	Pipeline[5]
Gross Acres		0.80	0.00	0.00	2.15	6.57	8.25	0.00	3.25
Residential Split[1]		0.80				1.97	2.47		
Plat Deductions[3]	**Roads**	0.12				0.30	0.37		
	Critical Areas[2]	0.00				0.00	0.00		
	Parks and Open Space	-				-	-		
Net Acres		0.68				1.68	2.10		
Non-Residential Uses[3]		0.11				-	-		
Adjusted Net Acres		0.57				1.68	2.10		
Land Unavailable for Development[3]		0.28				0.84	0.21		
Final Adjusted Net Acres		0.28	0.00			0.84	1.89		
Total Adjusted Net Acres		0.28		N/A		2.73		N/A	
One Dwelling Unit per Vacant (Single) Lot		0		0	11			0	12
Displaced Units[4]		0				0			
Displaced Jobs[4]		0				0			

[1]Acreage represents the percentage of land assumed for residential uses in zones that allow for both residential and commercial. See Table 4.
[2]The critical areas acreage for mixed use zones represents the percentage of land assumed for residential uses.
[3]See Table 4 "Development Assumptions and Trends" for deduction assumptions.
[4]Existing housing units and employees associated with underutilized parcels are adjusted to reflect the percent of net acres compared to gross.
[5]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Table 6 – Gig Harbor: Supply of Land/Lots for Residential Development									
Zoning District		**RB-2**				**MUD**			
Land Type		Underutilized	Vacant	Vacant (Single Unit)	Pipeline[5]	Underutilized	Vacant	Vacant (Single Unit)	Pipeline[5]
Gross Acres		20.99	33.35	0.00	35.21	31.89	46.14	0.00	38.14
Residential Split[1]		6.30	10.00			15.94	23.07		
Plat Deductions[3]	**Roads**	0.94	1.50			2.39	3.46		
	Critical Areas[2]	0.80	0.04			1.80	1.35		
	Parks and Open Space	-	-			-	-		
Net Acres		4.55	8.46			11.75	18.26		
Non-Residential Uses[3]		-	-			-	-		
Adjusted Net Acres		4.55	8.46			11.75	18.26		
Land Unavailable for Development[3]		2.27	0.85			5.87	1.83		
Final Adjusted Net Acres		2.27	7.61			5.87	16.43		
Total Adjusted Net Acres		9.89		N/A		22.31		N/A	
One Dwelling Unit per Vacant (Single) Lot				0	212			0	182
Displaced Units[4]		1				0			
Displaced Jobs[4]		5				0			

[1]Acreage represents the percentage of land assumed for residential uses in zones that allow for both residential and commercial. See Table 4.
[2]The critical areas acreage for mixed use zones represents the percentage of land assumed for residential uses.
[3]See Table 4 "Development Assumptions and Trends" for deduction assumptions.
[4]Existing housing units and employees associated with underutilized parcels are adjusted to reflect the percent of net acres compared to gross.
[5]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Table 6 – Gig Harbor: Supply of Land/Lots for Residential Development				
Zoning District		**PCD-RLD**	**PCD-RMD**	**WR**
Land Type		**Pipeline[1]**	**Vacant (Single Unit)**	**Pipeline[1]**	**Vacant (Single Unit)**
Gross Acres		160.90	21.12	29.71	0.37
Residential Split					
Plat Deductions	**Roads**				
	Critical Areas				
	Parks and Open Space				
Net Acres					
Non-Residential Uses					
Adjusted Net Acres					
Land Unavailable for Development					
Final Adjusted Net Acres					
Total Adjusted Net Acres		N/A	N/A		N/A
One Dwelling Unit per Vacant (Single) Lot		644	238	466	1
Displaced Units					
Displaced Jobs					

[1]See Appendix C for list of pipeline projects.

Table 7 - City of Gig Harbor: Housing Unit Needs				
2010 Total Housing Units[1]	2030 Total Housing Units Needed[2]	Additional Housing Needed (2010-2030)	Displaced Units	Total Housing Units Needed
3,560	5,431	1,871	89	1,960

[1]2010 Census.
[2]Adopted by Pierce County Ordinance No. 2011-36s.

Table 8 - City of Gig Harbor: Housing Unit Capacity						
Zoning District	Adjusted Net Acres	Assumed Density	Unit Capacity	One Dwelling Unit per Vacant (Single Unit) Lot	Pipeline[1]	Housing Capacity
R-1	193.20	4	773	2	213	988
R-2	116.07	6	696	9	100	805
R-3	0.28	8	2	0	11	13
RB-1	2.73	4	11	0	12	23
RB-2	9.89	8	79	0	212	291
MUD	22.31	4	89	0	182	271
PCD-RLD	0.00	4	0	0	644	644
PCD-RMD	0.00	8	0	238	466	704
WR	0.00	4	0	1	0	1
					Total Housing Capacity	**3,741**

[1]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Table 9 - City of Gig Harbor: Supply of Land for Commercial/Industrial Employment					
Zoning District	**RB-1**			**RB-2**	
Land Type	Vacant	Underutilized	Pipeline[3]	Vacant	Underutilized
Gross Acres	8.25	6.57	1.30	33.35	20.99
Commercial Split[1]	5.77	4.60		23.34	14.69
Land Unavailable for Development	0.58	2.30		2.33	7.35
Adjusted Gross Acres	5.20	2.30		21.01	7.35
Total Adjusted Gross Acres	7.49		N/A	28.35	
Displaced Jobs[2]		10			18
Displaced Units[2]		1			3

[1]Acreage represents the percentage of land assumed for commercial uses in zones that allow for both residential and commercial. See Table 4.
[2]Existing housing units and employees associated with underutilized parcels are adjusted to reflect the percent of net acres compared to gross.
[3]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Table 9 - City of Gig Harbor: Supply of Land for Commercial/Industrial Employment					
Zoning District	**B-1**		**B-2**		
Land Type	Vacant	Underutilized	Vacant	Underutilized	Pipeline[3]
Gross Acres	0.64	0.00	23.32	39.52	19.50
Commercial Split[1]	0.64	0.00	23.32	39.52	
Land Unavailable for Development	0.06	0.00	2.33	19.76	
Adjusted Gross Acres	0.58	0.00	20.99	19.76	
Total Adjusted Gross Acres	0.58		40.75		N/A
Displaced Jobs[2]		0		120	
Displaced Units[2]		0		1	

[1]Acreage represents the percentage of land assumed for commercial uses in zones that allow for both residential and commercial. See Table 4.
[2]Existing housing units and employees associated with underutilized parcels are adjusted to reflect the percent of net acres compared to gross.
[3]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Table 9 - City of Gig Harbor: Supply of Land for Commercial/Industrial Employment				
Zoning District	**C-1**		**DB**	
Land Type	Vacant	Underutilized	Vacant	Underutilized
Gross Acres	12.66	16.68	2.99	10.49
Commercial Split[1]	12.66	16.68	2.99	10.49
Land Unavailable for Development	1.27	8.34	0.30	5.24
Adjusted Gross Acres	11.39	8.34	2.69	5.24
Total Adjusted Gross Acres	19.73		7.94	
Displaced Jobs[2]		12		18
Displaced Units[2]		5		14

[1]Acreage represents the percentage of land assumed for commercial uses in zones that allow for both residential and commercial. See Table 4.
[2]Existing housing units and employees associated with underutilized parcels are adjusted to reflect the percent of net acres compared to gross.
*Numbers are rounded and may not calculate correctly as shown.

Table 9 - City of Gig Harbor: Supply of Land for Commercial/Industrial Employment				
Zoning District	**ED**		**PCD-C**	
Land Type	Vacant	Underutilized	Vacant	Underutilized
Gross Acres	142.9	45.20	0.00	4.31
Commercial Split[1]	142.9	45.20	0.00	4.31
Land Unavailable for Development	14.3	22.60	0.00	2.15
Adjusted Gross Acres	128.6	22.60	0.00	2.15
Total Adjusted Gross Acres	151.19		2.15	
Displaced Jobs[2]		45		15
Displaced Units[2]		4		0

[1]Acreage represents the percentage of land assumed for commercial uses in zones that allow for both residential and commercial. See Table 4.
[2]Existing housing units and employees associated with underutilized parcels are adjusted to reflect the percent of net acres compared to gross.
*Numbers are rounded and may not calculate correctly as shown.

Table 9 - City of Gig Harbor: Supply of Land for Commercial/Industrial Employment					
Zoning District	**PCD-BP**			**MUD**	
Land Type	Vacant	Underutilized	Pipeline[3]	Vacant	Underutilized
Gross Acres	63.52	1.21	11.50	46.14	31.89
Commercial Split[1]	63.52	1.21		23.07	15.94
Land Unavailable for Development	6.35	0.60		2.31	7.97
Adjusted Gross Acres	57.17	0.60		20.76	7.97
Total Adjusted Gross Acres	57.77		N/A	28.74	
Displaced Jobs[2]		2			0
Displaced Units[2]		0			0

[1]Acreage represents the percentage of land assumed for commercial uses in zones that allow for both residential and commercial. See Table 4.
[2]Existing housing units and employees associated with underutilized parcels are adjusted to reflect the percent of net acres compared to gross.
[3]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Table 10 - City of Gig Harbor: Employment Needs					
2010 Total Employment Estimate[1]	**Adopted 2030 Total Employment Target[2]**	**Total Employment Growth (2010-2030)**	**Adjusted Employment Growth[3]**	**Displaced Employees**	**Additional Employment Needs**
9,155	9,954	799	702	249	952

[1]PSRC Land Use Targets 2010 Employment Estimate.
[2]Adopted by Ordinance No. 2011-36s.
[3]The total employment allocations are reduced by 12.1% to account for mobile workers and work-at-home employees for the commercial/industrial land needs analysis.

Table 11 - City of Gig Harbor: Employment Capacity					
Type	**Zoning District**	**Net Acres**	**Employees per Acre**	**Pipeline[1]**	**Employment Capacity**
Commercial	RB-1	7.49	19.37	30	175
	RB-2	28.35	19.37	0	549
	B-1	0.58	19.37	0	11
	B-2	40.75	19.37	376	1,165
	C-1	19.73	19.37	382	0
	DB	7.94	19.37	0	154
	PCD-C	2.15	19.37	0	42
	PCD-BP	57.77	19.37	209	1,328
	MUD	28.74	19.37	0	557
Industrial	ED	151.19	8.25	0	1,247
				Total Employment Capacity	**5,611**

[1]See Appendix C for list of pipeline projects.
*Numbers are rounded and may not calculate correctly as shown.

Section IV: Conclusion

General Overview

The 2014 Pierce County Buildable Lands Report is a milestone project in an on-going monitoring and evaluation program. The development data collected and reviewed in this Report represents a changing urban environment in Pierce County and its cities and towns since the adoption of GMA comprehensive plans. The adopted 2030 housing and employment targets and assumptions applied in the housing and employment capacity analyses reflect a redirection of growth through redevelopment and achieving higher density residential projects in cities and towns. While some may be skeptical of the assumptions and the ability for local jurisdictions to meet their future population targets, it must be understood that the urban growth area(s) is sized for a 20-year planning horizon. This timeframe provides local jurisdictions the opportunity to influence a change in historical development patterns and characteristics through adopting "reasonable measures." The on-going monitoring program will reveal if these types of efforts are successful. If not, modification of assumptions will be warranted in future reports.

Countywide Capacity Results

Development Activity

The development activity generally indicates that urban density housing is being constructed within the urban growth area. For various zoning districts with the County and cities and towns, it is impossible to conclude whether or not there is a trend that indicates an increase or decrease in density due to a low number of projects in certain zones permitted since 2006.

As indicated in Figure 4, an average of 75 percent of the residential housing permits was issued in the urban area. The lots associated with formal plats and short plats recorded between 2006 and 2012 also indicate a decrease in housing activity in the designated rural and resource lands. The average split of recorded lots in the urban and rural areas is 91 percent and 9 percent, respectively. It should be noted that an unknown component of this data is the percentage of units and lots in the rural area that are intended for seasonal/vacation homes, as opposed to permanent year-round residence.

Figure 4: Countywide Rural/Urban Development Split									
Net Housing Units (Permits)[1]									
	Average	2006	2007	2008	2009	2010	2011	2012	Total
Urban	2,186	3,457	2,750	2,003	1,364	1,409	1,674	2,645	15,302
Rural	711	1,461	1,144	839	578	319	297	340	4,978
Total	2,897	4,918	3,894	2,842	1,942	1,728	1,971	2,985	20,280
% Urban	75%	70%	71%	70%	70%	82%	85%	89%	75%
% Rural	25%	30%	29%	30%	30%	18%	15%	11%	25%
Recorded Lots[2]									
	Average	2006	2007	2008	2009	2010	2011	2012	Total
Urban	1,991	4,478	3,647	2,890	1,319	613	600	392	13,939
Rural	205	494	339	376	108	30	31	57	1,435
Total	2,196	4,972	3,986	3,266	1,427	643	631	449	15,374
% Urban	91%	90%	91%	88%	92%	95%	95%	87%	91%
% Rural	9%	10%	9%	12%	8%	5%	5%	13%	9%

[1] Puget Sound Regional Council Annual Housing Building Permit Data.
[2] Recorded lots associated with short plats and formal plats. The total number of lots may not equal the total lots in Table 2 associated with each jurisdiction. Plats were excluded from Table 2 if not all necessary data was obtained associated with the development. Plats were identified via Pierce County Auditor files.

Housing Production

This report focuses on local jurisdictions' ability to accommodate adopted housing and employment targets. Various assumptions are made regarding densities, critical areas, and other characteristics of development. These types of assumptions can be more directly influenced through development regulations adopted by local jurisdictions. However, it should be recognized that despite a theoretical ability to accommodate the growth, housing construction may not be on pace to meet the future housing needs.

Figure 5 illustrates the housing production for the years 2000 and 2010 and the housing production necessary to accommodate the 2030 allocated population. Collectively, there has not been adequate housing built on an annual basis to indicate that the combined housing needs to accommodate the 2030 housing target can be met. Individually, the trend implies that 10 jurisdictions must experience a significant increase in annual housing production to have sufficient housing units to accommodate their individual allocations.

Figure 5: Annual Housing Production					
Jurisdiction	2000[1]	2010[2]	Average Annual Urban Housing Production (2000-2010)[3]	Total Urban Housing Units Needed[4]	Average Annual Urban Housing Production Needed to Accommodate 2010-2030 Housing Targets[5]
Auburn	70	3,146	308	493	25
Bonney Lake	3,404	6,394	299	2,275	114
Buckley	1,472	1,669	20	1,321	66
Carbonado	210	218	1	99	5
DuPont	977	3,241	226	2,097	105
Eatonville	805	1,059	25	424	21
Edgewood	3,562	3,801	24	2,609	130
Fife	2,232	3,895	166	640	32
Fircrest	2,573	2,847	27	544	27
Gig Harbor	3,085	3,560	48	1,960	98
Lakewood	25,449	26,548	110	9,565	478
Milton	2,173	2,724	55	181	9
Orting	1,382	2,361	98	792	40
Pacific	65	45	0	0	0
Puyallup	13,468	16,171	270	6,885	344
Roy	114	326	21	169	8
Ruston	355	430	8	346	17
South Prairie	138	174	4	109	5
Steilacoom	2,674	2,793	12	655	33
Sumner	3,689	4,279	59	1,591	80
Tacoma	81,102	85,786	468	47,240	2,362
University Place	12,684	13,573	89	5,709	285
Wilkeson	150	175	3	65	3
Unincorporated Urban Pierce County	115,227	140,160	2,493	29,714	1,486
Urban Total	**277,060**	**325,375**	**4,832**	**115,483**	**5,774**

[1]2000 Census Housing Data.
[2]2010 Census Housing Data.
[3]2000 Census Housing Data subtracted from 2010 Census Housing Data and divided by 10 (years).
[4]2030 Housing need in the Buildable Lands capacity analysis.
[5]2030 housing need divided by 20 (years).

Population Increase

In reading this report there may be a natural tendency to correlate population growth with housing unit growth. This correlation would lead one to believe that if a jurisdiction is meeting its adopted population targets it is also meeting its adopted housing unit targets. Assuming this direct correlation is not correct; a jurisdiction may obtain its population target while failing to meet its housing target. This situation may be attributed to various assumptions associated with the setting of the housing targets.

These assumptions include the person per household (pphh), home vacancy rates (at the base year and planning year), and growth in non-household populations. Figure 6 shows the observed average annual population growth from 2000-2010, the urban population growth targets, and the expected average annual population increase.

Figure 6: Annual Population Increase

Jurisdiction	2000[1]	2010[2]	Average Annual Population Change (2000-2010)[3]	Total 2030 Urban Population Growth Target[4]	Expected Average Annual Urban Population Change 2010-2030)[5]
Auburn	146	7,419	727	7,950	27
Bonney Lake	9,687	17,374	769	21,640	213
Buckley	4,145	4,354	21	7,500	157
Carbonado	621	610	-1	800	10
DuPont	2,452	8,199	575	11,900	185
Eatonville	2,012	2,758	75	3,120	18
Edgewood	9,089	9,387	30	13,700	216
Fife	4,784	9,173	439	9,425	13
Fircrest	5,868	6,497	63	6,950	23
Gig Harbor	6,465	7,126	66	10,500	169
Lakewood	58,293	58,163	-13	72,000	692
Milton	4,981	6,137	116	5,750	-19
Orting	3,931	6,746	282	8,000	63
Pacific	154	92	-6	0	-5
Puyallup	33,014	37,022	401	50,000	649
Roy	260	793	53	1,070	14
Ruston	738	749	1	1,450	35
South Prairie	382	434	5	750	16
Steilacoom	6,049	5,985	-6	6,830	42
Sumner	8,504	9,451	95	11,970	126
Tacoma	193,556	198,397	484	281,300	4,145
University Place	29,933	31,144	121	39,540	420
Wilkeson	395	477	8	570	5
Unincorporated Urban Pierce County	169,864	207,839	3,798	265,265	2,871
Urban Total	**555,323**	**636,326**	**8,100**	**837,980**	**10,083**

[1]2000 Census Population Data.
[2]2010 Census Population Data.
[3]2000 Census Housing Data subtracted from 2010 Census Housing Data and divided by 10 (years).
[4]2030 population target from Ord. No. 2011-36s.
[5]2010 population subtracted from the 2030 population target and divided by 20 (years).
[6]Includes Joint Base Lewis McChord.

Residential and Employment Capacity Analysis

The collective results of the analyses demonstrate that the adopted urban growth area encompasses more area than necessary to accommodate the 2030 urban housing and employment targets for the County and its cities and towns. While the individual residential analyses indicated a few jurisdictions fall short of accommodating their targeted growth, the excess capacity in many other jurisdictions more than compensate for the individual deficits. As illustrated in Figure 7, a countywide total of 115,483 additional housing units are needed to accommodate the 2030 urban housing target. The estimated housing capacity equals 184,962. This difference accounts for an excess of 69,479 dwelling units, or 60 percent more housing capacity than needed.

Figure 7: Summary of 2030 Housing Need Vs. Capacity

Municipality	2030 Total Housing Target[1]	2010-2030 Additional Housing Need[2]	2030 Estimated Housing Capacity	Difference
Auburn	3,634	493	922	429
Bonney Lake	8,498	2,275	4,195	1,920
Buckley	2,930	1,321	1,354	33
Carbonado	298	99	257	158
DuPont	5,291	2,097	1,286	-811
Eatonville	1,353	424	1,443	1,019
Edgewood	6,003	2,609	5,130	2,521
Fife	4,457	640	1,181	541
Fircrest	3,351	544	254	-290
Gig Harbor	5,431	1,960	3,741	1,781
Lakewood	34,284	9,565	10,919	1,354
Milton	2,779	181	602	421
Orting	3,121	792	1,200	408
Pacific	0	0	0	0
Puyallup	22,611	6,885	5,495	-1,390
Roy	487	169	142	-27
Ruston	775	346	580	234
South Prairie	281	109	113	4
Steilacoom	3,385	655	676	21
Sumner	5,743	1,591	2,029	438
Tacoma	129,030	47,240	97,692	50,452
University Place	18,698	5,709	5,615	-285
Wilkeson	238	65	78	13
Unincorporated Urban Pierce County	99,563	29,714	40,058	10,344
Urban Total	**362,241**	**115,483**	**184,962**	**69,479**

[1]Housing target adopted by Pierce County Ordinance No. 2011-36s.
[2]Includes displaced housing units associated with underutilized properties.

As illustrated in Figure 8, a countywide total of 160,885 additional jobs are needed to meet the 2030 total urban employment target. The estimated employment capacity equals 319,386, representing an excess of 158,501 jobs or approximately 98.5 percent of the total need.

Figure 8: Summary of 2030 Employment Need Vs. Capacity

Municipality	2030 Total Employment Target [1]	2030 Additional Employment Needs[2]	2030 Estimated Employment Capacity	Difference
Auburn	834	214	595	381
Bonney Lake	5,448	1,033	3,147	2,114
Buckley	3,033	934	1,283	349
Carbonado	68	14	6	-8
DuPont	9,078	5,400	5,230	-170
Eatonville	2,335	1,279	2,597	1,318
Edgewood	3,094	1,630	1,843	213
Fife	19,300	6,561	7,628	1,067
Fircrest	1,544	206	222	16
Gig Harbor	9,954	952	5,611	4,659
Lakewood	38,336	12,907	9,062	-3,845
Milton	2,337	584	2,177	1,593
Orting	2,370	1,090	1,129	39
Pacific	6,505	4,124	1,631	-2,493
Puyallup	34,267	11,648	9,759	-1,889
Roy	342	167	555	388
Ruston	494	310	524	214
South Prairie	307	212	102	-110
Steilacoom	788	135	388	253
Sumner	20,135	9,309	9,180	-129
Tacoma	176,930	71,819	225,471	153,652
University Place	9,593	3,309	1,100	-2,212
Wilkeson	153	79	28	-51
Unincorporated Urban Pierce County	65,893	26,969	30,118	3,149
Urban Total	**413,138**	**160,885**	**319,386**	**158,501**

[1]Employment target adopted by Pierce County Ordinance No. 2011-36s.
[2]Includes displaced employees associated with underutilized properties.

Section V: Consistency Analysis

Purpose

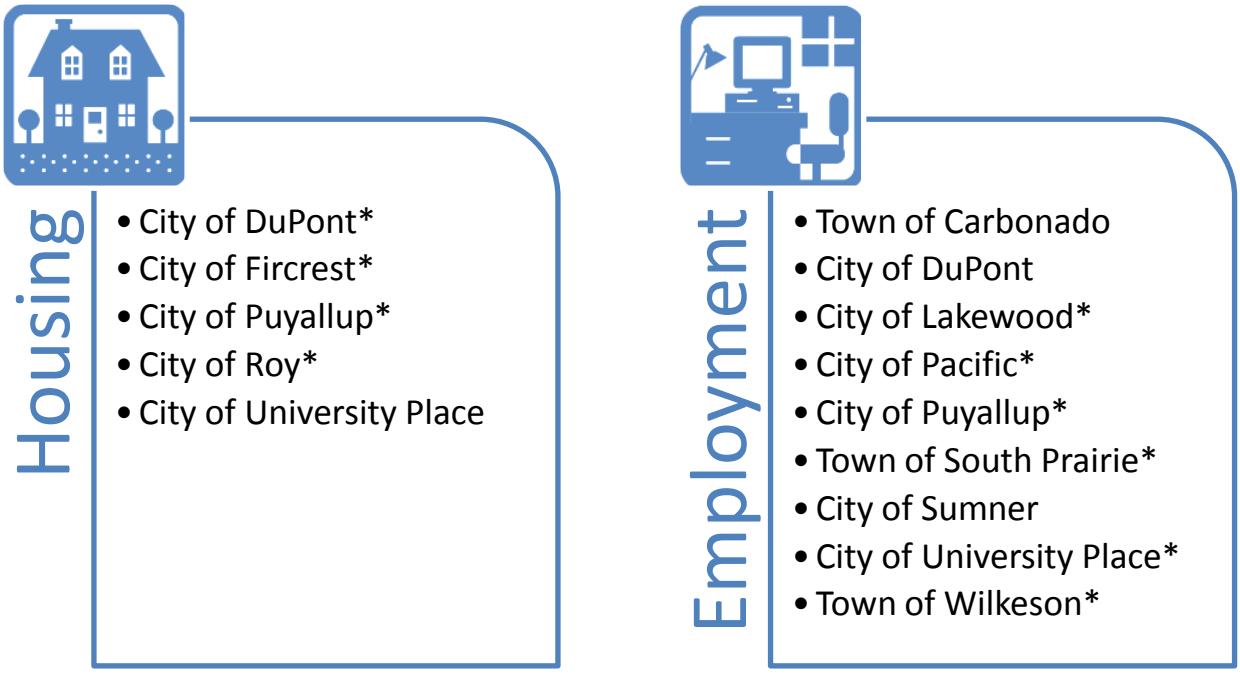
The purpose of this section is to identify jurisdictions that may need to adopt "reasonable measures" to rectify inconsistencies between housing/employment targets and estimated capacity to accommodate the growth.

Past analyses have included an evaluation of past development for trends and consistency, and a long-term capacity comparison. Due to the lack of development over the past seven years, this analysis focuses on the long-term residential and employment capacity comparisons. The long-term portion of the consistency analysis is aimed at determining if jurisdictions have sufficient land capacity to handle future growth based on assumed densities and deductions.

The analysis will provide information on all jurisdictions and identify which have sufficient land to accommodate growth, and which may need to make significant changes in order to accommodate future growth. Jurisdictions without sufficient land to accommodate the housing and/or employment targets may need to adopt reasonable measures. Determining the need for reasonable measures also factors in the past trends in meeting capacity needs. Reasonable measures vary depending on the severity of the deficiency in estimated capacity compared to total need.

Findings

The following jurisdictions are not meeting one or more of the 2030 targets:



*Jurisdictions which may need to adopt reasonable measures.

The 11 jurisdictions that are identified as having an estimated capacity deficiency may not necessarily need to adopt reasonable measures. There are jurisdictions with deficiencies that are only a small

percent of the total need, and since they are minor discrepancies, they do not warrant adopting reasonable measures.

Of the 11 jurisdictions, 9 are identified as having deficiencies that may warrant the need to adopt reasonable measures. The following analysis and tables go into further detail about the housing and employment capacity compared to the 2030 targets for each jurisdiction. It then reflects upon past capacity and need in order to compare the long-term results. These ten jurisdictions with insufficient capacity compared to the targets are identified and it is suggested that they consider adopting reasonable measures.

Individual Jurisdiction Consistency Analyses

City of Auburn

Figure 9: City of Auburn Comparison of Past Analyses

Type	Report	Need	Capacity	Difference
Housing	2002	1,079	1,067	-12
	2007	1,789	1,623	-166
	2014	493	922	429
Employment	2002	50	50	0
	2007	132	543	411
	2014	214	595	381

Housing

As shown in Figure 9, the City of Auburn has not had sufficient housing capacity in the past two reports. However, the 2014 Report capacity estimate of 922 units exceeds the 2030 target of 493 units by 429 units. The results suggest that City of Auburn currently has a suitable amount of residential land available to meet the 2030 housing target.

Employment

Figure 9 shows that the City of Auburn has been consistent in meeting the employment targets. The 2014 results show that the estimated capacity for Auburn is 595 jobs, which is 381 jobs more than the need of 214 jobs. The amount of commercial land available for development is adequate to meet the 2030 employment target.

City of Bonney Lake

Figure 10: City of Bonney Lake Comparison of Past Analyses

Type	Report	Need	Capacity	Difference
Housing	2002	1,744	2,961	1,217
	2007	2,216	2,061	-155
	2014	2,275	4,195	1,920
Employment	2002	1,494	5,458	3,964
	2007	1,390	2,472	1,082
	2014	1,033	3,147	2,114

Housing

Figure 17 shows that the City of Fircrest's housing need is 544 units and the estimated capacity is 254 units, creating a deficiency of 290 units, which is about 53% of the total need. Due to the deficiency in housing capacity, reasonable measures may need to be considered. Although this analysis shows that Fircrest does not have sufficient residential land available to meet the 2030 housing target, it should be noted that the City of Fircrest has additional housing capacity in the Golf Course (GC) zone.

The property was not included in the analysis because it is not completely clear if the golf course property will develop residential uses within the 20-year time frame. There is a suitable amount of residential development potential within the GC zone to accommodate growth that will enable Fircrest to meet the 2030 housing target. The GC zone covers approximately 164.8 acres of land and would build out at the same density of R-6. After applying the appropriate deductions and these density assumptions, the City of Fircrest would be able to accommodate up to 930 additional housing units on that land.

Employment

Fircrest has consistently shown sufficient capacity for employment. In Figure 17, the 2014 results show that the City has capacity for 222 jobs, 16 more jobs than their need of 206. These results suggest that the City of Fircrest has sufficient commercial land available for development to meet the 2030 employment target.

City of Gig Harbor

Figure 18: City of Gig Harbor Comparison of Past Analyses

Type	Report	Need	Capacity	Difference
Housing	**2002**	4,059	1,528	-2,531
	2007	2,503	2,787	284
	2014	1,960	3,741	1,781
Employment	**2002**	1,986	10,454	8,468
	2007	2,444	8,011	5,567
	2014	952	5,611	4,659

Housing

As shown in Figure 18, the City of Gig Harbor has been able to increase capacity and meet housing needs since the 2002 Report. The results of the 2014 Report show that Gig Harbor is able to accommodate 3,741 housing units, which is 1,781 more than the need of 1,960 units. The results suggest that Gig Harbor has sufficient residential land available for development to meet the 2030 housing target.

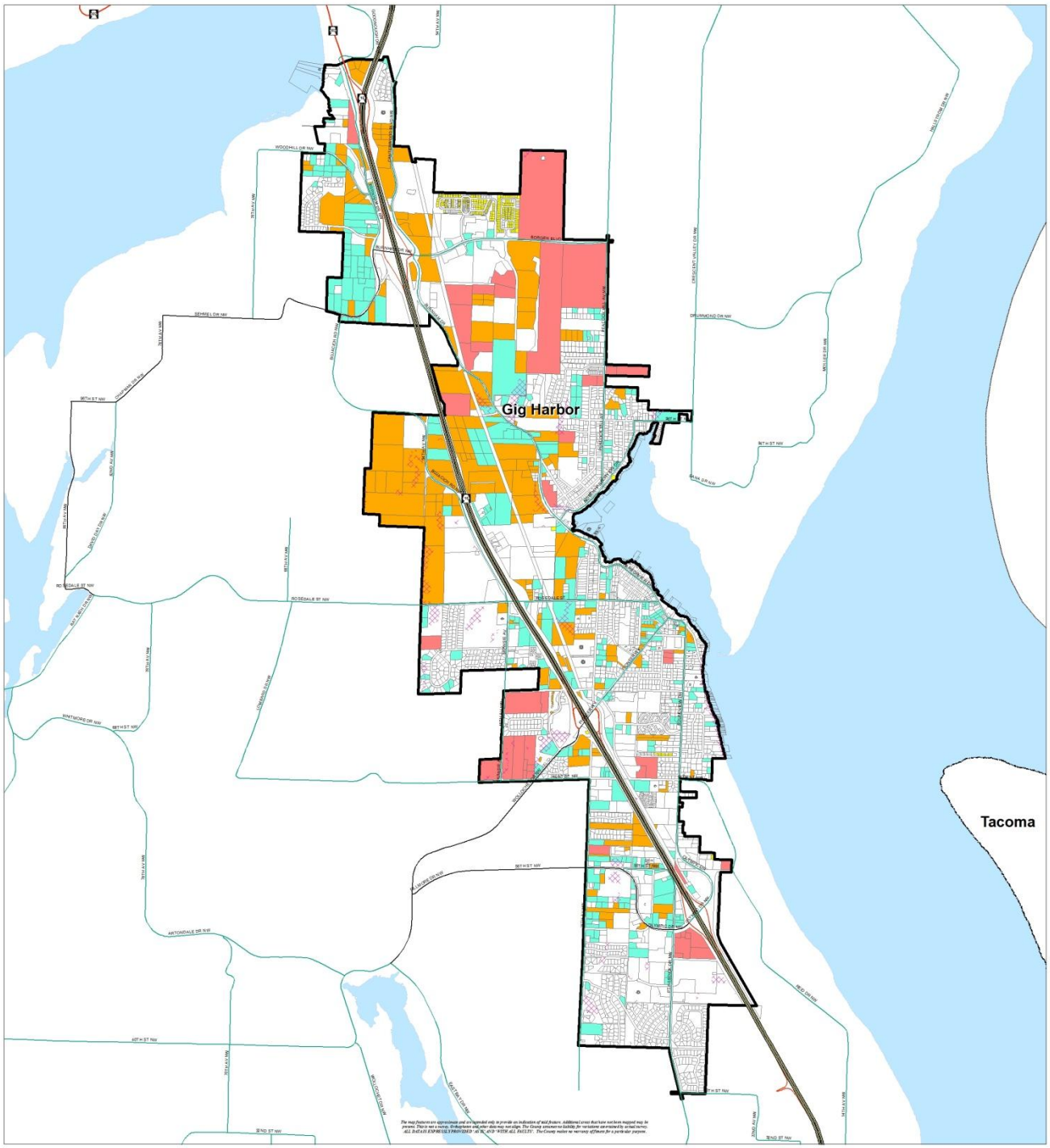
Employment

Figure 18 shows that the City of Gig Harbor has continually met employment targets. The results of the 2014 Report show that the City has a capacity of 5,611 additional jobs, which exceeds the target of 952 additional jobs by 4,659. The results suggest that Gig Harbor has sufficient commercial land to meet the 2030 employment target.

Appendix A: Inventory Maps

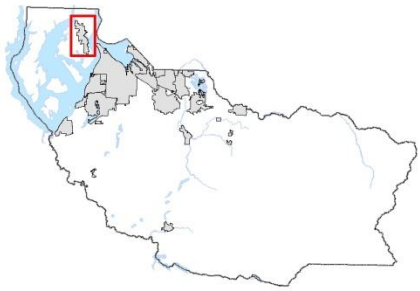
The following maps are a result of the vacant and underutilized land analysis, and provide an inventory of potentially developable land. These inventories are not meant to be a representation of all the land that will develop or redevelop, but they represent the parcels with qualities that make them more likely to. The acreages from these inventories are aggregated by zone and applied with deductions based on development trends in order to determine how much of the land has a reasonable likeliness to develop over the next 20 years.

The inventory maps have been edited by staff from each respective jurisdiction in order to more accurately reflect the current and future conditions of that jurisdiction. We rely on staff's inside knowledge of their jurisdiction to edit the inventories at the parcel level. After manually editing the inventory, each jurisdiction gives final approval for both the inventory maps and capacity calculations to make sure they are accurately represented in this Report.



City of Gig Harbor
Inventory of Vacant and Underutilized Land

- Underutilized
- Vacant
- Vacant Single Unit
- Pipeline
- Built Out/Undevelopable
- Critical Areas
- Municipal Boundary



Pierce County, Washington

0 0.375 0.75 1.5 Miles

Pierce County

Buildable Lands Report

N W E S

Map Document: \\tacfiler\IN\2015 Comp Plan\Buildable Lands\Maps\MXD\FINAL\Gig_Harbor_BLI_2014.mxd

Appendix B: Sample Calculation Tables

Table 6 Example Calculation: Supply of Land/Lots for Residential Development				
Zoning District		MSF (Unincorporated Pierce County)		
Land Type		Underutilized	Vacant (gross)	Vacant (single-unit)
Gross Acres		(A1) Total Acreage from Inventory	(B1) Total Acreage from Inventory	(C1) Total Acreage from Inventory
Residential Split[1]		(A2) = (A1)*(100%)	(B2) = (B1)*(100%)	
Individual Plat Deductions	**Roads**	(A3) = (.15)*(A2)	(B3) = (.15)*(B2)	
	Critical Areas	(A4) = [Documented Critical Areas from (A1)]*[(A2)/(A1)]	(B4) = [Documented Critical Areas from (B1)]*[(B2)/(B1)]	
	Parks and Open Space	-	-	
Net Acres		(A5) = (A2)-(A3)-(A4)	(B5) = (B2)-(B3)-(B4)	
Non-Residential Uses		(A6) = (.16)*(A5)	(B6) = (.02)*(B5)	
Adjusted Net Acres		(A7) = (A5)-(A6)	(B7) = (B5)-(B6)	
Land Unavailable for Development		(A8) = (.40)*(A7)	(B8) = (.15)*(B7)	
Final Adjusted Net Acres		(A9) = (A7)-(A8)	(B9) = (B7)-(B8)	
Total Adjusted Net Acres		(A9)+(B9)		
One dwelling unit per vacant (single unit) lot				(C2) Total Number of Units
Displaced Units[2]		(A10)*[(A9)/(A1)]		
Displaced Jobs[2]		(A11)*[(A9)/(A1)]		

[1]Percent of land allocated toward residential development, see Table 4

[2]Displaced housing units and employees associated with underutilized parcels are adjusted to reflect the mixed use and "unavailable to develop" assumption.

Table 9 Example Calculation: Supply of Land for Commercial/Industrial Employment		
Zoning District	**AC** (Unincorporated Pierce County)	
Land Type	Vacant	Underutilized
Gross Acres	(A1) Total Acreage from Inventory	(B1) Total Acreage from Inventory
Commercial Split[1]	(A2) = (A1)*(.35)	(B2) = (B1)*(.35)
Land Unavailable for Development	(A3) = (A2)*(.20)	(B3) = (B2)*(.40)
Net Acres	(A4) = (A2)-(A3)	(B4) = (B2)-(B3)
Total Net Acres	(A4)+(B4)	
Displaced Jobs[2]		(B5)*[(B4)/(B1)]
Displaced Units[2]		(B5)*[(B4)/(B1)]

[1] Percent of land allocated toward commercial development, see Table 4

[2]Displaced housing units and employees associated with underutilized parcels are adjusted to reflect the mixed use and "unavailable to develop" assumption.

Appendix C: Pipeline and Major Projects

City of Gig Harbor

City of Gig Harbor: Pipeline Projects				
Project Name	**Type**	**Acres**	**Units**	**Estimated Employees**
72nd Street Preliminary Plat	Residential	18.67	62	0
Bellesara	Residential	8.82	31	0
Business Park At Harbor Hill	Commercial	11.49	0	209
Carl's Jr.	Commercial	1.26	0	9
Commercial Development	Commercial	1.28	0	30
Courtyards at Skansie	Residential	28.52	179	0
Estates at Gig Harbor Phase II	Residential	5.89	18	0
Harbor Hill Development Agreement[1]	Residential	202.44	1,110	0
Haub Plat	Residential	3.87	12	0
Haub Pre-Plat	Residential	5.46	18	0
Highlands at the Harbor	Residential	9.09	14	0
Hunt Highlands Condominiums	Residential	8.67	33	0
Jasmine Court	Residential	2.87	10	0
Lydian Place	Residential	3.8	22	0
McCormick Creek	Residential	38.14	182	0
Morning Point	Residential	6.17	24	0
North Creek	Residential	12.37	100	0
Peacock Meadows	Residential	3.25	12	0
Point Fosdick Square	Commercial	18.24	0	367
Shore Acres	Residential	2.15	11	0
The Reserve	Residential	9.83	16	0
		Total	**1,854**	**615**

[1]PCD-RLD will be built out to 644 units at 4 units per acre on 160.9 gross acres under a developer's agreement. Total MF proposed units for the PCD-RMD zoning designation is 466. The City of Gig Harbor defines senior housing as 1/3 of a unit. In the PCD-RMD zone, there are currently 172 units being built in a MF apartment complex under this development agreement. There is availability for 294 MF units (senior housing) at this time in the pipeline.

City of Milton

City of Milton: Pipeline Projects		
Project Name	**Acres**	**Units**
Aerie Crest	4.37	18
Jones Short Plat	0.84	4
Vimont Short Plat	2.77	3
	Total	**25**

City of Orting

City of Orting: Pipeline Projects				
Project Name	**Gross Acres**	**Commercial SF**	**Units**	**Jobs**
Mixed Use Town Center North BSP	67.72	370,000	**600**	**900**

Unincorporated Urban Pierce County

Major Projects

Unincorporated Urban Pierce County: Major Projects				
Project Name	**Gross Acres**	**Units[1]**	**20 Year Housing Estimate[2]**	**20 Year Employment Estimate**
Tehaleh	4,614.45	6,437	4,000	2,200
Lipoma Firs	198.22	1,697	1,697	0
Sunrise	709.32	2,206	2,206	85
		Total	**7,903**	**2,285**

[1]Total number of units planned at full build-out. The Tehaleh land has the capacity for additional units and the project is vested to EBPC zoning that permits additional units. The number of units cited here is the number allowed under the current approval.
[2]Tehaleh is assumed to produce 200 housing units a year within the 20 year period. This assumption is based on absorption trends over recent years and the actual rate will be variable depending on local market conditions.

Employment Pipeline

Unincorporated Urban Pierce County: Employment Pipeline Projects		
Project Name	**Gross Acres**	**Estimated Employees**
Garfield Commons/ Parkland Townsite	**2.65**	**19**

Residential Pipeline

Unincorporated Urban Pierce County: Residential Pipeline Projects		
Project Name	**Gross Acres**	**Units**
Amber Rose	3.99	19
Aqueduct Estates PDD	2.52	7
Arsland	5.31	21
Ashburn	7.49	31
Bella on Canyon PDD	8.93	142
Boulder Creek PDD	9.13	27
Brantley's First Addition	1.13	12
Brighton Woods	3.14	15
Burrill Hollow	7.63	15
Burton Ray Estates	4.90	20
Cambridge Heights PDD	9.72	68
Candlewood Park	5.01	18
Canyon East	4.41	19
Canyon Village	4.83	20
Carson Court	4.71	10
Cassidy's Landing	3.52	16
Cherry Street	10.92	22
Clover Creek Highlands I	41.61	101
Clover Creek Highlands II	25.19	76
Clover Creek Highlands III	20.12	70
Cobble Field PDD	4.58	16
Darby Dawn Estates	18.28	44
Daybreak	110.27	529

Unincorporated Urban Pierce County: Residential Pipeline Projects		
Project Name	**Gross Acres**	**Units**
Dietrich Firs	4.70	19
Dreamscape	5.71	30
Dylan Addition	2.92	13
Eagle Quest	19.19	25
Edgewater at South Hill PDD Div 1	0.85	25
Emerald Glen II	16.35	50
Emerald Hollow	7.41	20
Emerald Woods PDD	10.53	93
Ethan & Jonathan Mayer Addition	5.69	11
Evergreen Ridge BSP/Hawthorne Lane Apartments	1.86	32
Falaschi Court	4.03	22
Forest Canyon Estates PDD	62.12	120
Forest Lawn PP	2.32	8
Garfield Commons/Parkland Townsite	2.65	104
Gem Heights PDD	2.31	35
Gig Harbor North Estates	12.23	12
Golden Willows Estates	2.43	8
Gwendolyn Hollow	8.59	19
Harmony Woods	4.79	22
Hawks Ridge Division I	9.19	47
Heritage Park at South Hill	4.36	45
Holland Gardens	6.22	13
Hudson Heights PDD	4.52	8
Ironwood Estates	4.96	15
Kapowsin Landing	2.51	9
Kilen Estates	4.61	16
Leone Addition	19.99	78
Liberty Park PDD	74.12	60
Lipoma Firs North Phase 4	35.01	374
Mikaela's Ridge	2.37	9
Mirabella	20.17	35
Miranda Rose	4.23	12
Molly's Court	9.59	18
Mountain Terrace Estates Phase 3	9.96	44
Mulberry Circle	5.92	28
Newberry	4.96	19
Nicolina Meadows	30.74	62
Oak Garden	3.38	22
Olympic Peak Estates	4.85	11
Orchard Mourning	6.30	19
Pacific Ridge PDD	3.30	13
Parkland Tall Firs	2.82	10

Unincorporated Urban Pierce County: Residential Pipeline Projects		
Project Name	**Gross Acres**	**Units**
Pheasant Run	4.39	14
Pineridge Estates	2.57	10
Portland Meadows	3.34	16
Red Hawk Addition	14.85	75
Red Hawk IV	10.10	70
Rexden Estates	4.86	16
Ridge at Crescent Pond, Div 2	9.28	47
Ridge at Southwood, Division II	18.49	67
Ridge at Southwood, Division III	15.23	65
Ridge View Estates	45.95	245
Ronda's Meadow	2.45	12
Royal Firs	9.95	63
Sara's Garden	3.50	12
Shawnee Ridge	38.84	87
Sheldon Grove	5.81	24
Sorrento's Landing	4.74	23
South Hill Estates	28.23	27
Starkel Poultry Farm PP	8.72	72
Summer Canyon PDD	5.74	27
Summerwood Park	106.82	358
Sunrise Corner PDD	9.76	47
Sword Addition II	2.72	6
Terra Woods	9.82	69
The Ivy	1.10	6
The Ranch at Frederickson	16.08	25
The Ridge at Crescent Pond	9.50	25
The Ridge at Woodland Heights	3.63	15
Thorpe	4.75	15
Tree Run Manor	5.59	11
Uplands PDD Rezone	319.93	850
Valerie Estates	7.15	19
Van Well Addition	11.80	2
Wohlford Addition	4.93	17
Zhuk	4.78	9
Zoe PDD	10.14	32
Zunno - Military Road	2.45	11
	Total	**5,442**

City of Puyallup

City of Puyallup: Pipeline Projects			
Project Name	**Acres**	**Units**	**Estimated Employees[2]**
Puyallup Highlands	51.01	152	0
Dr. Dahan Medical Building	0.51	30	0
Good Samaritan Hospital	11.67	0	753
Group Health Medical Building	10.88	0	110
Lowes	14.43	0	259
Nursing Home[1]	5.98	33	0
PDC Residential Development	68.89	368	0
Linden Lane Apartments	12.05	236	0
Hampton Inn	1.54	0	148
Safeland Storage	1.95	0	112
Preliminary Plat (Second Phase)	15.77	82	0
Short Plat	0.92	3 lots; 2 new units	0
Short Plat	0.51	2 lots; 1 new unit	0
Short Plat	0.36	2 lots; 1 new unit	0
Manufacturing Project	3.08	0	56
	Total	**905**	**1,438**

[1]100 beds at 1/3 of a unit each.
[2]All commercial is assumed 1 employee per square feet, and industrial/manufacturing at 1 employee per 900 square feet.

City of Ruston

City of Ruston: Pipeline Projects		
Project Name	**Gross Acres**	**Units**
The Commencement Condominiums	1.07	**62**

Town of Steilacoom

City of Steilacoom: Pipeline Projects		
Project Name	**Gross Acres**	**Units**
Joey Hollow	5.12	18
Top of the Bay	4.58	13
Norberg Estates	5.26	23
	Total	**54**

City of Tacoma

City of Tacoma: Pipeline Projects			
Project Name	**Total Acres**	**Units**	**Estimated Employees**
Cameron Estates	0.73	5	0
Founders Circle	1.46	6	0
Lindie Lane	1.62	6	0
Olympic View South	1.74	13	0
Wapato Ridge	2.29	14	0
La Terra At Northshore	9.30	51	0
Hawks Pointe	1.00	8	0
Highlands Golf & Racquet Club #2 Plat Alteration	10.19	2	0
Highlands Golf & Racquet Club #2 Plat Alteration	3.99	2	0
Short Plat 201011175005	0.24	2	0
Short Plat 201012145003	0.52	3	0
Short Plat 201102025009	0.30	2	0
Short Plat 201102095002	0.26	2	0
Short Plat 201103235003	2.06	4	0
Short Plat 201103315001	0.36	2	0
Short Plat 201104015003	0.91	4	0
Short Plat 201107265004	0.28	2	0
Short Plat 201108095009	1.47	2	0
Short Plat 201109225003	4.11	4	0
Short Plat 201110035004	0.10	4	0
Short Plat 201111105007	0.28	2	0
Short Plat 201112215002	0.24	2	0
Short Plat 201201175001	0.92	3	0
Short Plat 201202095001	0.29	2	0
Short Plat 201204195004	0.62	4	0
Short Plat 201204195005	0.79	4	0
Short Plat 201211085001	0.17	2	0
Short Plat 201212115004	0.53	2	0
Short Plat 201303225001	0.27	2	0
Short Plat 201303275001	0.46	3	0
Short Plat 201304085003	0.28	2	0
Short Plat 201308275001	0.77	4	0
Short Plat 201310015004	0.26	2	0
Short Plat 201401225001	0.77	2	0
Short Plat 201402255002	0.92	4	0
Permit #5004691190	0.21	3	0
Permit #5004690610	0.31	3	0
Permit #5004690620	0.31	3	0
Permit #5004220420	0.94	55	0
Permit #5004690700	0.15	3	0
Permit #5004690660	0.18	3	0

City of Tacoma: Pipeline Projects			
Project Name	**Total Acres**	**Units**	**Estimated Employees**
Permit #5004690730	0.16	4	0
Permit #5004690070	0.18	3	0
Permit #5004690080	0.17	3	0
Permit #5004690090	0.17	3	0
Permit #5004690310	0.16	3	0
Permit #5004690160	0.16	3	0
Permit #5004690180	0.15	3	0
Permit #5004690110	0.16	4	0
Permit #5004690140	0.15	3	0
Permit #5004690210	0.16	4	0
Point Ruston	35.30	1,000	450
	Total	**1,281**	**450**

City of University Place

City of University Place: Pipeline Projects		
Project Name	**Acres**	**Units**
29th & Morrison (Duplex/Condo)	1.68	26
Cascade Pointe	2.43	16
Clearview	0.73	100
Creek Vista	5.96	9
Grandview Senior Living	1.21	142
Johnson Estates	4.83	16
Latititude 47	1.02	156
Orchard Ridge	7.67	42
Summer Lane	3.46	18
Sunset South	4.82	21
Woodside Creek	23.34	123
	Total	**669**

Appendix D: City of Tacoma Mixed Use Centers Capacity Analysis

A New Approach to Growth Allocations for Tacoma's Urban Centers

Report Prepared by VIA Architecture

DRAFT: September 27, 2013

1. Introduction

This report documents a project to establish improved growth and employment forecasts for the City of Tacoma that properly reflect the City's aspirations to concentrate growth in its downtown core and mixed-use centers. The results of this work will inform the City of Tacoma's Transportation Master Plan and transportation modeling efforts.

The project consists of the following components:

- Reconfigure the Traffic Analysis Zones (TAZ) to align with Tacoma's planning boundaries
- Perform development capacity estimates for Tacoma's Regional Growth Centers (RGC), Manufacturing/Industrial Centers (MIC), and Mixed Use Centers (MUC)
- Distribute Tacoma's total population and employment allocations for 2030 and 2040 to the RGCs, MICs, and MUCs

Methods and results are described below.

2. TAZ Reconfiguration

Pierce County and the Puget Sound Regional Council (PSRC) have each developed a set of traffic analysis zones (TAZs) that cover Tacoma's geography. However, both TAZ sets have numerous boundaries that do not align with the planning boundaries for Tacoma's Regional Growth Centers (RGC), Manufacturing/Industrial Centers (MIC), Mixed-use Centers (MUC), and are even misaligned with the city limits in some cases.

Pierce County's and PSRC's established TAZ sets are fairly similar in terms of granularity and orientation. After consulting with staff from both organizations, it was decided that the PSRC "3700" TAZ set would be the best choice to form the base for subsequent modifications to align the TAZ boundaries with Tacoma's planning area boundaries.

The first draft of TAZ reconfiguration involved aligning TAZs with planning boundaries at the expense of alignment with street networks. Although this approach minimized the need to create brand new TAZs, Pierce County and PSRC both advised that the TAZ set would be more defensible and meaningful if it also maintained TAZ boundary alignment with important street networks.

PSRC staff made modifications to the first draft TAZ set, reintroducing numerous new TAZs with boundaries aligned to street networks, while preserving the boundary alignments with Tacoma's planning areas. The final TAZ set has a total of 3868 TAZs, as mapped in **Figure 1**. The TAZ set is also available in GIS shapefile format.

3. Citywide Allocations

Allocations for population and employment were developed for the 2030 and 2040 planning horizons. For 2030, the allocations used for the City as a whole are those established by Pierce County in compliance with the Growth Management Act (GMA). For 2040, the allocations used were taken from

the PSRC's VISION 2040 report, and are based on data generated by the State of Washington's Office of Financial Management. These total allocations are shown in **Table 1**.

The assumptions made to distribute the total allocations between Tacoma's RGCs, MICs, and aggregated MUCs are also shown in **Table 1**. These assumptions reflect local and regional intentions to concentrate growth in urban centers, and are also informed by broad assessment of existing conditions and future potential, such as can be found in the South Downtown Subarea Plan.

4. MUC Allocations

Once allocations were determined for the aggregated MUCs as shown in **Table 1**, they had to be divided among the individual MUCs. Allocations to individual MUCs were determined according to development capacity, which was estimated at the parcel level as described in **Section 6** below. Each MUC was allocated population and employment proportional to its fraction of the total capacity found in all the MUCs, as shown in **Table 3**. For example, if a MUC comprised 10% of the population capacity found in all the MUCs, and 15% of the employment capacity found in all the MUCs, then that MUC received 10% of the total MUC population allocation, and 15% of the total MUC employment allocation.

5. TAZ Allocations

Allocations to individual TAZs within each RGC, MIC, and MUC were determined according to development capacity, similar to the method used to divide the total MUC allocation between the individual MUCs. Each center's total population and employment allocation was distributed among TAZs proportional to the fraction of the center's total population and employment capacity within each TAZ. The allocations by TAZ for each RGC, MUC, and MIC are given in **Tables 4 through 20**.

6. Development Capacity

In order for areas to absorb their allocations, there must be sufficient development capacity. Capacity estimates for population and employment were derived for each of the RGCs, MICs, and MUCs, as shown in **Tables 2 and 3**.

First of all, parcels with the following uses were designated as undevelopable:

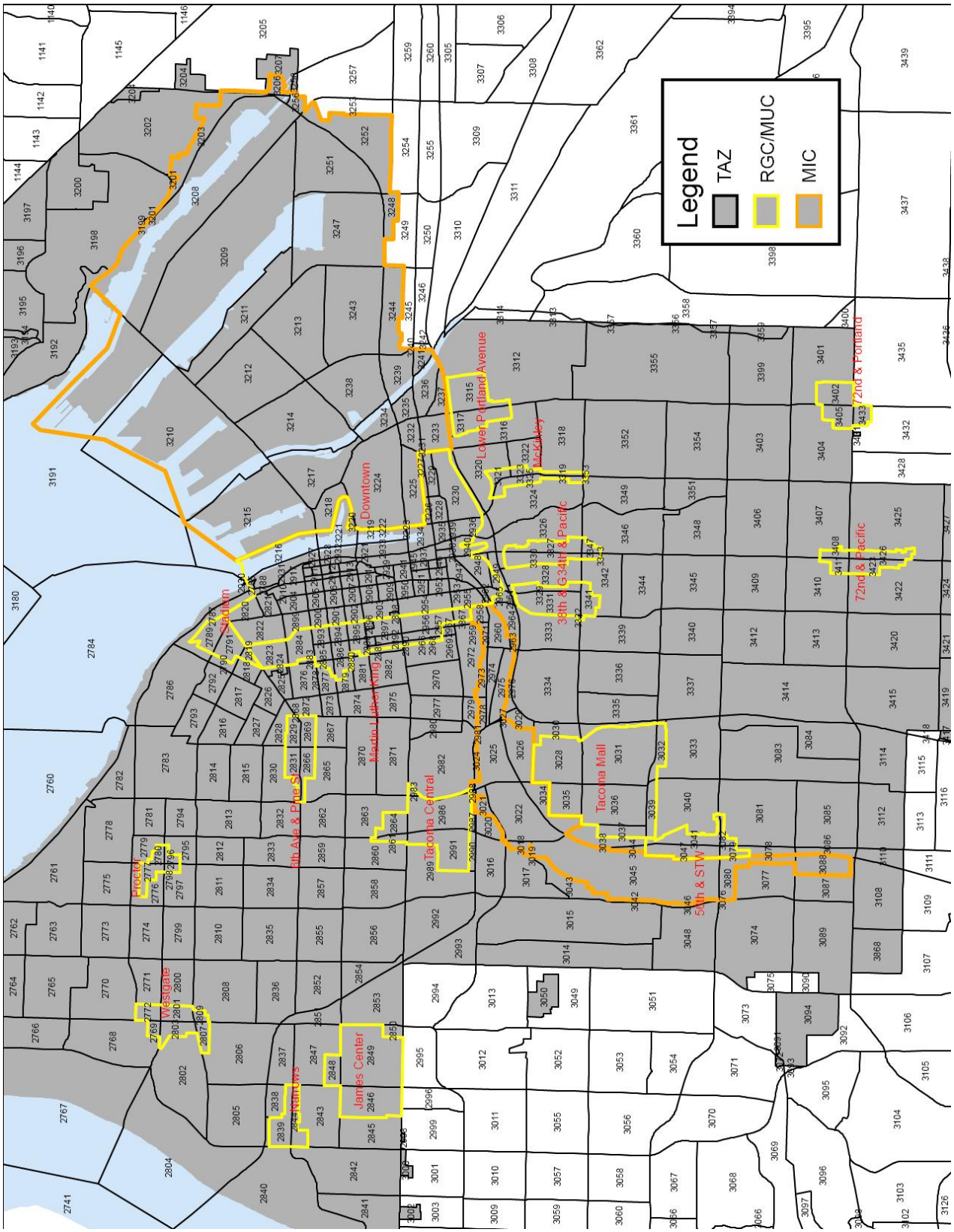
- schools
- historic structures
- parks and greenbelts
- religious services
- hospitals
- significant government offices
- utilities
- right-of-way (including rail)

To account for the dependence of future development potential on the value of existing improvements, parcels with an improvement-value-to-land-value ratio greater than 2 were designated as undevelopable. A map of developable and undevelopable parcels is provided in **Figure 2.**

For all parcels not identified as undevelopable, development capacity was calculated according to an assumed capacity of population and employment based on the zoning, as shown in **Table 21.** Capacities for zones in the RGCs and MUCs were based on 70% lot coverage, along with zone-specific assumptions for average number of floors, and for residential-commercial use mix. Residential floor area capacity

was converted to population using an average unit size of 1000 square feet, and an average household size of 2.32, which is Pierce County's projected year 2022 average household size for Tacoma. Commercial floor area capacity was converted to employment assuming an average of 375 square feet per employee.

Note that the estimated capacities for mixed-use zones shown in **Table 21** are significantly higher than those assumed in the 2007 Pierce County Buildable Lands report. We believe that these discrepancies are due to the County's higher weighting of past trends, and that the higher capacities are justified based on the kind of development that can be expected to occur in the future.


Legend
TAZ
RGC/MUC
MIC
Lower Portland Avenue
McKinley
Downtown
38th & 34th & Pacific
72nd & Portland
72nd & Pacific
Stadium
Martin Luther King
6th Ave & Pine St
Tacoma Central
Tacoma Mall
5th & STW
Proctor
Westgate
James Center
Narrows

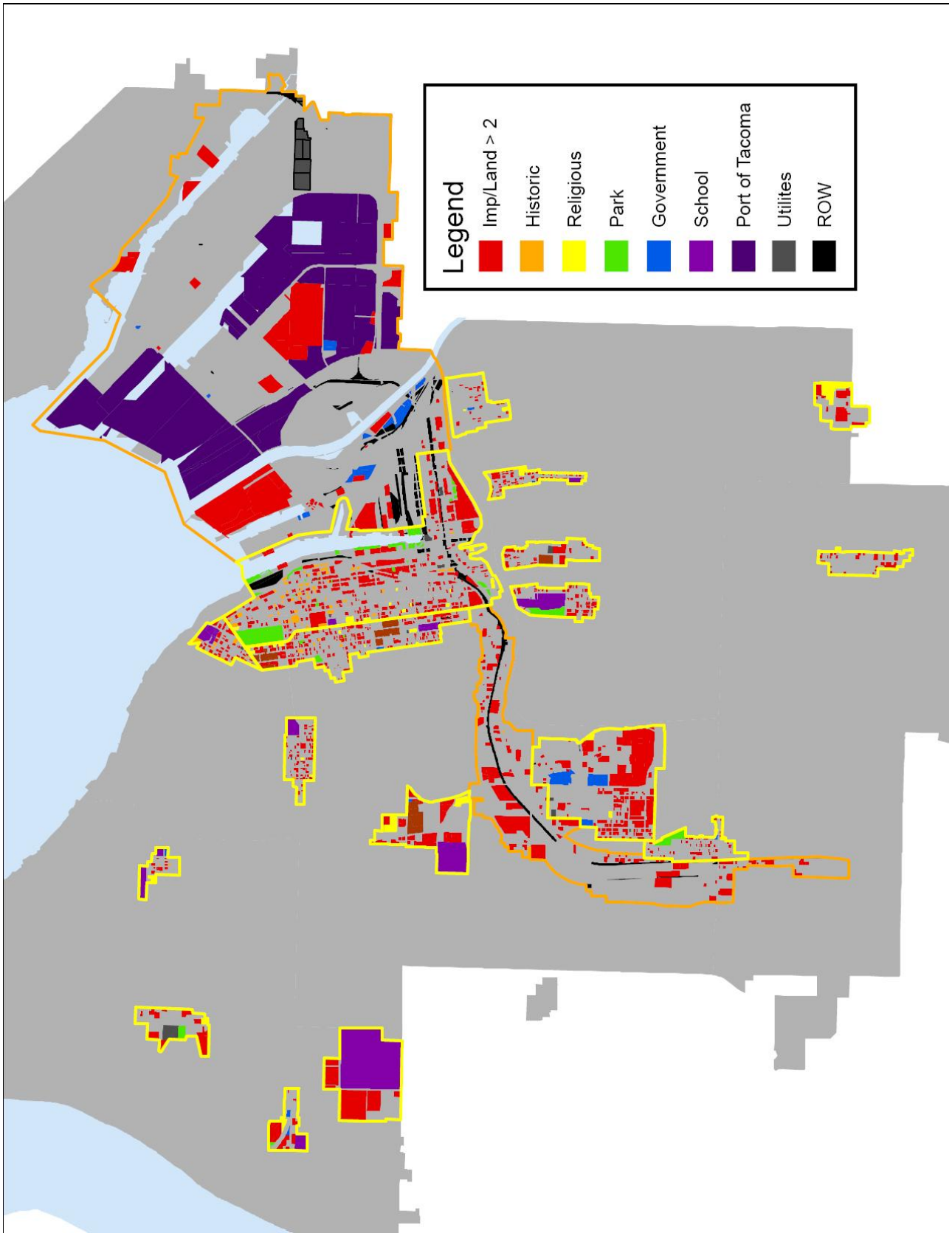

Legend
Imp/Land > 2
Historic
Religious
Park
Government
School
Port of Tacoma
Utilites
ROW

Table 1: Citywide allocations

	population allocations			employment allocations		
	percent	2030	2040	percent	2030	2040
Tacoma	100%	78,600	127,000	100%	64,200	97,000
Downtown Regional Growth Center	60%	47,160	76,200	70%	44,940	67,900
North Downtown	26%	20,080	32,445	30%	19,470	29,417
South Downtown	26%	20,080	32,445	30%	19,470	29,417
Martin Luther King	9%	7,000	11,310	9%	6,000	9,065
Tacoma Mall Regional Growth Center	6%	5,000	8,079	0	5,000	7,555
Tideflats Manufacturing/Industrial Center	0%	0	0	8%	5,000	7,555
South Tacoma Manufacturing/Industrial Center	0%	0	0	8%	5,000	7,555
remaining allocation	34%	26,440	42,721	7%	4,260	6,436
% of remaining allocation to MUCs	50%			80%		
MUCs	17%	13,220	21,361	5%	3,408	5,149
Outside all centers	17%	13,220	21,361	1%	852	1,287

Table 2: Citywide parcel area, development capacity, and allocations

	Parcel Area (acres)	Capacity		Capacity minus 25% market factor		Percent of total allocation		2030 allocation		2040 allocation	
		pop.	emp.	pop.	emp.	pop.	emp.	pop.	emp.	pop.	emp.
All Tacoma	24,053					100%	100%	78,600	64,200	127,000	97,000
Centers	6,812	266,419	285,136	199,814	213,852	83%	99%	65,380	63,348	105,639	95,713
Outside Centers	17,241					17%	1%	13,220	852	21,361	1,287
Downtown Regional Growth Center	818	127,547	91,011	95,660	68,258	60%	70%	47,160	44,940	76,200	67,900
North Downtown	283	52,666	41,008	39,499	30,756	26%	30%	20,080	19,470	32,445	29,417
South Downtown	365	57,789	34,706	43,342	26,029	26%	30%	20,080	19,470	32,445	29,417
Martin Luther King	170	17,092	15,297	12,819	11,473	9%	9%	7,000	6,000	11,310	9,065
Tacoma Mall Regional Growth Center	389	49,862	44,760	37,396	33,570	6%	8%	5,000	5,000	8,079	7,555
Tideflats Manufacturing /Industrial Center	3,912	0	57,762	0	43,321	0%	8%	0	5,000	0	7,555
South Tacoma Manufacturing /Industrial Center	690	0	22,303	0	16,727	0%	8%	0	5,000	0	7,555
Total for 13 Mixed Use Centers	1,003	89,009	69,300	66,757	51,975	17%	5%	13,220	3,408	21,361	5,149

25% market factor capacity reduction
2 maximum improvement-to-land-value ratio for redevelopable parcels
2.32 average household size

Table 3: MUC parcel area, development capacity, and allocations

	Parcel Area (acres)	Capacity		Capacity minus 25% market factor		Percent of MUC capacity		2030 allocation		2040 allocation	
		pop.	empl.	pop.	empl.	pop.	empl.	pop.	empl.	pop.	empl.
Total for 13 Mixed Use Centers	**1,003**	**89,009**	**69,300**	**66,757**	**51,975**	**100%**	**100%**	**13,220**	**3,408**	**21,361**	**5,149**
34th & Pacific	58	7,171	7,466	5,378	5,599	8%	11%	1,065	367	1,721	555
38th & G	58	6,139	1,592	4,604	1,194	7%	2%	912	78	1,473	118
56th & STW	64	5,534	8,651	4,151	6,488	6%	12%	822	425	1,328	643
6th Ave & Pine St	55	8,488	1,329	6,366	997	10%	2%	1,261	65	2,037	99
72nd & Pacific	59	10,571	7,002	7,928	5,252	12%	10%	1,570	344	2,537	520
72nd & Portland	68	7,110	6,815	5,332	5,112	8%	10%	1,056	335	1,706	506
James Center	228	6,589	4,746	4,942	3,559	7%	7%	979	233	1,581	353
Lower Portland Ave	64	10,629	8,533	7,972	6,400	12%	12%	1,579	420	2,551	634
McKinley	31	3,618	475	2,714	356	4%	1%	537	23	868	35
Narrows	40	3,200	706	2,400	529	4%	1%	475	35	768	52
Proctor	26	2,472	915	1,854	686	3%	1%	367	45	593	68
Tacoma Central	175	10,814	13,730	8,111	10,297	12%	20%	1,606	675	2,595	1,020
Westgate	77	6,674	7,340	5,005	5,505	7%	11%	991	361	1,602	545

25% market factor capacity reduction
2 maximum improvement-to-land-value ratio for redevelopable parcels
2.32 average household size

Table 4: North Downtown allocations by TAZ

North Downtown						
	Population			Employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,788	0	0	0	0	0	0
2,789	514	261	422	64	41	61
2,791	1,506	766	1,237	474	300	453
2,819	309	157	253	118	75	113
2,820	2,567	1,305	2,109	738	467	706
2,821	2,338	1,189	1,920	672	425	643
2,822	1,961	997	1,611	564	357	539
2,899	2,366	1,203	1,944	786	498	752
2,900	0	0	0	0	0	0
2,901	1,520	773	1,249	751	475	718
2,902	1,392	708	1,143	400	253	383
2,904	2,755	1,400	2,263	2,523	1,597	2,414
2,905	1,732	881	1,423	1,722	1,090	1,647
2,906	2,498	1,270	2,052	2,679	1,696	2,563
2,907	1,727	878	1,419	496	314	475
2,910	2,391	1,216	1,964	2,753	1,743	2,633
2,911	1,012	515	831	1,165	738	1,114
2,912	834	424	685	960	608	918
2,913	1,561	793	1,282	1,797	1,137	1,718
2,917	1,235	628	1,014	1,422	900	1,360
2,918	273	139	224	314	199	300
2,919	0	0	0	0	0	0
2,920	485	246	398	558	353	533
2,922	469	238	385	540	342	516

North Downtown						
	Population			Employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,923	63	32	51	72	46	69
2,924	0	0	0	0	0	0
2,925	384	195	316	442	280	423
2,926	1,152	586	946	1,326	840	1,269
2,927	0	0	0	0	0	0
2,928	403	205	331	464	294	443
3,216	1,799	915	1,478	2,068	1,309	1,978
3,221	4,253	2,162	3,493	4,889	3,095	4,676
TOTALS	**39,499**	**20,080**	**32,445**	**30,756**	**19,470**	**29,417**

Table 5: South Downtown allocations by TAZ

South Downtown						
	Population			Employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,898	303	141	227	87	65	99
2,903	2,228	1,032	1,668	640	479	724
2,908	2,680	1,241	2,006	2,400	1,795	2,712
2,909	2,362	1,094	1,768	1,167	873	1,319
2,914	137	63	102	153	115	173
2,915	584	270	437	288	216	326
2,916	42	19	31	21	15	23
2,921	281	130	211	139	104	157
2,929	307	142	230	152	113	171
2,931	1,355	628	1,014	1,557	1,165	1,760
2,932	770	357	577	885	662	1,001
2,933	482	223	361	554	414	626
2,934	493	228	369	569	425	643
2,935	1,018	471	762	957	716	1,082
2,936	1,382	640	1,035	1,598	1,195	1,806
2,937	1,083	502	811	535	400	605
2,938	704	326	527	348	260	393
2,939	437	203	327	216	162	244
2,940	2,245	1,040	1,681	1,109	829	1,253
2,941	963	446	721	475	356	537
2,942	698	323	522	345	258	389
2,943	391	181	292	193	144	218
2,944	276	128	206	136	102	154
2,945	1,235	572	924	610	456	689

South Downtown						
	Population			Employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,946	853	395	638	421	315	476
2,947	1,287	596	963	636	475	718
2,948	1,372	636	1,027	358	268	404
2,949	232	107	173	0	0	0
2,950	2,365	1,096	1,771	1,168	874	1,320
2,951	2,151	996	1,610	1,062	795	1,200
2,952	1,856	860	1,389	917	686	1,036
2,953	996	461	746	492	368	556
2,954	5,369	2,488	4,019	1,752	1,311	1,980
2,955	1,574	729	1,178	452	338	511
2,962	0	0	0	0	0	0
2,965	177	82	132	0	0	0
3,219	694	322	520	798	597	902
3,222	676	313	506	777	581	878
3,226	441	204	330	510	381	576
3,227	0	0	0	93	69	105
3,228	571	265	428	660	494	746
3,229	0	0	0	144	107	162
3,230	274	127	205	658	492	743
TOTALS	**43,342**	**20,080**	**32,445**	**26,029**	**19,470**	**29,417**

Table 6: Martin Luther King allocations by TAZ

Martin Luther King						
	Population			Employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,823	0	0	0	2,422	1,267	1,914
2,878	319	174	281	122	64	97
2,880	1,115	609	984	326	170	257
2,884	1,356	740	1,196	684	358	541
2,885	760	415	671	252	132	199
2,886	922	504	814	318	166	251
2,888	824	450	727	257	134	203
2,890	387	212	342	149	78	117
2,891	242	132	214	66	34	52
2,892	0	0	0	1,612	843	1,274
2,893	911	498	804	226	118	178
2,894	755	412	666	204	106	161
2,895	714	390	630	92	48	73
2,896	325	178	287	42	22	33
2,897	0	0	0	2,371	1,240	1,874
2,956	1,710	934	1,509	1,214	635	959
2,966	968	528	854	789	413	624
2,968	400	219	353	154	80	121
3,867	1,110	606	979	174	91	137
TOTALS	**12,819**	**7,000**	**11,310**	**11,473**	**6,000**	**9,065**

Table 7: Tacoma Mall allocations by TAZ

Tacoma Mall						
	Population			Employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,028	8,851	1,183	1,912	10,229	1,524	2,302
3,031	8,167	1,092	1,764	9,439	1,406	2,124
3,032	2,762	369	597	3,192	475	718
3,035	5,197	695	1,123	6,006	895	1,352
3,036	9,709	1,298	2,098	4,011	597	903
3,037	1,777	238	384	229	34	52
3,039	934	125	202	463	69	104
TOTALS	**37,396**	**5,000**	**8,079**	**33,570**	**5,000**	**7,555**

Table 8: 34th and Pacific allocations by TAZ

34th and Pacific						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,327	2,479	491	793	2,452	161	243
3,330	1,642	325	526	2,239	147	222
3,343	325	64	104	374	25	37
3,346	0	0	0	0	0	0
3,347	932	185	298	534	35	53
TOTALS	5,378	1,065	1,721	5,599	367	555

Table 9: 38th and G allocations by TAZ

38th and G						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,329	1,380	273	441	388	25	38
3,331	1,762	349	564	429	28	43
3,332	59	12	19	23	1	2
3,333	47	9	15	18	1	2
3,341	1,356	269	434	336	22	33
TOTALS	**4,604**	**912**	**1,473**	**1,194**	**78**	**118**

Table 10: 56th and STW allocations by TAZ

56th and STW						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,829	1,967	390	629	570	37	56
2,831	1,179	233	377	4,096	269	406
2,866	324	64	104	1,625	107	161
2,869	680	135	218	198	13	20
TOTALS	**4,151**	**822**	**1,328**	**6,488**	**425**	**643**

Table 11: 6th Ave and Pine St allocations by TAZ

6th Ave and Pine St						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,041	850	168	272	105	7	10
3,047	2,195	435	702	301	20	30
3,079	1,598	316	511	291	19	29
3,082	1,723	341	551	300	20	30
TOTALS	**6,366**	**1,261**	**2,037**	**997**	**65**	**99**

Table 12: 72nd and Pacific allocations by TAZ

72nd and Pacific						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,408	876	173	280	659	43	65
3,411	1,293	256	414	1,224	80	121
3,423	2,767	548	885	2,410	158	239
3,425	0	0	0	0	0	0
3,426	2,993	593	958	958	63	95
TOTALS	**7,928**	**1,570**	**2,537**	**5,252**	**344**	**520**

Table 13: 72nd and Portland allocations by TAZ

72nd and Portland						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,402	1,511	299	484	1,451	95	144
3,405	2,379	471	761	2,000	131	198
3,433	1,443	286	462	1,661	109	165
TOTALS	**5,332**	**1,056**	**1,706**	**5,112**	**335**	**506**

Table 14: James Center allocations by TAZ

James Center						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,845	0	0	0	0	0	0
2,846	4,900	970	1,568	3,511	230	348
2,848	42	8	13	48	3	5
2,849	0	0	0	0	0	0
TOTALS	**4,942**	**979**	**1,581**	**3,559**	**233**	**353**

Table 15: Lower Portland Ave allocations by TAZ

Lower Portland Ave						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,312	0	0	0	0	0	0
3,315	3,867	766	1,237	3,653	240	362
3,317	4,105	813	1,313	2,746	180	272
TOTALS	**7,972**	**1,579**	**2,551**	**6,400**	**420**	**634**

Table 16: McKinley allocations by TAZ

McKinley						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
3,319	432	86	138	37	2	4
3,321	478	95	153	44	3	4
3,323	290	57	93	67	4	7
3,325	1,448	287	463	183	12	18
3,350	10	2	3	4	0	0
3,352	0	0	0	0	0	0
3,353	56	11	18	21	1	2
TOTALS	**2,714**	**537**	**868**	**356**	**23**	**35**

Table 17: Narrow allocations by TAZ

Narrows						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,839	1,081	214	346	189	12	19
2,844	1,320	261	422	340	22	34
TOTALS	**2,400**	**475**	**768**	**529**	**35**	**52**

Table 18: Proctor allocations by TAZ

Proctor						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,777	423	84	135	138	9	14
2,780	482	96	154	185	12	18
2,796	480	95	154	184	12	18
2,798	468	93	150	180	12	18
TOTALS	**1,854**	**367**	**593**	**686**	**45**	**68**

Table 19: Tacoma Central allocations by TAZ

Tacoma Central						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,861	361	71	115	415	27	41
2,864	1,067	211	341	1,206	79	119
2,983	0	0	0	0	0	0
2,986	5,775	1,144	1,848	7,644	501	757
2,991	909	180	291	1,032	68	102
TOTALS	**8,111**	**1,606**	**2,595**	**10,297**	**675**	**1,020**

Table 20: Westgate allocations by TAZ

Westgate						
	population			employment		
TAZ	Capacity	2030 allocation	2040 allocation	Capacity	2030 allocation	2040 allocation
2,769	519	103	166	404	26	40
2,772	1,474	292	472	1,697	111	168
2,801	1,956	387	626	2,252	148	223
2,803	687	136	220	791	52	78
2,807	314	62	100	361	24	36
2,809	56	11	18	0	0	0
TOTALS	**5,005**	**991**	**1,602**	**5,505**	**361**	**545**

Table 21: Development Capacity by Zone

zone	height limit	average # of floors	FAR	average unit size	resid/ comm. split	household density	floor area per employee	empl. density
NCX	45	4	3	1,000	75%	91	375	81
CCX	65	5	4	1,000	50%	76	375	203
UCX	75	6	4	1,000	50%	91	375	244
RCX	60	5	4	1,000	90%	137	375	41
CIX	75	5	4	1,000	5%	8	375	386
NRX	35	3	2	1,000	95%	87	375	12
URX	45	4	3	1,000	95%	116	375	16
HMX	150	10	7	1,000	0%	0	375	813
DR	90	8	6	1,000	80%	195	375	130
DMU	100	9	6	1,000	70%	192	375	220
WR	100	9	6	1,000	70%	192	375	220
DCC	400		12	1,000	50%	261	375	697
UCX-TD	75	6	4	1,000	50%	91	375	244
S8	65 - 180		4	1,000	50%	90	375	240
S9	35				0%	0		19
S10	35				0%	0		19
S11	35				0%	0		19
M1	75				0%	0		25
M2	100				0%	0		50
PMI	100				0%	0		25
C2	45				0%	0		25
R2	35				100%	6		0
R3	35				100%	14		0
R4	60				100%	46		0
R4L	35				100%	17		0

Assumptions:

2.32	average household size (source: 2007 Pierce County Buildable Lands Report)
1000	square feet average multifamily unit size
375	square feet average floor space per employee
70%	average lot coverage of development
	capacities for R zones and C2 zone taken from the 2007 Pierce County Buildable Lands Report
	capacities for the S8 zone taken from the South Downtown Subarea Plan
	capacities for the S9, S10, S11, M1, M2, and PMI based on input from City of Tacoma staff

Appendix E: Employment Density Survey

An excerpt from the 2007 Buildable Lands Report:

2006 Employment Density Survey Conclusion

The average employment density for commercial uses is estimated at 21.92 employees per gross acre. The average employment density for industrial uses is estimated at 13.8 employees per gross acre. The average employment density in downtown Tacoma is estimated at 356.77 employees per gross acre.

The range within each category varies dramatically. As an example, various restaurants within the Retail/FIRES category generates an employment density between 90 and 100 employees per acre while various retail establishments generate a density between 10 and 20. This is observed through a lower median employment figure for Retail/FIRES of 19.37. While the Manufacturing/Warehousing median is slightly higher than its average, the downtown Tacoma area median density is significantly lower than its average.

Resulting Employment Density Per Employment Sector						
Employment Sector	**Jurisdictions Surveyed**	**# of Parcels**	**Total Employees**	**Total Acreage**	**Average Employees***	**Median Employees***
Manufacturing/ Warehousing	Tacoma Fife Puyallup Bonney Lake	21	2,364	171	13.8	21.32
Retail/FIRES	Pierce County Bonney Lake University Place Fife Orting Puyallup Tacoma	97	4,206	192	21.92	19.37
Downtown Retail/FIRES	Tacoma	7	2,162	6.06	356.77	235.59

Source: 2004 ESD Employment Data, Pierce County ATR Parcel Records.
*Per gross acre.

The estimated average employment density for public administrative buildings is 27.56. Fire stations are estimated at an average employment density of 12.01. The average employment density for a school is estimated at 5.48.

Resulting Employment Density for Publicly Owned Facilities				
Type of Facility	**# of Parcels**	**Total Employees**	**Total Acreage**	**Average Employees Per Gross Acre**
Administrative Buildings	11	2,926	106	27.56
Fire Stations	11	264	21.98	12.01
Schools	45	5,329	972.19	5.48

Comparison with Previous Employment Survey: Data on individual businesses in Pierce County was obtained from the Washington State Employment Security Department to identify an average employment statistic to incorporate into the analysis for the 2002 Report. However, businesses included within the survey were randomly chosen in disregard to the time period in which a building was constructed. In essence, many of the commercial/industrial sites may have been constructed prior to the adoption and implementation of GMA policies and regulations.

Similar to the new survey, the employment information was grouped into three categories: commercial, industrial, and government. The downtown Tacoma area was also segregated as in the present survey. As seen on the table below, the average employment density for commercial uses was determined to be 34.3 employees per gross acre; the average employment density for industrial uses was determined to be 11.2 employees per gross acre; the average employment density for governmental uses was determined to be 22.7 employees per gross acre; and, the average employment density in downtown Tacoma was 318 employees per gross acre.

The commercial employment average was generated from the review of 131 businesses located on 56 separate properties. The industrial average was generated from the review of 50 businesses located on 35 separate properties. The downtown Tacoma average was derived from the review of 56 businesses on 6 separate properties. The average employee per acre for each category was calculated by summing the employees for all the businesses and dividing by the total acreage.

Comparison of 1999 and 2004 Surveys			
Employment Sector	**1999 Survey**	**2004 Survey Average**	**2004 Survey Median**
Manufacturing/Warehousing	11.15	13.8	21.32
Retail/FIRES	34.3	21.92	19.37
Governmental	22.7	7.74	N/A
Downtown Tacoma	318	356.77	235.59

Source: 1999 ESD Employment Data, 2004 ESD Employment Data, Pierce County ATR Parcel Records.

Conclusion/Recommendation: UGAs associated with Pierce County and its cities and towns are required to include sufficient land to accommodate the housing and employment growth targets within a 20-year planning period. The publication of a Buildable Lands report every five years documents the UGAs housing/employment capacity analysis. This analysis incorporates various assumptions, such as, housing density, persons per household, market availability, and employees per acre. The assumptions are reviewed every five years to determine if modifications should be implemented for the subsequent analysis/report.

The methodology applied to calculate the employment capacity relies upon two primary inputs: an inventory of developable land (vacant and redevelopable) and assumed number of employees per gross acre. This simplified approach results from the intricacies associated with employment capacity. While household sizes associated with residential development may minimally increase/decrease during any given point, employment intensities may deviate substantially.

Given the various intricacies of employment capacity, a more conservative approach in determining an employment capacity may be warranted. This approach may be implemented through the application of the lower employees per acre statistics, from the two surveys as depicted in the table below, to

vacant and redevelopable lands within commercial and industrial zoning categories. If applicable, one of the three governmental employment statistics may be applied to documented capital facility projects that may be constructed within residentially zoned areas, such as new schools.

Employment Sector	Recommended Employment Density for Analysis Within 2007 Report
Manufacturing/Warehousing	11.15
Retail/FIRES	19.37
Downtown Tacoma	235.59

2010 Employment Density Survey Data

Provided by: Pierce County Public Works Department, Traffic Division.

OFFICE	Current Trend (2010 ESD & Parcel Data)					Calibrated Data	
Area	**Number of Records**	**Jobs/Per Acre**	**SF/Per Job**	**SF/Per Acre**	**FAR**	**Adjusted Factor**	**Adjusted Jobs/Acre**
Downtown Core	224	258.55	488	126,099	2.895	0.884	224.09
Downtown	139	78.38	629	49,275	1.131	1.555	116.66
Tacoma - Core	127	34.88	445	15,525	0.356	0.779	27.19
Tacoma - HMX	107	206.22	251	51,779	1.189	1.806	373.30
Urban - High	529	15.26	544	8,299	0.191	1.162	18.15
Urban - Medium	1,306	10.14	566	5,739	0.132	1.207	15.00
Urban - Low	1,071	16.61	546	6,343	0.146	1.298	15.00
Average		17.55	499	8,759	0.200		
Total	**3,503**						

RETAIL	Current Trend (2010 ESD & Parcel Data)					Calibrated Data	
Area	**Number of Records**	**Jobs/Per Acre**	**SF/Per Job**	**SF/Per Acre**	**FAR**	**Adjusted Factor**	**Adjusted Jobs/Acre**
Downtown Core	33	N/A	N/A	N/A	N/A	2.696	49.38
Downtown	41	N/A	N/A	N/A	N/A	1.103	49.38
Tacoma - Core	183	26.00	436	11,340	0.260	1.306	33.92
Tacoma - HMX	4	N/A	N/A	N/A	N/A	0.142	33.92
Urban - High	347	15.37	619	9,515	0.218	1.223	18.94
Urban - Medium	1,071	14.80	586	8,679	0.199	1.157	17.19
Urban - Low	506	14.21	599	8,520	0.196	1.045	14.81
Average		15.77	585	9,229	0.210		
Total	2,185						

MANU	Current Trend (2010 ESD & Parcel Data)					Calibrated Data	
Area	Number of Records	Jobs/Per Acre	SF/Per Job	SF/Per Acre	FAR	Adjusted Factor	Adjusted Jobs/Acre
Downtown Core	4	N/A	N/A	N/A	0.000	0.606	N/A
Downtown	14	N/A	N/A	N/A	0.000	0.820	N/A
Tacoma - Core	13	N/A	N/A	N/A	0.000	1.065	N/A
Tacoma - HMX	3	N/A	N/A	N/A	0.000	0.000	N/A
Urban - High	14	N/A	N/A	N/A	0.000	0.855	9.90
Urban - Medium	115	11.45	1,185	13,574	0.312	0.701	8.12
Urban - Low	147	7.44	1,007	8,520	0.172	0.991	7.50
Average		8.94	1,055	9,427	0.220		
Total	**310**						

WTCU	Current Trend (2010 ESD & Parcel Data)					Calibrated Data	
Area	Number of Records	Jobs/Per Acre	SF/Per Job	SF/Per Acre	FAR	Adjusted Factor	Adjusted Jobs/Acre
Downtown Core	5	N/A	N/A	N/A	N/A	N/A	
Downtown	10	N/A	N/A	N/A	N/A	N/A	
Tacoma - Core	15	N/A	N/A	N/A	N/A	N/A	
Tacoma - HMX	0	N/A	N/A	N/A	N/A	N/A	N/A
Urban - High	23	12.88	633	8,150	0.187	0.439	10.11
Urban - Medium	224	9.42	956	9,006	0.207	1.057	10.11
Urban - Low	325	6.86	878	6,020	0.138	1.242	8.63
Average		8.25	896	7,395	0.170		
Total	602						

Appendix F: Technical Description of the Inventory Model

Unincorporated Urban Pierce County Example Process.

Provided by: Pierce County Public Works Department, Traffic Division.

Data Inventory

The process of buildable lands begins with assigning designations to parcels based on land use description. Parcels will be coded as vacant, potentially underutilized, unbuildable, or a special code for specific circumstance based on land use description. Certain land use codes that could be vacant will be marked for review by digital orthophoto to determine if they are vacant or not. This process is known as Stage 1A.

While vacant, vacant – single unit, and unbuildable are easily recognizable, underutilized lands require some definition and context. Previously, the Buildable Lands used vacant, vacant single, underdeveloped, and redevelopable. Now underdeveloped and redevelopable are categorized as underutilized which encompasses all parcels that could be further developed given market conditions. Thus underutilized will capture parcels that have low densities for housing units or jobs that are assumed to have more capacity to accommodate population or employment growth. The following sections outline this process; text bodies contain the contextual information while the technical sequencing will be displayed underneath in bullets.

Estimated Net Units and Jobs

Net units and jobs are derived from the difference between the future estimated number of units and jobs respectively and the current baseline figures. These estimations are based on observed densities.

- For residential classifications future units equal the actual housing density observed within the zoning code for the last 10 years multiplied by the net acreage.
- For commercial and industrial classifications future jobs equal net acreage multiplied by the future job density assigned by PALS; in this case 19.37 for commercial and 8.25 for industrial.
- For mixed use commercial 35% of the acreage is applied to housing and 65% to commercial which is then multiplied by the observed unit density and job density.
- Residential net units equal the future residential units minus the 2010 inventoried units on the parcel.
- Commercial and industrial present jobs are calculated by parcel square feet divided by 500 for commercial and 900 for industrial.
- The net is then calculated by the present value subtracted from the future value. The new mixed use is a combination of the above methods to determine both net units and jobs.

Inclusions and Exclusions

Utilizing the classifications created in the first stage of this process, it was possible to manually search through selected fields and insert user overrides and special cases that need to be handled by the model separately. All of these classifications will be marked for inclusion or exclusion based on whether or not one could build upon them; hence those included are underutilized or vacant. So libraries are excluded while vacant parcels are included. Some parcels are locked at this stage so that the model ignores their land use type when calculating units and jobs. The model instead relies solely on the inventoried value

supplied with the parcel itself. As an example this occurs with Master Planned Communities which design their number of units.

- The first query locks all pipeline parcels within the master planned developments of Sunrise, Lipoma Firs, and Cascadia/Tehaleh.
- Exclude all lots less than 3,000 net square feet.
- Lock out right of ways, narrow polygons, playgrounds, condos, some forms of government owned lands, MPDs, and marine areas from being calculated according to the assumptions.
- Exclude shooting ranges.
- School sites are then identified [this includes universities and colleges] and those that are owned by schools but currently exist outside the school boundary or building structures and auxiliaries have been included in buildable lands.
- Unbuildable parcels identified in Stage 1A are excluded although those that were corrected to vacant were included.
- Government specified parcels such as fire stations and libraries are locked however vacant government parcels are included.
- Unknown designations from Stage 1A were included if upon visual inspection they were vacant and they were excluded if indicated as unbuildable.
- Port parcels were included.
- Residential Single Family Residences on commercial, industrial, or mixed use lands were included as underutilized.
- Include vacant parcels that were corrected and exclude unbuildable parcels that were corrected.
- Exclude JBLM parcels.
- Include corrected redevelopable parcels.
- Include Stage 1A agriculture land as vacant or redevelopable parcels. Urban agriculture land is considered exclusively vacant.

Redevelopable Exclusions

Redevelopable exclusions provide another parameter which would exclude otherwise included parcels. This has to do with valuations of structures, that once they reach a certain dollar amount it would be improbable from a profitability outlook to tear the structure down and input something new. The exception is Multi-Family parcels which depend on the ratio of current units to estimated future units.

- If an SFR does not meet the minimum lot size it is excluded.
- If an SFR has an improvement value that is greater than or equal to $500,000 it is excluded.
- If a MHP has a value greater than or equal to $1,000,000 it is excluded.
- If a MF has a future unit to base unit ratio less than 2.5 it is excluded; it is assumed that unless the units increase by at least 2.5 times it will be unappealing for redevelopment.
- The final exclusion is for commercial lots that are greater than or equal to $1,000,000.

Unit and Job Revisions

This section determines the final net units and jobs based on certain markets assumptions, presumably that for underutilized units and jobs there has to be sufficient additional units or jobs respectively in order for develop to likely occur.

- Housing units are first tested to determine if their acreage meets the minimum size. Those that do not meet this minimum are given a final unit of 1.
- School sites are marked at zero units and jobs while school parcels outside of the school boundary are treated as the parcel provided units and jobs indicate.
- PALS pipeline, MPDs, and other pipelines/projects are marked with recorded units and jobs for the final units and jobs; similar to the processes of the previous stages.
- Test redevelopable parcels for jobs and units and if they are below the minimum size they will result in zero jobs and zero units. For buildable lands the ratio between future and base must be at least 2.5 for units and 5.0 for jobs. While the ratio of units has been derived previously, jobs will be estimated and those that do not meet the 5.0 ratio will be excluded.
- The query then excludes the parcels from previous stages that were marked for exclusion.
- In terms of auxiliaries, 20% are coded for potential future development.
- Remove underutilized parcels from the Buildable Lands capacity if the mixed commercial jobs are less than five or units are less than two.

Categorizing Potentially Vacant, Underutilized, and Unbuildable Land

Figures 33, 34, and 35 show the Assessor-Treasurer's (ATR) land use descriptions used to categorize land within the Buildable Lands Model. Parcels with a data label under Figure 33 are analyzed assuming the land is vacant. Figure 34 shows the data labels for parcels that would be included in the underutilized analysis. The parcels with data labels in Figure 35 are considered undevelopable outright.

Figure 33: ATR Land Use Descriptions Considered to be Potentially Vacant

Description	Data Label
Commercial Vacant Land	COMM VAC LAND
Commercial Vacant Land Special Environmental Approval Filed	COMM VAC LND SP ENVIR APPR FILED
Farms Not Current Use	FARMS NOT CURRENT USE
Industrial Indian Reservation Land	IND INDIAN RESERV LND
Industrial Land With Improvement Land Value Only	IND LND WITH IMPROV LAND VAL ONLY
Industrial Vacant Land Special Environmental Approval Filed	IND VAC LND SP ENVIR APPR FILED
Noncommercial Forest	NON COMM FOREST
Other Undeveloped Land	OTHER UNDEVEL LAND
Residential No Perk Vacant Land Required Documentation	RES NO PERK VAC LND REQ DOC
Vacant Industrial Land	VAC INDUSTRIAL LAND
Vacant Land Building Restriction Documentation Required	VAC LND BLDG RESTRICT DOC REQ
Vacant Land Undeveloped	VACANT LAND UNDEVELOPED

Figure 34: ATR Land Use Descriptions Considered to be Potentially Underutilized	
Description	Data Label
Agricultural Related Activities	AG RELATED ACTIVITIES
Agriculture Not Current Use	AG NOT CURRENT USE
Amusements	AMUSEMENTS
Apparel & Finished Products Manufacturing	APPAREL & FINISH MFG
Apparel Accessories Retail	APPAREL ACCSSRS RETAIL
Apartment Condominium High Rise	APT CONDO HIGH RISE
Apartment/Condominium 3 Stories Or Less	APT/CONDO 3 STOR OR LESS
Automobile Accessories Retail	AUTO ACCESSORIES RETAIL
Automobile Dealer New And Used Retail	AUTO DLR NEW AND USED RETAIL
Automobile Parking	AUTO PARKING
Automobile Repair Services	AUTO REPAIR SERVICES
Automobile Wrecking Retail	AUTO WRECKING RETAIL
Banks	BANKS
Big Box Power Center	BIG BOX POWER CTR
Building Material Farm Equipment Retail	BLDG MTRL FARM EQUIP RETAIL
Business Services	BUSINESS SERVICES
Car Wash	CAR WASH
Chemical Manufacturing	CHEMICAL MFG
Commercial Land With Improvement Land Value Only	COMM LND WITH IMPROV LAND VAL ONLY
Commercial Land With Single Family Residence	COMM LND WITH SFR
Communication	COMMUNICATION
Contractor Services	CONTRACTOR SERVICES
Convenience Store May Have Gas	CONVEN STORE MAY HAVE GAS
Credit Unions	CREDIT UNIONS
Cultural Activities	CULTURAL ACTIVITIES
Current Use Farm & Agriculture RCW 84.34	CU FARM & AGRI RCW 84.34 CURRENT USE
Current Use Open Space RCW 84.34	CU OPEN SPACE RCW 84.34 CURRENT USE
Current Use Timberland RCW 84.34	CU TIMBERLAND RCW 84.34 CURRENT USE
Designated Forest Land RCW 84.33	DESIG FOREST LND RCW 84.33
Dental Services	DENTAL SERVICES
Detached Garage Condominium	DET GARAGE CONDO
Discount Stores	DISCOUNT STORES
Duplex 2 Units	DUPLEX 2 UNITS
Duplex Condominium	DUPLEX CONDO
Educational Services	EDUCATIONAL SERVICES
Entertainment Bars	ENTERTAINMENT BARS
Espresso Shop	ESPRESSO SHOP
Fabricated Metal Products	FAB METAL PRODUCTS
Fast Food	FAST FOOD
Fishing Activities And Services	FISHING ACTIVITIES AND SERVICES
Food Manufacturing	FOOD MFG
Food Retail Trade	FOOD RETAIL TRADE
Fourplex 4 Units	FOURPLEX 4 UNITS
Fourplex Or More Condominium	FOURPLEX OR MORE CONDO
Fueling Stations	FUELING STATIONS
Funeral Crematory Services	FUNERAL CREMATORY SERV

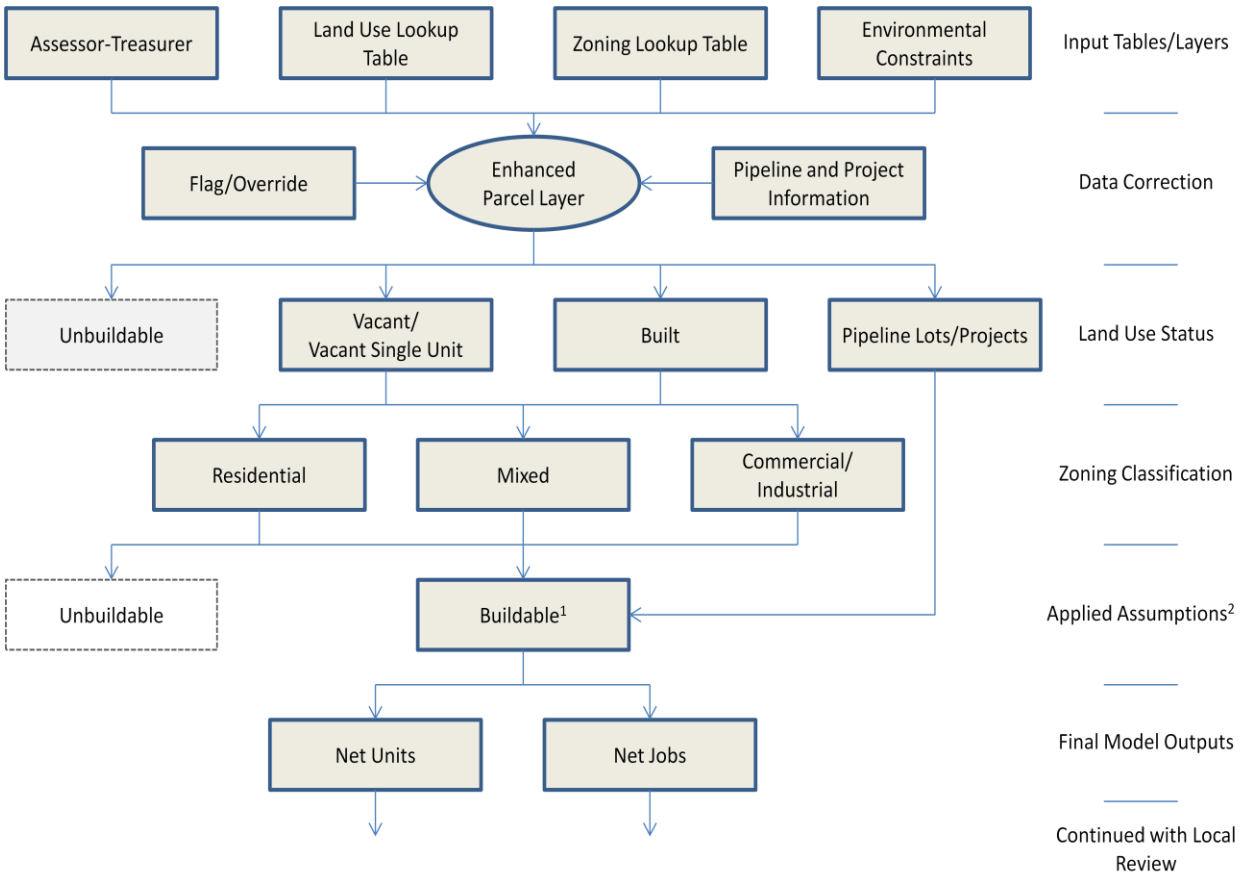
Figure 34: ATR Land Use Descriptions Considered to be Potentially Underutilized	
Description	Data Label
Furniture Manufacturing	FURNITURE MFG
Gas Station Cashier Booth	GAS STATION CASHIER BOOTH
Gas Station Mini Mart	GAS STATION MINI MART
Gas Station Service Garage	GAS STATION SERV GAR
Gas Station Vacant No Pumps	GAS STATION VAC NO PUMPS
General Merchandise Retail Trade	GEN MERCHANDISE RETAIL TRADE
General Warehousing Storage	GEN WAREHOUSING STORAGE
Governmental Services	GOVERNMENTAL SERVICES
Horticultural Specialties	HORTICULTURAL SPECIALTIES
Hospital	HOSPITAL
Hotels/Motels	HOTELS/MOTELS
Institutional Lodging	INSTITUTIONAL LODGING
Laundry & Dry Cleaning Services	LNDRY & DRY CLEANING SERV
Lumber & Wood Manufacturing	LUMBER & WOOD MFG
Medical Offices Services	MEDICAL OFFICES SERVICES
Mobile Home Park	MH PARK
Mobile Home Park Condominium	MH PARK CONDO
Mobile Home Sales Retail	MH SALES RETAIL
Mobile Home Senior/Disabled Exempt Administrative Combination	MH SR/DISABLED EXEMPT ADMIN COMBO
Mobile Home Title Eliminated	MH TITLE ELIM
Mini-Lube Service	MINI LUBE SERVICE
Mini-Warehousing	MINI WAREHOUSING
Misc Manufacturing	MISC MFG
Miscellaneous Office Space	MISC OFFICE SPACE
Miscellaneous Services	MISC SERVICES
Mobile/Manufactured Home	MOBILE/MFG HOME
Motion Picture Theaters	MOTION PICTURE THEATERS
Multi-Family Apartments 5 Units Or More	MULTI FAM APTS 5 UNITS OR MORE
Multi-Family High Rise 5 Units Or More	MULTI FAM HIGH RISE 5 UNITS OR MORE
Neighborhood Community Shopping Center	NGB COMMUNITY SC
Nursery Schools	NURSERY SCHOOLS
Nursing Convalescent Hospitals	NURSING CONVALESCENT HOSPITALS
Office, Insurance, Real Estate, Finance	OFF INSURANCE REAL ESTATE FINANCE
Office Condominium	OFFICE CONDO
Older Business District	OLDER BUSINESS DIST
Other Cultural Activities	OTHER CULTURAL ACTIVITIES
Other Group Quarters	OTHER GROUP QTRS
Other Public Assembly	OTHER PUB ASSEMBLY
Other Residential	OTHER RESIDENTIAL
Other Resource Production	OTHER RESOURCE PROD
Other Retail Trade	OTHER RETAIL TRADE
Paper Product Manufacturing	PAPER PROD MFG
Personal Services	PERSONAL SERVICES
Petroleum Industries	PETRO INDUSTRIES
Postal Services	POSTAL SERVICES
Primary Metal Industries	PRIM METAL INDUSTRIES

Figure 34: ATR Land Use Descriptions Considered to be Potentially Underutilized	
Description	Data Label
Printing and Publishing	PRINTING PUBLISHING
Professional Services	PROFESSIONAL SERVICES
Recreational Activities	REC ACTIVITIES
Refrigerated Warehouse	REFRIG WAREHOUSE
Regional Shopping Center	REGIONAL SC
Rental Equipment Auto Truck	RENTAL EQUIP AUTO TRUCK
Repair Services	REPAIR SERVICES
Residential Indian Reservation Land	RES INDIAN RESERV LND
Residential Land With Commercial Building	RES LND WITH COMM BUILDING
Residential Land With Improvement Land Value Only	RES LND WITH IMPROV LAND VAL ONLY
Resorts Camps	RESORTS CAMPS
Restaurant	RESTAURANT
Retail Home Furnishings	RETAIL HOME FURNISHINGS
Retail Stand Alone	RETAIL STAND ALONE
Retirement Home	RETIREMENT HOME
Room Boarding House	RM BOARDING HOUSE
Recreational Vehicle Sales Retail	RV SALES RETAIL
Salons, Spas, Barber Shops	SALONS SPAS BARBER SHOPS
Scientific Instruments, Photo, Optical, Watch Manufacturing	SCI INSTR PHOTO OPTICAL WATCH MFG
Single Family Residential Condominium	SFR CONDO
Single Family Dwelling	SINGLE FAMILY DWELLING
Special Training Schools	SPECIAL TRAINING SCHOOLS
Specialty Food Markets	SPECIALTY FOOD MKTS
Sports Bar, Restaurant, Larger Tavern	SPORTS BAR REST LARGER TAV
Stone, Clay, Glass Manufacturing	STONE/CLAY/GLASS MFG
Subsidized High Rise 5 Or More	SUBSIDIZED HIGH RISE 5 OR MORE
Subsidized Units 5 Or More	SUBSIDIZED UNITS 5 OR MORE
Taverns	TAVERNS
Textile Mill Manufacturing	TEXTILE MILL MFG
Triplex 3 Units	TRIPLEX 3 UNITS
Triplex Condominium	TRIPLEX CONDO
Used Car Lots Only Retail	USED CAR LOTS ONLY RETAIL
Vehicle Transportation	VEHICLE TRANSPORTATION
Veterinarian Services	VETERINARIAN SERVICES
Vocational Trade Schools	VOC TRADE SCHOOLS
Warehouse Condominium	WAREHOUSE CONDO
Wholesale Trade	WHOLESALE TRADE

Figure 35: ATR Land Use Descriptions Considered to be Undevelopable	
Description	**Data Label**
Bays Or Lagoons	BAYS OR LAGOONS
Cemeteries	CEMETERIES
Cultivated Tidelands	CULTIVATED TIDELANDS
Drain Fields and Catch Basins	DRAINFLDS CATCH BASINS
Flood Plain	FLOOD PLAIN
Floodway	FLOODWAY
Greenbelt Common Areas	GRNBELT COMMON AREAS
Marina Slip Condominiums	MARINA SLIP CONDOS
Marinas	MARINAS
Marine Craft Transportation	MARINE CRAFT TRANSPORTATION
Military Bases	MILITARY BASES
Mining Activities	MINING ACTIVITIES
Operating Property Railroad Right Of Way	OP PROP RR RIGHT OF WAY
Other Transportation Utilities	OTHER TRANS UTILITIES
Other Water Areas	OTHER WATER AREAS
Parks	PARKS
Quarry Sand Rock	QUARRY SAND ROCK
Religious Services	RELIGIOUS SERVICES
Railroad Equipment Maintenance	RR EQUIP MAINT
Railroad Passenger Terminals	RR PASSENGER TERMINALS
Saltwater Tidelands	SALTWATER TIDELANDS
Street Right Of Way	STREET RIGHT OF WAY
Transferred Development Rights	TRANSFERRED DEVELOPMENT RIGHTS
Transit Railroad Right Of Way	TRANSIT RR RIGHT OF WAY
Utilities	UTILITIES
Vacant Land Major Problem	VAC LND MAJOR PROBLEM
Water Areas	WATER AREAS
Well Sites	WELL SITES
Wetlands Recorded	WETLANDS RECORDED
Elementary Schools 1 To 6	ELEM SCHOOLS 1 TO 6
Junior Colleges	JR COLLEGES
Secondary Schools 7 To 12	SEC SCHOOLS 7 TO 12
University/Colleges	UNIVERSITY/COLLEGES
Fire Stations	FIRE STATIONS
Libraries	LIBRARIES
Prisons	PRISONS
Aircraft Transportation	AIRCRAFT TRANSPORTATION
Golf Courses	GOLF COURSES

2014 Buildable Lands – Model Process Flow

Highlights key script processes in the Buildable Lands model



Appendix G: Comment Letters

University Place
WASHINGTON

June 6, 2014

Dan Cardwell
Senior Planner
Pierce County Planning and Land Services
2401 So. 35th Street
Tacoma, WA 98409

PLANNING & LAND SERVICES
JUN 09 2014
PIERCE COUNTY

RE: 2014 Draft Buildable Land Report

Dear Mr. Cardwell:

Thank you for providing the City of University Place with an opportunity to review the 2014 Draft Buildable Lands Report. We understand that when creating a buildable lands report for the County and its 23 cities and towns general assumptions need to be made for consistency and ease of use. However, local knowledge of land use conditions and the development community allows for a more accurate assessment of the capacity for residential and employment growth. Following review of the 2014 Draft Buildable Lands Report the City has the following comments:

The draft report takes a general and conservative approach to demand for land which may be appropriate in unincorporated areas of Pierce County but less appropriate in a relatively built out community like University Place where quality of life and the School District put more pressure on vacant and underdeveloped land. Where the draft report assumes a residential lot must be 2.5 times the maximum density lot size to be considered underutilized, the City considers a lot underutilized if it is twice the minimum lot size.

Although the Zoning Code specifies maximum density, a lot can be divided if all resulting lots meet the minimum lot size of 9,000 square feet in the R1 zone and 6,000 square feet in the R2 zone (*UPMC 19.45.090 Compliance with density and minimum lot size standards*). Therefore, to divide a lot it needs to be at least 18,000 square feet in the R1 zone and at least 12,000 square feet in the R2 zone. The draft report requires lots to be at least 27,225 square feet in the R1 and at least 18,295 square feet in R2 zone to be considered underutilized. This results in undercounting the number of available building sites and potential lots from vacant and underutilized lands.

The draft report subtracts land for roads, critical areas and open space requirements. While these are valid assumptions for subdivisions of 5 or more lots they generally do not apply to dividing lots by short subdivision in University Place. Many of the underutilized lots in University Place can only be divided into two lots. In these cases none of the assumptions apply. In cases where land can be divided into three or four lots there is no open space requirement. It is also uncommon to have "plat deductions" in the multi-family, mixed use and the Town Center zones unless these deductions are intended to account for areas dedicated to parking and landscaping.

In subdivisions of 5 or more lots, the City requires only 7% open space as opposed to 10% assumed in the draft report.

There are some discrepancies between the draft report and our own residential capacity analysis. For example, the draft report indicates there is 229 acres of underutilized land in the R1 Zone. According to ATR data there is 471 acres of land in the R1 Zone with the following Land Use Codes and sizes:

- Land Use Code 1101 greater than 18,000 sq. ft. = 382 acres
- Land Use Code 1202 greater than 22,500 sq. ft. = 12 acres
- Land Use Code 1800 = 10.5 acres

University Place City Hall
3715 Bridgeport Way West
University Place, WA 98466
Tel 253.566.5656
Fax 253.566.5658
www.CityofUP.com

- Gun Club (Land Use Code 9400) = 67 acres

Table 6 does not include any pipeline projects which account for 348 building lots in preliminary and final plats created since the last Buildable Lands Inventory.

In the mixed use zones the City assumes 50% of the vacant land and 25% of the underutilized land will developed for residential use The draft report assumes only 20% if vacant and underutilized land will be developed for residential use. Local developers typically inquire about building residential rather than commercial projects on mixed use zoned lots.

In the Town Center Overlay, (a Planned Action area) all roads and open space have been provided by the City and no new roads or open space is required or planned. There are no critical areas in the TC Overlay and parking is provided on-street or in underbuilding structured parking. The Town Center Planned Action allows up to 750 dwelling units, with no maximum density, provided the overall density in the entire planned action area does not exceed 60 dwelling units per acre. The *Clearview,* a 100-unit mixed use apartment building, was recently completed and *Latitude 47,* a 150 unit mixed use apartment building, is currently under construction. The developers of a 25 unit luxury apartment building recently submitted a site development permit application.

In October 2013 the City adopted a new Comprehensive Plan designation and Zone known as Mixed Use Maritime. There is 13.19 acres of underutilized land in this Zone with a maximum density of 35 dwelling units / acre. Narrows Marina has shared plans with the City to construct residential condominium units on the underutilized land. With a 50% residential split the new zone should accommodate 230 housing units.

After accounting for displaced housing units, the City's residential capacity analysis indicates there is a gross capacity for 6,656 housing units. Deducting land for roads, critical areas, open space and market assumptions results in a net capacity of 5,120 housing units. The differences between the more general and conservative approach of the 2014 Draft Buildable Land Report and the City's capacity analysis which takes local knowledge of conditions into consideration is stark in this case. While the draft report indicates capacity for 2,316 additional units is needed, the City's capacity analysis indicates capacity for just five additional housing units is required!

The City is currently reviewing its Comprehensive Plan and development regulations pursuant to RCW 36.70B.130 and plans to add additional housing and employment capacity by increasing densities and re-designating some residential areas to mixed use.

Once again thank you for the opportunity to review the 2014 Draft Buildable Land Report. If possible, please include this letter as an appendix to the Final 2014 Buildable Land Report.

Sincerely,

David Swindale
Director, Planning and Development Services

Copy: Planning Commission
Jessica Gwilt, Assistant Planner

futurewise
Building communities
Protecting the land

June 16, 2014

Mr. Dan Cardwell
Pierce County Planning and Land Services
2401 S. 35th St. Suite #2
Tacoma, Washington 98409

Dear Mr. Cardwell:

Subject: Comments on the Draft Pierce County Buildable Lands Report (June 30 2014)
Sent via email to: dcardwe@co.pierce.wa.us

Thank you for the opportunity to comment on the Draft Pierce County Buildable Lands Report. Futurewise is working throughout Washington State to create livable communities, protect our working farmlands, forests, and waterways, and ensure a better quality of life for present and future generations. We work with communities to implement effective land use planning and policies that prevent waste and stop sprawl, provide efficient transportation choices, create affordable housing and strong local businesses, and ensure healthy natural systems. We are creating a better quality of life in Washington State together. We have members across Washington State including Pierce County.

We very much appreciate and support the updated Draft Pierce County Buildable Lands Report. We very much appreciate the hard work of Pierce County staff and the staff of the cities that complied data and helped with the analysis and the report. We believe that the methodology of the report is well thought out. We have also concluded that the data, overall, is of high quality. We believe the results accurately reflect the availability of vacant and re-developable land for housing and jobs in Pierce County although because it excludes certain lands, such as vacant lands adjacent to marine shorelines, it will tend to undercount capacity somewhat. We also appreciate including the Inventory Maps in Appendix A. By mapping the available lands, the public can review those lands and the maps should increase confidence in the report.

We also agree that jurisdictions with very small differences from their housing or employment targets and their capacities should not be required to undertake reasonable measures. As the Buildable Lands Report documents, capacity tends to vary over time as assumptions, building trends, and land use regulations change. However, if the jurisdiction does not undertake reasonable measures, those variances from their targets and capacities cannot be used to justify urban growth area expansions.

Thank you for considering our comments. If you require additional information please contact me at telephone 206-343-0681 and email tim@futurewise.org

816 Second Avenue, Suite 200 Seattle, WA 98104 www.futurewise.org phone 206 343 0681

Mr. Dan Cardwell, Pierce County Planning and Land Services
June 16, 2014
Page 2

Congratulations to you and the county and city staffs for a job well done!

Sincerely,



Tim Trohimovich, AICP
Director of Planning & Law

The following letter from Bonney Lake has been discussed and, since the Buildable Lands Report does not allocate targets and capacity of the unincorporated UGA affiliated with cities and towns to their respective affiliated jurisdictions, it has been determined that there will be no action taken pertaining to this request. The targets associated with the affiliated area will be transferred to the City's target after annexation takes place, not with the affiliation mentioned in the letter.

BONNEY Lake
P.O. Box 7380 • Bonney Lake, WA 98391
(253) 862-8602

June 16, 2014

Dan Cardwell
Senior Planner
Pierce County – Planning and Land Services
2401 South 35th Street
Tacoma, Washington 98409-7460

Re: Pierce County Draft Buildable Lands Report

Dear Mr. Cardwell:

This letter is to officially comment on the Bonney Lake section of Pierce County's *Draft Buildable Lands Report.* The City would first like to take this opportunity to thank you and your staff for all of the County's assistance throughout this process.

As you know, the Pierce County Council approved Ordinance 2013-59 on November 5, 2013 officially affiliating a portion of the Comprehensive Urban Growth Area (CUGA) with the City of Bonney Lake and adding the area to the Bonney Lake Urban Growth Area (BLUGA). Therefore, the City requests that both the 2030 housing and employment targets and remaining capacity be based on the expanded BLUGA, given that the County has approved the affiliation and both the City and County are in the process of updating their comprehensive plans. The City is aware that the affiliation will not become effective until October 2014; provided that the City and County ratify the Joint Planning Agreement. However, including the newly affiliated area will ensure consistency between the buildable lands report, the County's comprehensive plan, and the City's comprehensive plan as required by state law.

Again, thank you for the opportunity to comment. If you would like to discuss the City's comment in more detail, please contact the City's lead – Jason Sullivan, Senior Planner by phone at (253) 447-4355 or by email at sullivanj@ci.bonney-lake.wa.us.

Sincerely,

John P. Vodopich, AICP
Community Development Director
City of Bonney Lake

Justice & Municipal Center:
9002 Main Street East
Bonney Lake, WA 98391
Fax (253) 862-8538

Public Safety Building:
18421 Veterans Memorial Dr E
Bonney Lake, WA 98391
Fax (253) 863-2661

Public Works Center:
19306 Bonney Lake Blvd.
Bonney Lake, WA 98391
Fax (253) 826-1921

Senior Center:
19304 Bonney Lake Blvd.
Bonney Lake, WA 98391
Fax (253) 862-8538

Appendix H-2

WATER FACILITIES INVENTORY STATISTICS

Water Facilities Inventory (WFI) Statistics for 2011

7,200	Population in City Limits as of April 2011 (Jenn K.)
3,614	Households in City (FTH over 180 days/yr, Jenn K.)
1.99	Average Residents per Household (Jenn K.)
1,419	Full-time Single Family Residences
872	Full-time Residential Units (Apartments, Condos, Duplexes, etc) (Lisa)
99	Non-Residential (Hotels) (Lisa)
2,291	Full-time Residential Units on City Water System (Households)
4,559	Population Based on Full Occupancy and 1.99 per Household
302	Non-Res. Connections – Institutional, Commercial/Business, Day Care, etc. (Lisa)

Note: All numbers provided have been updated in 2011.

Breakdown:

Full-time Residential Units in the Apartments, Condos, Duplexes, etc. that are occupied more than 180 days per year:

64	Duplexes
24	Tri-plex
100	Four-plex
5	Five-plex
6	Six-plex
673	Seven-plex+
872	Units

Hotels on City Water:

84 rooms	Wesley Inn
15 rooms	Maritime Inn
99	Units

Water Facilities Inventory (WFI) Statistics for 2012

7,340	Population in City Limits as of April 2012 (Jenn K.)
3,669	Households in City (FTH over 180 days/yr, Jenn K.)
2.00	Average Residents per Household (Jenn K.)
1,419	Full-time Single Family Residences
872	Full-time Residential Units (Apartments, Condos, Duplexes, etc) (Lisa)
99	Non-Residential (Hotels) (Lisa)
2,291	Full-time Residential Units on City Water System (Households)
4,559	Population Based on Full Occupancy and 1.99 per Household
302	Non-Res. Connections – Institutional, Commercial/Business, Day Care, etc. (Lisa)

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Full-time Residential Units in the Apartments, Condos, Duplexes, etc. that are occupied more than 180 days per year:

64	Duplexes
24	Tri-plex
100	Four-plex
5	Five-plex
6	Six-plex
673	Seven-plex+
872	Units

Hotels on City Water:

84 rooms	Wesley Inn
15 rooms	Maritime Inn
99	Units

Water Facilities Inventory (WFI) Statistics for 2013

7670	Population in City Limits as of April 2012 (Jenn K.)
3853	Households in City (FTH over 180 days/yr (Jenn K.)
2	Average Residents per Household (Jenn K.)
1650	Full-time Single Family Residences (Lisa) (inside=1576/outside=74)
1181	Full-Time Residential Units (Apartments, Condos, Duplexes, etc. (Lisa)
99	Non-Residential (Hotels) (Lisa)
	Full-time Residential Units on City Water System (Households)
	Population Based on Full Occupancy and 2.0 per Household
311	Non-Res. Connections – Institutional, Commercial/Business, Day Care, etc. (Lisa) (inside=305/outside=6)

Note: All numbers provided have been updated in 2013.

Breakdown:

Full-time Residential Units in the Apartments, Condos, Duplexes, etc. that are occupied more than 180 days per year:

66	Duplexes
24	Tri-plex
100	Four-plex
5	Five-plex
6	Six-plex
980	Seven-plex +
1181	Total Units

Hotels on City Water:

84	Wesley Inn (rooms)
15	Maritime Inn (rooms)
99	Total Units

Water Facilities Inventory (WFI) Statistics for 2014

7,958	Population in City Limits as of April 2014 (Lindsey – OFM)
4,028	Households in City (FTH over 180 days/yr) (Lindsey – OFM)
1.98	Average Residents per Household (Lindsey - OFM)
1730	Full-time Single Family Residences (Lisa) (inside=1659/outside=71)
1181	Full-Time Residential Units (Apartments, Condos, Duplexes, etc. (Lisa)
99	Non-Residential (Hotels) (Lisa)
	Full-time Residential Units on City Water System (Households)
	Population Based on Full Occupancy and 2.0 per Household
345	Non-Res. Connections – Institutional, Commercial/Business, Day Care, etc. (Lisa) (inside=341/outside=4)

Note: All numbers provided have been updated in 2014.

Breakdown:

Full-time Residential Units in the Apartments, Condos, Duplexes, etc. that are occupied more than 180 days per year:

66	Duplexes
24	Tri-plex
100	Four-plex
5	Five-plex
6	Six-plex
980	Seven-plex +
1181	Total Units

Hotels on City Water:

84	Wesley Inn (rooms)
15	Maritime Inn (rooms)
99	Total Units

Water Facilities Inventory (WFI) Statistics for 2015

7,958	Population in City Limits as of April 2015 (Lindsey – OFM)
4,028	Households in City (FTH over 180 days/yr) (Lindsey – OFM)
1.98	Average Residents per Household (Lindsey - OFM)
1730	Full-time Single Family Residences (Lisa) (inside=1659/outside=71)
1181	Full-Time Residential Units (Apartments, Condos, Duplexes, etc. (Lisa)
99	Non-Residential (Hotels) (Lisa)
	Full-time Residential Units on City Water System (Households)
	Population Based on Full Occupancy and 2.0 per Household
345	Non-Res. Connections – Institutional, Commercial/Business, Day Care, etc. (Lisa) (inside=341/outside=4)

Note: All numbers provided have been updated in 2015.

Breakdown:

Full-time Residential Units in the Apartments, Condos, Duplexes, etc. that are occupied more than 180 days per year:

66	Duplexes
24	Tri-plex
100	Four-plex
5	Five-plex
6	Six-plex
980	Seven-plex +
1181	Total Units

Hotels on City Water:

84	Wesley Inn (rooms)
15	Maritime Inn (rooms)
99	Total Units

Water Facilities Inventory (WFI) Statistics for 2016

9,065	Population in City Limits as of April 2016 (OFM)
4,488	Households in City (FTH over 180 days/yr) (OFM)
2.02	Average Residents per Household (OFM)
1,875	Full-time Single Family Residences (Heather) (inside=1,804/outside=71)
1,246	Full-Time Residential Units (Apartments, Condos, Duplexes, etc.(Heather)
99	Non-Residential (Hotels) (Heather)
3,121	Full-time Residential Units on City Water System (Households)
6,273	Population Based on Full Occupancy and 2.0 per Household
353	Non-Res. Connections – Institutional, Commercial/Business, Day Care, etc. (Heather) (inside=341/outside=4)

Note: All numbers provided have been updated in 2016.

Breakdown:

Full-time Residential Units in the Apartments, Condos, Duplexes, etc. that are occupied more than 180 days per year:

		BLDGS
66	Duplexes	(33)
24	Tri-plex	(8)
100	Four-plex	(25)
5	Five-plex	(1)
6	Six-plex	(1)
1,045	Seven-plex +	(36)
1,246	Total Units	(104)

FULL TIME RESIDENTS

1,804
71
1,246
3,121
X 2.02 (9,065/4,488)
6,273

Hotels on City Water:

84	Wesley Inn (rooms)
15	Maritime Inn (rooms)
99	Total Units

April 1, 2016 Population of
Cities, Towns and Counties
Used for Allocation of Selected State Revenues
State of Washington

County Municipality	Census 2010	Estimate 2011	Estimate 2012	Estimate 2013	Estimate 2014	Estimate 2015	Estimate 2016
Pierce *continued*							
Gig Harbor	7,126	7,200	7,340	7,670	7,985	8,555	9,065
Lakewood	58,163	58,190	58,260	58,310	58,360	58,400	58,800
Milton *part*	6,137	6,140	6,150	6,345	6,350	6,375	6,625
Orting	6,746	6,770	6,790	6,930	7,065	7,290	7,535
Pacific *part*	92	85	85	85	80	70	55
Puyallup	37,022	37,240	37,620	37,980	38,670	38,950	39,850
Roy	793	795	805	805	805	805	805
Ruston	749	750	755	795	830	905	935
South Prairie	434	435	435	435	435	435	435
Steilacoom	5,985	6,000	6,015	6,040	6,060	6,115	6,170
Sumner	9,451	9,450	9,470	9,520	9,545	9,660	9,705
Tacoma	198,397	198,900	199,600	200,400	200,900	202,300	206,100
University Place	31,144	31,170	31,270	31,340	31,420	31,720	32,230
Wilkeson	477	475	485	485	485	485	490
San Juan	**15,769**	**15,900**	**15,925**	**16,000**	**16,100**	**16,180**	**16,320**
Unincorporated	13,607	13,720	13,785	13,815	13,910	13,965	14,070
Incorporated	2,162	2,180	2,140	2,185	2,190	2,215	2,250
Friday Harbor	2,162	2,180	2,140	2,185	2,190	2,215	2,250
Skagit	**116,901**	**117,400**	**117,950**	**118,600**	**119,500**	**120,620**	**122,270**
Unincorporated	48,112	48,255	48,345	48,411	48,720	49,220	49,860
Incorporated	68,789	69,145	69,605	70,189	70,780	71,400	72,410
Anacortes	15,778	15,860	15,960	16,080	16,190	16,310	16,580
Burlington	8,388	8,420	8,435	8,445	8,445	8,485	8,675
Concrete	710 *	710	715	710	720	730 *	735
Hamilton	301	300	300	304 +	305	305	305
La Conner	891	885	895	890	895	895	905
Lyman	438	440	440	440	445	445	450
Mount Vernon	31,743	31,940	32,250	32,710	33,170	33,530	33,730
Sedro-Woolley	10,540	10,590	10,610	10,610	10,610	10,700	11,030
Skamania	**11,066**	**11,150**	**11,275**	**11,300**	**11,370**	**11,430**	**11,500**
Unincorporated	8,645	8,685	8,755	8,780	8,855	8,895	8,955
Incorporated	2,421	2,465	2,520	2,520	2,515	2,535	2,545
North Bonneville	956	965	1,000	1,005	1,005	1,005	1,005
Stevenson	1,465	1,500	1,520	1,515	1,510	1,530	1,540
Snohomish	**713,335**	**717,000**	**722,900**	**730,500**	**741,000**	**757,600**	**772,860**
Unincorporated	302,292	304,435	308,445	312,500	320,335	330,260	338,995
Incorporated	411,043	412,565	414,455	418,000	420,665	427,340	433,865
Arlington	17,926	17,930	17,970	18,270	18,360	18,490	18,620
Bothell *part*	16,415	16,570	16,720	17,020	17,020	17,230	17,390
Brier	6,087	6,100	6,155	6,315	6,345	6,500	6,555
Darrington	1,347	1,345	1,345	1,350	1,350	1,350	1,350
Edmonds	39,709	39,800	39,800	39,950	39,950	40,490	40,900
Everett	103,019	103,100	103,300	104,200	104,900	105,800	108,300
Gold Bar	2,075	2,060	2,060	2,080	2,085	2,115	2,125
Granite Falls	3,364	3,370	3,380	3,385	3,390	3,390	3,395
Index	178	180	180	180	180	160	165
Lake Stevens	28,069	28,210	28,510	28,960	29,170	29,900	30,900
Lynnwood	35,836	35,860	35,900	35,960	36,030	36,420	36,590
Marysville	60,020	60,660	61,360	62,100	62,600	64,140	64,940
Mill Creek	18,244	18,370	18,450	18,600	18,780	19,760	19,900
Monroe	17,304	17,330	17,390	17,510	17,660	17,620	18,120
Mountlake Terrace	19,909	19,990	20,090	20,160	20,530	21,090	21,090

April 1 official population estimates

RCW 43.62.030 states that the Office of Financial Management (OFM) shall annually determine the April 1 populations of all cities and towns of the state. OFM population estimates for cities and towns are used in state program administration and in the allocation of selected state revenues (RCW 43.62.020). Population estimates for counties are used to allocate revenues as specified in RCW 36.13.100
and RCW 43.62.030.

April 1, 2016 press release and data products

- Press release PDF
- Population Trends PDF
- April 1, 2016 population of cities, towns, and counties used for the allocation of selected state revenues PDF | Excel
- Population change and rank Excel
- Components of change
- Housing units Excel
- Historical estimates of population and housing
- Technical information

Water Facilities Inventory (WFI) Statistics for 2017

9,560	Population in City Limits as of April 2017 (OFM)
4,665	Households in City (FTH over 180 days/yr) (OFM) *ESTIMATED HOUSING UNITS*
2.05	Average Residents per Household (OFM) *POPULATION divided by HOUSEHOLDS*
1,992	Full-time Single Family Residences (Heather) (inside=1,921/outside=71)
1,245	Full-Time Residential Units (Apartments, Condos, Duplexes, etc.-Heather)
~~99~~	~~Non-Residential (Hotels) (Heather)~~ Do not include individual units/# of businesses only-add 2 To total of non-residential connections
3,237	Full-time Residential Units on City Water System (Households)
6,636	Population Based on Full Occupancy and 2.05 per Household
365	Non-Res. Connections – Institutional, Commercial/Business, Day Care, etc. (Heather) (inside=361/outside=4)

Note: All numbers provided have been updated in 2017.
Utility count effective as of 12/31/2016

Breakdown:

Full-time Residential Units in the Apartments, Condos, Duplexes, etc. that are occupied more than 180 days per year:

66	Duplexes (33)
27	Tri-plex (8)
96	Four-plex (24)
5	Five-plex (1)
6	Six-plex (1)
1,045	Seven-plex + (36)
1,245	Total Units (103)

FULL TIME RESIDENTS

1,921
71
1,245
3,237
X 2.05
6,636

~~Hotels on City Water:~~
(Each business is considered 1 connection)

~~84~~	~~Wesley Inn (rooms)~~
~~15~~	~~Maritime Inn (rooms)~~
~~99~~	~~Total Units~~

Appendix I

CITY OF GIG HARBOR COLIFORM MONITORING PLAN

COLIFORM MONITORING PLAN

WATER SYSTEM INFORMATION

City of Gig Harbor:
3510 Grandview St
Gig Harbor, WA 98335

Water system ID: #276009
County: Pierce
Group: A
Type:Community
Owner:City of Gig Harbor

Jeff Langhelm, Public Works Director: 253-853-7630 (Office)
253-377-0553 (Cell)
Ken Andrews, Public Works
Superintendent: 253-851-8406 (Office)
253-377-9410 (Cell)
Emergency: 253-530-6888
DOH: 253-395-6776
DOH 24HR: 1-877-481-4901

WATER SYSTEM SOURCES

DOE#	Utility's Name	Zone	DOH Source	Location	GPM	Well Depth
AAF 346	City Park Well #2	1	S02	SW/SE 32 22N 02E	330	121
AAF 349	Well #3	2	S03	NE/SE 17 21N 02E	625	902
AAF 348	Harbor Heights Well #4	1	S04	NE/SW 08 21N 02E	230	438
AAF 347	North Creek Well #5	2	S05	SE/NW 02 21N 02E	500	808
AAF 351	North Creek Well #6	2	S06	SE/NW 02 21N 02E	1000	566
AAF 350	Rushmore	2	S08	SE/SE 17 21N 02E	30	222
BBK 509	Well #10*	1	S010	SW/SE 32 22N 02E	0	147
BAL 876	Well #11	3	S09	SW/SW 32 22N 02E	1000	910

*Well 10 has been drilled but has not yet been added to system.

WATER STORAGE TANKS

#	Utility's Name	Zone	Storage Volume	Diameter/Height	Year Built	Zone to Zone
1	Skansie Tank	2	1,100,000	106-2 ft / 43-0 ft	1979	2 to 1
2	Shurguard Tank	2	500,000	101-6 ft / 30-0 ft	1989	2 to 1
3	Grandview A	1	250,000	30-0 ft / 38-0 ft	1962	N/A
4	Grandview B	1	250,000	30-0 ft / 38-0 ft	1973	N/A
5	East Tank	1	250,000	52-2 ft / 16-2 ft	1973	N/A
6	North Tank	3	2,500,000	53-0 ft / 155-0 ft	2005	3 to 2
	Total		4,750,000			

WATER SYSTEMS PUMPING STATIONS

#	Utility's Name	Motor- HP	Pump GPM	Zone to Zone
1	Skanise Ave Booster Pump	60 HP 60 HP	1-2000 GPM VFD 1-200 GPM soft start	2 to 3

One Booster Station located at the Skansie tank site for fire flow to Gig Harbor North business district. 8 PRV Interties from the Zone 3 to the Zone 1, mainly for fire protection.

WATER SYSTEMS INFORMATION

Total population served:	9,854*
Total Commercial connections:	317
Total Municipal/Government/Park connections:	76
Total Residential Connections:	2,772
Total Service Connections:	3,165
	(*as of 2019)

PRESSURE ZONES

The City currently has three zones: Zone 1 (320) Zone 2 (440) and Zone 3 (450). Wells 2 and 4 are the sources for zone 1, Wells 3, 5, and 6 are the sources for zone 2, and Well 11 is the source for zone 3. If demand exceeds Wells 2 and 4 production capability, there is a Flow Control valve within the Grandview tank site that allows zone 2 to supplement zone 1. In addition, there are also 8 PRV interties throughout the distribution system which allow water to supplement the lower pressure zone should demand necessitate. The majority of our high production wells are in zone 2 giving us the ability to supply water to the other two zones through our PRV's to zone 1 or booster pump station on Skansie to zone 3, should a pump failure during peak demand occur.

SAMPLING INFORMATION

All Group A public water systems must collect samples for coliform bacteria analysis (WAC 246-290). The samples must be collected from the distribution system and the sources of supply. WAC 246-290-300 coliform monitoring requirements are based on the Revised Total Coliform Rule, the Groundwater Rule, and the Surface Water Treatment Rule.

The City of Gig Harbor is required to take 10 routine samples per month except June, July and August when 9 samples per month are required from our distribution system. In addition, we take two engineering samples from our well sources per month.

The Revised Coliform Rule requires the collection of repeat samples within 24 hours when a routine distribution system sample is unsatisfactory. The Groundwater Rule requires the collection of triggered source samples within 24 hours when a routine sample is unsatisfactory if all or part of the water supply comes from the groundwater source. One sample must be collected from the same sampling site as the original coliform presence, plus a sample must be taken from each of the three repeat sites as identified in this plan. The original routine sampling

site and the three associated repeat sampling sites constitute a Sampling Site Group. Repeat sample sites were selected based on the following criteria: 1) within 5 active service connections downstream from original sample location, 2) within 5 active service connections upstream from original sample location, and 3) within 5 service connections upstream or downstream from the original routine sample location.

In addition to Sampling Site Group, a triggered source sample must be collected from each groundwater source in use when an unsatisfactory routine sample was collected. The source must be collected prior to any treatment.

The month following one or more samples with a coliform presence requires a minimum of five Follow-Up samples. The City of Gig Harbor will sample from all routine sample locations following a coliform presence sample.

In addition to the above routine samples the City of Gig Harbor also samples for Chloride's from Wells S03, S04, S05 and S09 the first week of April and the third week of August. Nitrate samples from Wells S02, S03, S04, S05, S06 and S09 the third week of May.

Four Disinfection By-Products samples are required annually from the system. These samples are taken the first week of August from sample sites: 9502 Peacock, 7520 Soundview, 5321 25th, and Borgen Blvd & 51st.

SAMPLING INTERVALS

The City of Gig Harbor has installed 17 sampling stations throughout the city distribution system with the highest concentration in areas of homes and business. We divided our sample sites into two routes per month, 1st week includes 6 sample stations and the 3rd week includes 4 sample stations and 2 well sources. The 17 sample stations and 6 well sources are rotated in these routes during the year. Samples are taken the first and third week of every month on Wednesday or Thursday and are collected by qualified personnel. Samples are dropped off at City Hall collection point between 11:30AM and 1:00 PM.

SAMPLING STATUS

Positive Sample: The laboratory notifies the water division as soon as the results indicate a positive sample.

Negative Sample: the Water Division confirms all sample results as negative on or before Friday at 3:30 PM each week samples are taken.

Sample Results: Sample results are by the laboratory to the State Department of Health and the City Water Division.

ANALYSIS

Performed By: Water Management Laboratories Inc.
1515 80th St E., Tacoma, WA, 98404
253-531-3121 Lab ID: C546

Alternate Lab: Spectra Laboratory
2221 Ross Way, Tacoma 98421
(253) 272-4850

SAMPLE SITES

Sample sites:

1. 6633 McDonald
2. 3207 Harborview Drive
3. 8222 Stinson
4. 11534 Arrowhead
5. 9701 54th Ave NW

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6. 5103 23rd Ave NW
7. 6714 Cascade
8. 7712 Chinook
9. 8828 N. Harborview Drive

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10. 9504 Peacock
11. 7404 Elk Creek
12. 7520 Soundview
13. 3405 Shyleen St
14. Borgen Blvd. & 51st Avenue

These Water samples alternate throughout the year as the samples taken first week of the month.

15. 9820 Ringold
16. 6507 Wollochet
17. 10182 Sentinel Loop

Well site samples:

18. S02 - 3303 Vernhardson
19. S03 - 8966 SR16 Hwy. W.
20. S04 - 3488 Grandview St.
21. S05 - 4700 North Creek Lane
22. S06 - 4700 North Creek Lane
23. S08 - 5202 25th Ave. Ct. NW
24. S09- 8698 Skansie Ave

COLIFORM MONITORING PLAN

ROUTE #1 – JANUARY – 1ST WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Hos Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group				
	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	15	9820 Ringold Sample station	
	Repeat	15-A	9820 Ringold Meter S.S.	
	Repeat	15-B	9819 Harborview Place Meter S.S.	
	Repeat	15-C	9816 Woodworth Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN

ROUTE #2 – JANUARY – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	20	Well S04 Well Head	
	Engineering	24	Well S09 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – FEBRUARY – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7718 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	16	6506 Wollochet Sample station	
	Repeat	16-A	6504 Wollochet Meter S.S.	
	Repeat	16-B	6508 Wollochet Meter S.S.	
	Repeat	16-C	6626 Wagner Way Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN
ROUTE #2 – FEBRUARY – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – MARCH – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	17	10182 Sentinel Loop Sample station	
	Repeat	17-A	10204 Sentinel Loop Meter S.S.	
	Repeat	17-B	10170 Sentinel Loop Meter S.S.	
	Repeat	17-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN
ROUTE #2 – MARCH – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7718 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	18	Well S02 Well Head	
	Engineering	19	Well S03 Well Head	
	Iron	18	Well S02 Well Head	
	Manganese	18,19	Well S02, S03 Well Head	

Note: Chlorides 1st of next month samples.

COLIFORM MONITORING PLAN

ROUTE #1 – APRIL – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06,S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06,S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	15	9820 Ringold	Sample station	
	Repeat	15-A	9820 Ringold	Meter S.S.	
	Repeat	15-B	9819 Harborview Place	Meter S.S.	
	Repeat	15-C	9816 Woodworth	Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09		
	Chloride	19	S03	Well Head	
	Chloride	20	S04	Well Head	
	Chloride	21	S05	Well Head	
	Chloride	22	S06	Well Head	
	Chloride	24	S09	Well Head	

COLIFORM MONITORING PLAN

ROUTE #2 – APRIL – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	20	Well SO4 Well Head	
	Engineering	24	Well S09 Well Head	

COLIFORM MONITORING PLAN
ROUTE #1 – MAY – 1st WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7718 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave.	Sample station
	Repeat	14-A	5151 Borgen Blvd.	Meter S.S.
	Repeat	14-B	5160 Borgen Blvd.	Meter S.S.
	Repeat	14-C	5050 Borgen Blvd.	Meter S.S.
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	16	6506 Wollochet	Sample station
	Repeat	16-A	6504 Wollochet	Meter S.S.
	Repeat	16-B	6508 Wollochet	Meter S.S.
	Repeat	16-C	6626 Wagner Way	Meter S.S.
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN
ROUTE #2 – MAY – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	
	Nitrates	18	Well S02 Well Head	
	Nitrates	19	Well S03 Well Head	

	Nitrates	20	Well S04 Well Head	
	Nitrates	21	Well S05 Well Head	
	Nitrates	22	Well S06 Well Head	
	Nitrates	24	Well S09 Well Head	

COLIFORM MONITORING PLAN
ROUTE #1 – JUNE – 1st WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06,S09	

Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	17	10182 Sentinel Loop Sample station	
	Repeat	17-A	10204 Sentinel Loop Meter S.S.	
	Repeat	17-B	10170 Sentinel Loop Meter S.S.	
	Repeat	17-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN

ROUTE #2 – JUNE – 3rd WEEK

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

CITY OF GIG HARBOR ID #276009

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7718 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	18	Well S02 Well Head	
	Engineering	19	Well S03 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – JULY – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Rountine	15	9820 Ringold Sample station	
	Repeat	15-A	9820 Ringold Meter S.S.	
	Repeat	15-B	9819 Harborview Place Meter S.S.	
	Repeat	15-C	9816 Woodworth Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN
ROUTE #2 – JULY – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	20	Well S04 Well Head	
	Engineering	24	Well S09 Well Head	

Note: Call for sample kits for disinfection byproducts annual sampling for 1st week of August. Chlorides 1st of next month samples. VOC samples 2nd week of August

COLIFORM MONITORING PLAN
ROUTE #1 – AUGUST – 1st WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7718 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	16	6506 Wollochet Sample station	
	Repeat	16-A	6504 Wollochet Meter S.S.	
	Repeat	16-B	6508 Wollochet Meter S.S.	
	Repeat	16-C	6626 Wagner Way Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Disinfection By-Products	10	9504 Peacock Sample station	
	Disinfection By-Products	12	7520 Soundview Sample station	
	Disinfection By-Products	13	5321 25th Sample station	
	Disinfection By-Products	14	Borgen Blvd.& 51st Sample station	
	Herbicides/ Pest	22	S06 Well Head	

COLIFORM MONITORING PLAN
ROUTE #2 – AUGUST – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	
	Chloride	19	Well S03 Well Head	
	Chloride	20	Well S04 Well Head	
	Chloride	21	Well S05 Well Head	

	Chloride	22	Well S06	Well Head	
	Chloride	24	Well S09	Well Head	
	VOC	18	S09	Well Head	

COLIFORM MONITORING PLAN
ROUTE #1 – SEPTEMBER – 1st WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	22	10182 Sentinel Loop Sample station	
	Repeat	22-A	10204 Sentinel Loop Meter S.S.	
	Repeat	22-B	10170 Sentinel Loop Meter S.S.	
	Repeat	22-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Gross Alpha	19,20, 21, 22	S03, S04, S05, S06 Well Head	
	Radium 228	19,20, 21, 22	S03, S04, S05, S06 Well Head	
	Iron	22	S06 Well Head	
	Manganese	21, 22	S05, S06 Well Head	

COLIFORM MONITORING PLAN
ROUTE #2 – SEPTEMBER – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7718 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	17	Well S03 Well Head	
	Engineering	18	Well S02 Well Head	

COLIFORM MONITORING PLAN
ROUTE #1 – OCTOBER – 1st WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	15	9820 Ringold Sample station	
	Repeat	15-A	9820 Ringold Meter S.S.	
	Repeat	15-B	9819 Harborview Place Meter S.S.	
	Repeat	15-C	9816 Woodworth Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN

ROUTE #2 – OCTOBER – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	20	Well S04 Well Head	
	Engineering	24	Well S09 Well Head	

COLIFORM MONITORING PLAN
ROUTE #1 – NOVEMBER – 1st WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7718 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	16	6506 Wollochet Sample station	
	Repeat	16-A	6504 Wollochet Meter S.S.	
	Repeat	16-B	6508 Wollochet Meter S.S.	
	Repeat	16-C	6626 Wagner Way Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN
ROUTE #2 – NOVEMBER – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	4	11534 Arrowhead Sample station	
	Repeat	4-A	11532 Arrowhead Meter S.S.	
	Repeat	4-B	11548 Arrowhead Meter S.S.	
	Repeat	4-C	11526 Arrowhead Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	

COLIFORM MONITORING PLAN
ROUTE #1 – DECEMBER – 1st WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	17	10182 Sentinel Loop Sample station	
	Repeat	17-A	10204 Sentinel Loop Meter S.S.	
	Repeat	17-B	10170 Sentinel Loop Meter S.S.	
	Repeat	17-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	

COLIFORM MONITORING PLAN
ROUTE #2 – DECEMBER – 3rd WEEK
CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220

Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S09

Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
Sample Site Group	Routine	13	3405 Shyleen St Sample station	
	Repeat	13-A	3415 Shyleen St Meter S.S.	
	Repeat	13-B	7227 McDonald Meter S.S.	
	Repeat	13-C	3406 Shyleen St Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S09	
	Engineering	18	Well S02 Well Head	
	Engineering	19	Well S03 Well Head	

Legend
Service Area
Gig Harbor Retail Water Service Area
Wholesale Service Area
Peacock Hill System
Shore Acres Water Co.
Urban Growth Boundary
City Limits
Roads
Waterway
Feet
0 1,500 3,000
Data Sources: Gig Harbor
Disclaimer: Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.

Puget Sound
PEACOCK HILL SYSTEM
GIG HARBOR SPORTSMENS CLUB
WASHINGTON STATE CORRECTIONS-WOMEN
GIG HARBOR WATER DEPT
SHORE ACRES WATER CO.
Borgen Blvd
Burnham Dr NW
Peacock Hill Ave NW
Crescent Valley Dr
96th St NW
54th Ave NW
Rosedale St NW
Harborview Dr
Stinson Ave
Pioneer Way
72nd St NW
36th Ave
Hunt St NW
Wollochet Dr NW
56th St NW
Point Fosdick Dr NW
Murphy Dr NW
E Bay Dr NW
38th Ave NW
35th St NW

Sample Site #4
11534 Arrowhead Dr
Sample Site #20
51st Ave/Borgen Blvd
Sample Site #15
9820 Ringold St
Sample Site #17
10182 Sentinel Lp
Sample Site #10
9502 Peacock Hill
Sample Site #5
9703 54th Ave
Sample Site #18
Well S02
Sample Site #24
Well S09
Sample Site #9
8828
N.Harborview
Sample Site #3
8222 Stinson
Sample Site #21
Well S05
Sample Site #2
3207 Harborview Dr
Sample Site #8
7712 Chinook Ave
Sample Site #22
Well S06
Sample Site #12
7520 Soundview Dr
Sample Site #11
7404 Elk Creek Ln
Sample Site #7
6714 Cascade Ave
Sample Site #1
6633 Mcdonald Ave
Sample Site #13
3405 Shyleen St
Sample Site #19
Well S03
Sample Site #16
6507 Wollochet Dr
Sample Site #23
Well S08
Sample Site #20
Well S04
Sample Site #6
5103 23rd Ave NW

COLIFORM MONITORING PLAN

ROUTE #1 – JANUARY – 1ST WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Hos Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group				
	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	15	9820 Ringold Sample station	
	Repeat	15-A	9820 Ringold Meter S.S.	
	Repeat	15-B	9819 Harborview Place Meter S.S.	
	Repeat	15-C	9816 Woodworth Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – JANUARY – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	20	Well S04 Well Head	
	Engineering	23	Well S08 Well Head	
	Engineering	24	Well S09 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – FEBRUARY – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	16	6506 Wollochet Sample station	
	Repeat	16-A	6504 Wollochet Meter S.S.	
	Repeat	16-B	6508 Wollochet Meter S.S.	
	Repeat	16-C	6626 Wagner Way Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – FEBRUARY – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 9,110 Service Connections: 2,856
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – MARCH – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	17	10182 Sentinel Loop Sample station	
	Repeat	17-A	10204 Sentinel Loop Meter S.S.	
	Repeat	17-B	10170 Sentinel Loop Meter S.S.	
	Repeat	17-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – MARCH – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	18	Well S02 Well Head	
	Engineering	19	Well S03 Well Head	
Note: Chlorides 1st of next month samples.				

COLIFORM MONITORING PLAN

ROUTE #1 – APRIL – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site	Routine	15	9820 Ringold Sample station	
	Repeat	15-A	9820 Ringold Meter S.S.	

Group	Repeat	15-B	9819 Harborview Place Meter S.S.	
	Repeat	15-C	9816 Woodworth Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Chloride	19	S03 Well Head	
	Chloride	20	S04 Well Head	
	Chloride	21	S05 Well Head	
	Chloride	22	S06 Well Head	
	Chloride	24	S09 Well Head	

COLIFORM MONITORING PLAN

ROUTE #2 – APRIL – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	20	Well SO4 Well Head	
	Engineering	23	Well S08 Well Head	
	Engineering	24	Well S09 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – MAY – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	16	6506 Wollochet Sample station	
	Repeat	16-A	6504 Wollochet Meter S.S.	
	Repeat	16-B	6508 Wollochet Meter S.S.	
	Repeat	16-C	6626 Wagner Way Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – MAY – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	
	Nitrates	18	Well S02 Well Head	
	Nitrates	19	Well S03 Well Head	
	Nitrates	20	Well S04 Well Head	
	Nitrates	21	Well S05 Well Head	
	Nitrates	22	Well S06 Well Head	
	Nitrates	23	Well S08 Well Head	
	Nitrates	24	Well S09 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – JUNE – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Engineering	17	10182 Sentinel Loop Sample station	
	Repeat	17-A	10204 Sentinel Loop Meter S.S.	
	Repeat	17-B	10170 Sentinel Loop Meter S.S.	
	Repeat	17-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – JUNE – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	18	Well S02 Well Head	
	Engineering	19	Well S03 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – JULY – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

Sample Site Group	Engineering	15	9820 Ringold Sample station	
	Repeat	15-A	9820 Ringold Meter S.S.	
	Repeat	15-B	9819 Harborview Place Meter S.S.	
	Repeat	15-C	9816 Woodworth Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – JULY – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	20	Well S04 Well Head	
	Engineering	23	Well S08 Well Head	
	Engineering	24	Well S09 Well Head	
Note: Call for sample kits for disinfection byproducts annual sampling for 1st week of August. Chlorides 1st of next month samples. VOC samples 2nd week of August				

COLIFORM MONITORING PLAN

ROUTE #1 – AUGUST – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Engineering	16	6506 Wollochet Sample station	
	Repeat	16-A	6504 Wollochet Meter S.S.	
	Repeat	16-B	6508 Wollochet Meter S.S.	
	Repeat	16-C	6626 Wagner Way Meter S.S.	

	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Disinfection By-Products	10	9504 Peacock Sample station	
	Disinfection By-Products	12	7520 Soundview Sample station	
	Disinfection By-Products	13	5321 25th Sample station	
	Disinfection By-Products	14	Borgen Blvd.& 51st Sample station	

COLIFORM MONITORING PLAN

ROUTE #2 – AUGUST – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	
	Chloride	19	Well S03 Well Head	
	Chloride	20	Well S04 Well Head	
	Chloride	21	Well S05 Well Head	
	Chloride	24	Well S09 Well Head	
	VOC	18	S02 Well Head	
	VOC	19	S03 Well Head	
	VOC	20	S04 Well Head	
	VOC	21	S05 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – SEPTEMBER – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	22	10182 Sentinel Loop Sample station	
	Repeat	22-A	10204 Sentinel Loop Meter S.S.	
	Repeat	22-B	10170 Sentinel Loop Meter S.S.	
	Repeat	22-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – SEPTEMBER – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	17	Well S03 Well Head	
	Engineering	18	Well S02 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – OCTOBER – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site	Routine	15	9820 Ringold Sample station	
	Repeat	15-A	9820 Ringold Meter S.S.	

Group	Repeat	15-B	9819 Harborview Place Meter S.S.	
	Repeat	15-C	9816 Woodworth Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – OCTOBER – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	20	Well S04 Well Head	
	Engineering	23	Well S08 Well Head	
	Engineering	24	Well S09 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – NOVEMBER – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	5	9701 54th Ave. NW Sample station	
	Repeat	5-A	9601 Bujacich Rd. NW 1st test cock on RPBA	
	Repeat	5-B	9703 54th Ave. NW Sample Station	
	Repeat	5-C	9511 Bujacich Rd. NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	16	6506 Wollochet Sample station	
	Repeat	16-A	6504 Wollochet Meter S.S.	
	Repeat	16-B	6508 Wollochet Meter S.S.	
	Repeat	16-C	6626 Wagner Way Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – NOVEMBER – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	1	6633 McDonald Sample Station	
	Repeat	1-A	3317 Emerald Lane Meter S.S.	
	Repeat	1-B	6777 Port Lane Meter S.S.	
	Repeat	1-C	3225 Soundview Ct. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	2	3207 Harborview Dr. Sample Station	
	Repeat	2-A	3207 Harborview Dr. Meter S.S.	
	Repeat	2-B	3202 Harborview Dr. Meter S.S.	
	Repeat	2-C	3117 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	3	8222 Stinson Sample station	
	Repeat	3-A	8209 Stinson Meter S.S.	
	Repeat	3-B	8118 Stinson Meter S.S.	
	Repeat	3-C	3802 Harborview Dr. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	4	9010 Prentice Sample station	
	Repeat	4-A	8919 Prentice Meter S.S.	
	Repeat	4-B	9015 Prentice Meter S.S.	
	Repeat	4-C	8917 Prentice Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	21	Well S05 Well Head	
	Engineering	22	Well S06 Well Head	

COLIFORM MONITORING PLAN

ROUTE #1 – DECEMBER – 1st WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	6	5103 23rd. Ave NW Sample Station	
	Repeat	6-A	2211 50th St. Ct. NW Meter S.S.	
	Repeat	6-B	2302 50th St. Ct. NW Meter S.S.	
	Repeat	6-C	5102 23rd Ave NW Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	7	6714 Cascade Ave. Sample station	
	Repeat	7-A	6711 Cascade Ave. Meter S.S.	
	Repeat	7-B	6722 Cascade Ave. Meter S.S.	
	Repeat	7-C	6818 Cascade Ave. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	8	7712 Chinook Sample station	
	Repeat	8-A	7706 Chinook Meter S.S.	
	Repeat	8-B	7816 Chinook Meter S.S.	
	Repeat	8-C	7809 Chinook Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	9	8828 N. Harborview Sample station	
	Repeat	9-A	9009 N. Harborview Meter S.S.	
	Repeat	9-B	8827 N. Harborview Meter S.S.	
	Repeat	9-C	8913 N. Harborview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	14	Borgen Blvd.& 51st Ave. Sample station	
	Repeat	14-A	5151 Borgen Blvd. Meter S.S.	
	Repeat	14-B	5160 Borgen Blvd. Meter S.S.	
	Repeat	14-C	5050 Borgen Blvd. Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	17	10182 Sentinel Loop Sample station	
	Repeat	17-A	10204 Sentinel Loop Meter S.S.	
	Repeat	17-B	10170 Sentinel Loop Meter S.S.	
	Repeat	17-C	10197 Sentinel Loop Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	

COLIFORM MONITORING PLAN

ROUTE #2 – DECEMBER – 3rd WEEK

CITY OF GIG HARBOR ID #276009

Peak Population Served: 6,273 Service Connections: 3,220
Source: Wells – DOH Source Number S02, S03, S04, S05, S06, S08
Treatment: None Storage: Above Ground Storage Capacity: 4,750,000 gal

SAMPLING INFORMATION				
Sampled by:		**Number of Sample Sites Needed to Represent the Distribution System: 23**		
Date / /	**Type**	**Site #**	**Location**	**Free Chlorine Residual**
Sample Site Group	Routine	10	9504 Peacock Sample station	
	Repeat	10-A	9520 Peacock Meter S.S.	
	Repeat	10-B	9416 Peacock Meter S.S.	
	Repeat	10-C	9513 Peacock Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	11	7404 Elk Creek Sample station	
	Repeat	11-A	7416 Elk Creek Meter S.S.	
	Repeat	11-B	7503 Elk Creek Meter S.S.	
	Repeat	11-C	7515 Elk Creek Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	12	7520 Soundview Sample station	
	Repeat	12-A	7422 Soundview Meter S.S.	
	Repeat	12-B	7601 Soundview Meter S.S.	
	Repeat	12-C	7421 Soundview Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
Sample Site Group	Routine	13	5321 25th Sample station	
	Repeat	13-A	5401 25th Meter S.S.	
	Repeat	13-B	5315 25th Meter S.S.	
	Repeat	13-C	5308 25th Meter S.S.	
	Source	All	Well S02, S03, S04, S05, S06, S08 S09	
	Engineering	18	Well S02 Well Head	
	Engineering	19	Well S03 Well Head	

Appendix J

WATER QUALITY MONITORING SCHEDULE AND WATER QUALITY REPORT

Water Quality Monitoring Schedule

System: GIG HARBOR WATER DEPT **PWS ID: 27600 9** **Region: NORTHWEST**
Contact: Kenneth R Andrews **Group: A - Comm** **County: PIERCE**

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019
Coliform Monitoring Population	9959	9957	8348	8361	8361	9996	9976	9959	9957	9957	9965	9957
Number of Routine Samples Required	10	10	9	9	9	10	10	10	10	10	10	10

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*	
Lead and Copper	20	Jan 2018 - Dec 2020	standard - 3 year	08/07/2017	Jul 2020	
Asbestos	1	Jan 2011 - Dec 2019	standard - 9 year	05/27/2015		
Total Trihalomethane (THM)	1	Jan 2018 - Dec 2018	reduced - 1 year	08/01/2017	***Aug 2018***	
Halo-Acetic Acids (HAA5)	1	Jan 2018 - Dec 2018	reduced - 1 year	08/01/2017	***Aug 2018***	

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S02 *WELL #2-TOWN PARK (AAF346)* *Well* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	05/17/2017	***May 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	12/03/2015	
Iron	1	Jan 2017 - Dec 2019	standard - 3 year	12/03/2015	Oct 2019
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	12/03/2015	Sep 2019
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	08/27/2012	***Aug 2018***
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	11/30/2016	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	11/30/2016	

Source S03 *WELL #3-HIGH LEVEL (AAF349)* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	05/17/2017	***Aug 2018***

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S03 *WELL #3-HIGH LEVEL (AAF349)* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	09/22/2015	
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	09/22/2015	***Aug 2018***
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	08/27/2012	***Aug 2018***
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	

Source S04 *WELL #4 HARBOR HEIGHTS (AAF348)* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	03/16/2018	
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	03/16/2018	
Iron	1	Jan 2017 - Dec 2019	standard - 3 year	03/16/2018	
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	03/16/2018	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	08/27/2012	***Aug 2018***
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S04	*WELL #4 HARBOR HEIGHTS (AAF348)*	*Well*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	

Source S05	*WELL #5 NORTH CREEK (AAF347)*	*Well*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	05/17/2017	***Sep 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	09/22/2015	
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	09/22/2015	***Jun 2018***
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	08/27/2012	***Aug 2018***
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	

Source S06	*WELL #6 NORTH CREEK (AAF351)*	*Well*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	05/17/2017	***Sep 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	09/22/2015	
Iron	1	Jan 2017 - Dec 2019	standard - 3 year	09/22/2015	***Jul 2018***

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S06 *WELL #6 NORTH CREEK (AAF351)* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	09/22/2015	***Apr 2018***
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	11/30/2016	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/27/2012	Aug 2021
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/27/2012	Aug 2021
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	09/22/2015	

Source S08 *RUSHMORE (AAF350)* *Well* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	# Samples Required	Compliance Period	Frequency	Last Sample Date	Next Sample Due
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	05/17/2017	***May 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	08/23/2012	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	11/30/2016	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/19/2010	Aug 2019
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	11/30/2016	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	11/30/2016	

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2018
Submit CCR certification form to ODW (Community systems only):	10/01/2018
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2018
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Northwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding DBPs:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Carol Stuckey or Ingrid Salmon: (253) 395-6775: or carol.stuckey@doh.wa.gov or ingrid.salmon@doh.wa.gov

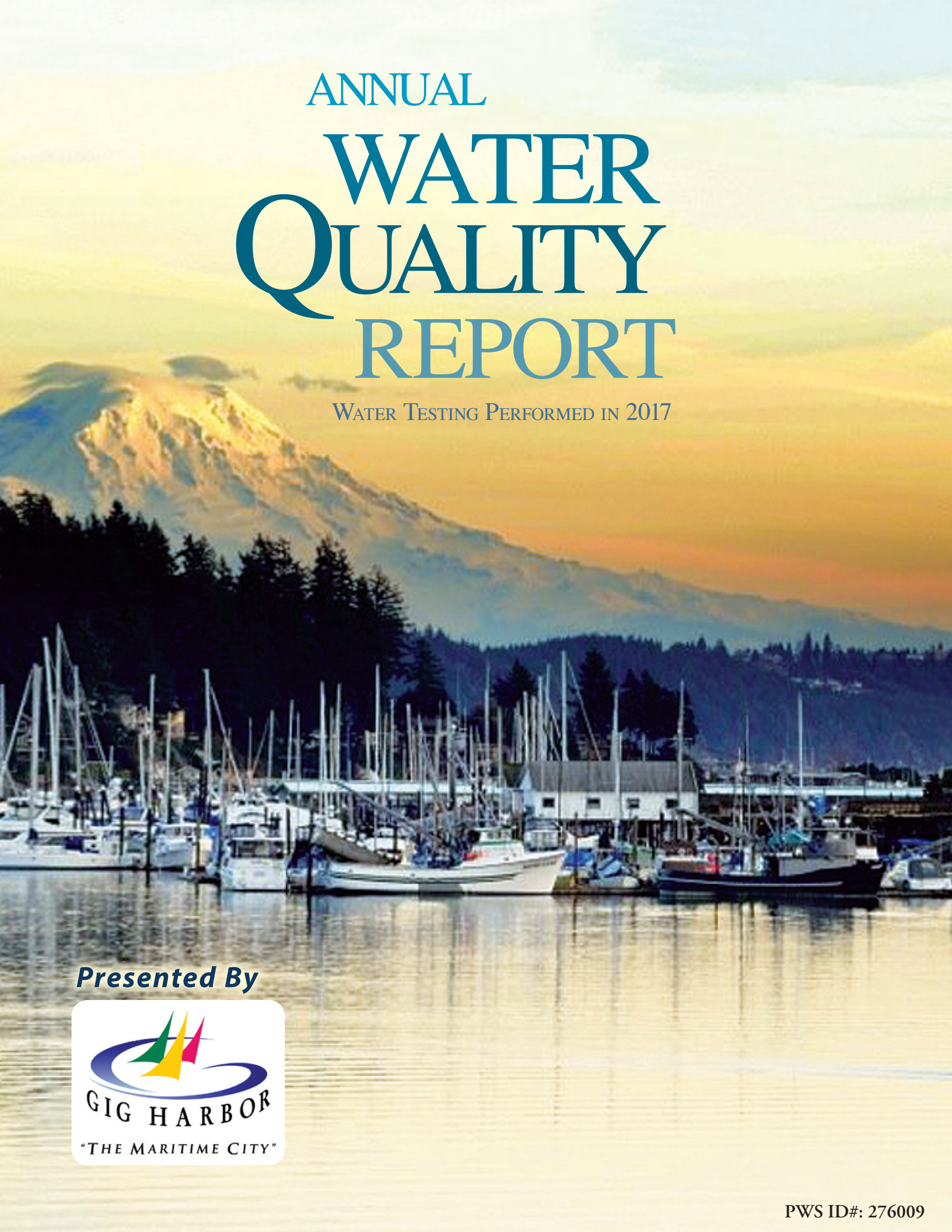
Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.



ANNUAL WATER QUALITY REPORT

WATER TESTING PERFORMED IN 2017

Presented By

GIG HARBOR

"THE MARITIME CITY"

PWS ID#: 276009

Quality First

Once again we are pleased to present our annual water quality report. As in years past, we are committed to delivering the best-quality drinking water possible. To that end, we remain vigilant in meeting the challenges of new regulations, source water protection, water conservation, and community outreach and education while continuing to serve the needs of all of our water users. Thank you for allowing us the opportunity to serve you and your family.

We encourage you to share your thoughts with us on the information contained in this report. After all, well-informed customers are our best allies.

Where Does My Water Come From?

The City of Gig Harbor Water customers are fortunate because we enjoy high-quality water supplied from a series of underground aquifers. This means that the water you consume is pumped from a series of wells throughout the City to your home or business through our system of pipes.

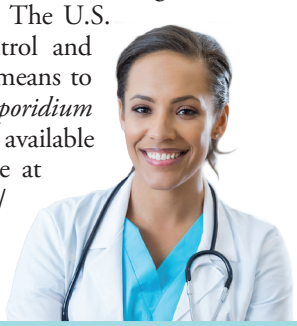
We are pleased to report that your water meets or exceeds all health-related standards for quality and safety, according to the State of Washington Department of Health.

The Federal Safe Drinking Water Act (SDWA) divides drinking water standards into two categories: Primary and Secondary. Primary standards relate to constituents that affect public health. Secondary standards relate to constituents that affect esthetic qualities such as appearance, taste, odor, and color.

The regulatory schedule for testing the Gig Harbor Water's production wells is as follows: Volatile Organic and Radionuclides, every 36 months; Microbiological, 10 times per month; Chlorides, every 6 months; Nitrate, annual sample.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as those with cancer undergoing chemotherapy, those who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791 or http://water.epa.gov/drink/hotline.



Substances That Could Be in Water

In order to ensure that tap water is safe to drink, the U.S. EPA and the Washington Department of Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration and the Washington Department of Agriculture regulations establish limits for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, in some cases, radioactive material, and substances resulting from the presence of animals or from human activity. Substances that may be present in source water include:

Microbial Contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, or wildlife;

Inorganic Contaminants, such as salts and metals, which can be naturally occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;

Pesticides and Herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and may also come from gas stations, urban stormwater runoff, and septic systems;

Radioactive Contaminants, which can be naturally occurring or may be the result of oil and gas production and mining activities.

For more information about contaminants and potential health effects, call the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Community Participation

The City of Gig Harbor does not hold regularly scheduled meetings on water quality, but you are encouraged to visit our Web site at www.cityofgigharbor.net for information and meeting announcements.

Source Water Assessment

A Source Water Assessment Plan (SWAP) has been completed for the City of Gig Harbor. This plan is an assessment of the delineated area around our listed sources through which contaminants, if present, could migrate and reach our source water. It also includes an inventory of potential sources of contamination within the delineated area, and a determination of the water supply's susceptibility to contamination by the identified potential sources.

According to the Source Water Assessment Plan, our water system had a susceptibility rating of "low to medium." If you would like to review the Source Water Assessment Plan, please feel free to contact our office during regular office hours.

> "Water treatment is a complex, time-consuming process."

Water System Plan

The City of Gig Harbor's Water Department is preparing a routine update to our utility planning document known as the Water System Plan. This update to the Water System Plan, which is performed every 10 years, reviews the utility's maintenance needs and anticipated impacts due to population growth in our community. The Water System Plan is reviewed by Pierce County and the Washington State Department of Health for consistency with their respective rules and regulations. There are still opportunities for you to review the Plan in its draft form and have your voice heard before it is adopted. For more information, please contact Trent Ward at (253) 853-7637 or WardT@cityofgigharbor.net, or visit the City's Web site: www.cityofgigharbor.net/232/Active-Projects.

Lead in Home Plumbing

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We are responsible for providing high-quality drinking water, but we cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/lead.

What's a Cross-connection?

Cross-connections that contaminate drinking water distribution lines are a major concern. A cross-connection is formed at any point where a drinking water line connects to equipment (boilers), systems containing chemicals (air conditioning systems, fire sprinkler systems, irrigation systems) or water sources of questionable quality. Cross-connection contamination can occur when the pressure in the equipment or system is greater than the pressure inside the drinking water line (backpressure). Contamination can also occur when the pressure in the drinking water line drops due to fairly routine occurrences (main breaks, heavy water demand) causing contaminants to be sucked out from the equipment and into the drinking water line (backsiphonage).

Outside water taps and garden hoses tend to be the most common sources of cross-connection contamination at home. The garden hose creates a hazard when submerged in a swimming pool or when attached to a chemical sprayer for weed killing. Garden hoses that are left lying on the ground may be contaminated by fertilizers, cesspools or garden chemicals. Improperly installed valves in your toilet could also be a source of cross-connection contamination.

Community water supplies are continuously jeopardized by cross-connections unless appropriate valves, known as backflow prevention devices, are installed and maintained. We have surveyed industrial, commercial, and institutional facilities in the service area to make sure that potential cross-connections are identified and eliminated or protected by a backflow preventer. We also inspect and test backflow preventers to make sure that they provide maximum protection.

For more information on backflow prevention contact the Safe Drinking Water Hotline at (800) 426-4791.

How Long Can I Store Drinking Water?

The disinfectant in drinking water will eventually dissipate even in a closed container. If that container housed bacteria prior to filling up with the tap water the bacteria may continue to grow once the disinfectant has dissipated. Some experts believe that water could be stored up to six months before needing to be replaced. Refrigeration will help slow the bacterial growth.

QUESTIONS?

For more information about this report, or for any questions relating to your drinking water, please call Ken Andrews, Superintendent, at (253) 851-8136.

What's Your Water Footprint?

You may have some understanding about your carbon footprint, but how much do you know about your water footprint? The water footprint of an individual, community, or business is defined as the total volume of freshwater that is used to produce the goods and services that are consumed by the individual or community or produced by the business. For example, 11 gallons of water are needed to irrigate and wash the fruit in one half-gallon container of orange juice. Thirty-seven gallons of water are used to grow, produce, package, and ship the beans in that morning cup of coffee. Two hundred and sixty-four gallons of water are required to produce one quart of milk, and 4,200 gallons of water are required to produce two pounds of beef.

According to the U.S. EPA, the average American uses over 180 gallons of water daily. In fact, in the developed world, one flush of a toilet uses as much water as the average person in the developing world allocates for an entire day's cooking, washing, cleaning, and drinking. The annual American per capita water footprint is about 8,000 cubic feet; twice the global per capita average. With water use increasing six-fold in the past century, our demands for freshwater are rapidly outstripping what the planet can replenish.

To check out your own water footprint, go to http://goo.gl/QMoIXT.



BY THE NUMBERS

The number of gallons of water produced daily by public water systems in the U.S. **34 BILLION**

1 MILLION The number of miles of drinking water distribution mains in the U.S.

The amount of money spent annually on maintaining the public water infrastructure in the U.S. **135 BILLION**

300 MILLION The number of Americans who receive water from a public water system.

The age in years of the world's oldest water found in a mine at a depth of nearly two miles. **2 BILLION**

151 THOUSAND The number of active public water systems in the U.S.

The number of highly trained and licensed water professionals serving in the U.S. **199 THOUSAND**

93 The number of federally regulated contaminants tested for in drinking water.

Water Conservation

You can play a role in conserving water and saving yourself money in the process by becoming conscious of the amount of water your household is using and by looking for ways to use less whenever you can. It is not hard to conserve water. Here are a few tips:

- Automatic dishwashers use 15 gallons for every cycle, regardless of how many dishes are loaded. So get a run for your money and load it to capacity.
- Turn off the tap when brushing your teeth.
- Check every faucet in your home for leaks. Just a slow drip can waste 15 to 20 gallons a day. Fix it and you can save almost 6,000 gallons per year.
- Check your toilets for leaks by putting a few drops of food coloring in the tank. Watch for a few minutes to see if the color shows up in the bowl. It is not uncommon to lose up to 100 gallons a day from an invisible toilet leak. Fix it and you save more than 30,000 gallons a year.
- Use your water meter to detect hidden leaks. Simply turn off all taps and water using appliances. Then check the meter after 15 minutes. If it moved, you have a leak.

Tap vs. Bottled

Thanks in part to aggressive marketing, the bottled water industry has successfully convinced us all that water purchased in bottles is a healthier alternative to tap water. However, according to a four-year study conducted by the Natural Resources Defense Council, bottled water is not necessarily cleaner or safer than most tap water. In fact, about 25 percent of bottled water is actually just bottled tap water (40 percent according to government estimates).

The Food and Drug Administration is responsible for regulating bottled water, but these rules allow for less rigorous testing and purity standards than those required by the U.S. EPA for community tap water. For instance, the high mineral content of some bottled waters makes them unsuitable for babies and young children. Further, the FDA completely exempts bottled water that's packaged and sold within the same state, which accounts for about 70 percent of all bottled water sold in the United States.

People spend 10,000 times more per gallon for bottled water than they typically do for tap water. If you get your recommended eight glasses a day from bottled water, you could spend up to $1,400 annually. The same amount of tap water would cost about 49 cents. Even if you installed a filter device on your tap, your annual expenditure would be far less than what you'd pay for bottled water.

For a detailed discussion on the NRDC study results, check out their Web site at https://goo.gl/Jxb6xG.

Test Results

Our water is monitored for many different kinds of substances on a very strict sampling schedule. The information in the data tables shows only those substances that were detected between January 1 and December 31, 2017. Remember that detecting a substance does not necessarily mean the water is unsafe to drink; our goal is to keep all detects below their respective maximum allowed levels. The State recommends monitoring for certain substances less often than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

REGULATED SUBSTANCES

Tap water samples were collected for lead and copper analyses from sample sites throughout the community.

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2017	1.3	1.3	0.18	0/20	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2017	15	0	8	1/20	No	Corrosion of household plumbing systems; Erosion of natural deposits

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	MCLG	AMOUNT DETECTED	RANGE LOW-HIGH	EXCEEDANCE	TYPICAL SOURCE
Iron (ppb)	2017	300	NA	540	NA	Yes	Leaching from natural deposits; Industrial wastes
Manganese (ppb)	2017	50	NA	150	NA	Yes	Leaching from natural deposits

Definitions

AL (Action Level): The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

NA: Not applicable

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

SMCL (Secondary Maximum Contaminant Level): SMCLs are established to regulate the aesthetics of drinking water like appearance, taste and odor.



ANNUAL WATER QUALITY REPORT

REPORTING YEAR 2020

Presented By

GIG HARBOR

"THE MARITIME CITY"

PWS ID#: 276009

Quality First

Once again, we are pleased to present our annual water quality report covering all testing performed between January 1 and December 31, 2020. As in years past, we are committed to delivering the best-quality drinking water possible. To that end, we remain vigilant in meeting the challenges of new regulations, source water protection, water conservation, and community outreach and education while continuing to serve the needs of all our water users.

In 2020 the Washington State Department of Health performed a sanitary survey. The survey is described as an inspection into the health of the city's water system infrastructure. The inspection results determined the city's water system is well maintained.

Well No. 3 was taken offline in October for maintenance. Degradation issues were discovered within the well casing; as a result, the city is drilling a new well on the same site and decommissioning the existing well. The new well is scheduled to be online in 2021.

Water system flushing continued in 2020 with the goal of providing the highest-quality water possible throughout our service area.

Thank you for allowing us the opportunity to serve you and your family.

Water Conservation Tips

You can play a role in conserving water and save yourself money in the process by becoming conscious of the amount of water your household is using and looking for ways to use less whenever you can. It is not hard to conserve water. Here are a few tips:

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QUESTIONS? For more information about this report, or for any questions relating to your drinking water, please call Ken Andrews, Superintendent, at (253) 851-8136.

Tip Top Tap

The most common signs that your faucet or sink is affecting the quality of your drinking water are discolored water, sink or faucet stains, a buildup of particles, unusual odors or tastes, and a reduced flow of water. The solutions to these problems may be in your hands.

Kitchen Sink and Drain

Handwashing, soap scum buildup, and the handling of raw meats and vegetables can contaminate your sink. Clogged drains can lead to unclean sinks and backed-up water in which bacteria (i.e., pink and black slime growth) can grow and contaminate the sink area and faucet, causing a rotten egg odor. Disinfect and clean the sink and drain area regularly. Also, flush regularly with hot water.

Faucets, Screens, and Aerators

Chemicals and bacteria can splash and accumulate on the faucet screen and aerator, which are located on the tip of faucets and can collect particles like sediment and minerals, resulting in a decreased flow from the faucet. Clean and disinfect the aerators or screens on a regular basis.

Check with your plumber if you find particles in the faucet screen, as they could be pieces of plastic from the hot water heater dip tube. Faucet gaskets can break down and cause black, oily slime. If you find this slime, replace the faucet gasket with a higher-quality product. White scaling or hard deposits on faucets and showerheads may be caused by hard water or water with high levels of calcium carbonate. Clean these fixtures with vinegar, or use water softening to reduce the calcium carbonate levels for the hot water system.

Water Filtration/Treatment Devices

A smell of rotten eggs can be a sign of bacteria on the filters or in the treatment system. The system can also become clogged over time, so regular filter replacement is important. (Remember to replace your refrigerator filter!)

What Causes the Pink Stain on Bathroom Fixtures?

The reddish-pink color frequently noted in bathrooms on shower stalls, tubs, tile, toilets, sinks, and toothbrush holders and on pets' water bowls is caused by the growth of the bacterium Serratia marcescens. Serratia is commonly isolated from soil, water, plants, insects, and vertebrates (including humans). The bacteria can be introduced into the house through any of the above-mentioned sources. The bathroom provides a perfect environment (moist and warm) for bacteria to thrive.

The best solution to this problem is to continually clean and dry the involved surfaces to keep them free from bacteria. Chlorine-based compounds work best, but keep in mind that abrasive cleaners may scratch fixtures, making them more susceptible to bacterial growth. Chlorine bleach can be used periodically to disinfect the toilet and help to eliminate the occurrence of the pink residue. Wiping down bathtubs and sinks with a solution that contains chlorine will also help to minimize its occurrence. Serratia will not survive in chlorinated drinking water.

Substances That Could Be in Water

In order to ensure that tap water is safe to drink, the U.S. EPA and the Department of Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration and Washington Department of Agriculture regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, in some cases radioactive material, and substances resulting from the presence of animals or from human activity. Substances that may be present in source water include:

Microbial Contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, or wildlife;

Inorganic Contaminants, such as salts and metals, which can be naturally occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;

Pesticides and Herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and may also come from gas stations, urban stormwater runoff, and septic systems;

Radioactive Contaminants, which can be naturally occurring or may be the result of oil and gas production and mining activities.

For more information about contaminants and potential health effects, call the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Community Participation

The City of Gig Harbor does not hold regularly scheduled meetings on water quality, but you are encouraged to check our website, www.cityofgigharbor.net, for information and meeting announcements.



What's a Cross-Connection?



Cross-connections that contaminate drinking water distribution lines are a major concern. A cross-connection is formed at any point where a drinking water line connects to equipment (boilers), systems containing chemicals (air conditioning systems, fire sprinkler systems, irrigation systems), or water sources of questionable quality. Cross-connection contamination can occur when the pressure in the equipment or system is greater than the pressure inside the drinking water line (back pressure). Contamination can also occur when the pressure in the drinking water line drops due to fairly routine occurrences (main breaks, heavy water demand), causing contaminants to be sucked out from the equipment and into the drinking water line (back siphonage).

Outside water taps and garden hoses tend to be the most common sources of cross-connection contamination at home. The garden hose creates a hazard when submerged in a swimming pool or attached to a chemical sprayer for weed killing. Garden hoses that are left lying on the ground may be contaminated by fertilizers, cesspools, or garden chemicals. Improperly installed valves in your toilet could also be a source of cross-connection contamination.

Community water supplies are continuously jeopardized by cross-connections unless appropriate valves, known as backflow prevention devices, are installed and maintained. We have surveyed industrial, commercial, and institutional facilities in the service area to make sure that potential cross-connections are identified and eliminated or protected by a backflow preventer. We also inspect and test backflow preventers to make sure that they provide maximum protection.

For more information on backflow prevention, contact the Safe Drinking Water Hotline at (800) 426-4791.

Water Main Flushing

Distribution mains (pipes) convey water to homes, businesses, and hydrants in your neighborhood. The water entering distribution mains is of very high quality; however, water quality can deteriorate in areas of the distribution mains over time. Water main flushing is the process of cleaning the interior of water distribution mains by sending a rapid flow of water through the mains.

Flushing maintains water quality in several ways. For example, flushing removes sediments like iron and manganese. Although iron and manganese do not pose health concerns, they can affect the taste, clarity, and color of the water. Additionally, sediments can shield microorganisms from the disinfecting power of chlorine, contributing to the growth of microorganisms within distribution mains. Flushing helps remove stale water and ensures the presence of fresh water with sufficient dissolved oxygen and disinfectant levels and an acceptable taste and smell.

> "We remain vigilant in delivering the best-quality drinking water"

During flushing operations in your neighborhood, some short-term deterioration of water quality, though uncommon, is possible. You should avoid tap water for household uses at that time. If you do use the tap, allow your cold water to run for a few minutes at full velocity before use and avoid using hot water to prevent sediment accumulation in your hot water tank.

Please contact us if you have any questions or if you would like more information on our water main flushing schedule.

Where Does My Water Come From?

The City of Gig Harbor water customers are fortunate because we enjoy high-quality water supplied from a series of underground aquifers. This means that the water you consume is pumped from a series of wells throughout the city to your home or business through our system of pipes.

We are pleased to report that your water meets or exceeds all health-related standards for quality and safety according to the Washington Department of Health.

The federal Safe Drinking Water Act (SDWA) divides drinking water standards into two categories: primary and secondary. Primary standards relate to constituents that affect public health. Secondary standards relate to constituents that affect aesthetic qualities such as appearance, taste, odor, and color.

The regulatory schedule for testing the Gig Harbor water production wells is as follows:

SUBSTANCE	TESTING SCHEDULE
Volatile Organic and Radionuclides	Every 36 months
Microbiological	10 times per month
Chlorides	Every 6 months
Nitrate	Annual sample

What type of container is best for storing water?

Consumer Reports has consistently advised that glass or BPA-free plastics such as polyethylene are the safest choices. To be on the safe side, don't use any container with markings on the recycle symbol showing "7 PC"(that's code for BPA). You could also consider using stainless steel or aluminum with BPA-free liners.

How much emergency water should I keep?

Typically, 1 gallon per person per day is recommended. For a family of four, that would be 12 gallons for 3 days. Humans can survive without food for 1 month but can only survive 1 week without water.

How long can I store drinking water?

The disinfectant in drinking water will eventually dissipate, even in a closed container. If that container housed bacteria prior to filling up with the tap water, the bacteria may continue to grow once the disinfectant has dissipated. Some experts believe that water could be stored up to six months before needing to be replaced. Refrigeration will help slow the bacterial growth.

How long does it take a water supplier to produce one glass of drinking water?

It could take up to 45 minutes to produce a single glass of drinking water.

How many community water systems are there in the U.S.?

About 53,000 public water systems across the United States process 34 billion gallons of water per day for home and commercial use. Eighty-five percent of the population is served by these systems.

Which household activity wastes the most water?

Most people would say the majority of water use comes from showering or washing dishes; however, toilet flushing is by far the largest single use of water in a home (accounting for 40% of total water use). Toilets use about 4–6 gallons per flush, so consider an ultra-low-flow (ULF) toilet, which requires only 1.5 gallons.

Table Talk

Get the most out of the Testing Results data table with this simple suggestion. In less than a minute, you will know all there is to know about your water:

> For each substance listed, compare the value in the Amount Detected column against the value in the MCL (or AL, SMCL) column. If the Amount Detected value is smaller, your water meets the health and safety standards set for the substance.

Other Table Information Worth Noting

Verify that there were no violations of the state or federal standards in the Violation column. If there was a violation, you will see a detailed description of the event in this report.

If there is an ND or a "less-than" symbol (<), that means that the substance was not detected (i.e., below the detectable limits of the testing equipment).

The Range column displays the lowest and highest sample readings. If there is an NA showing, that means only a single sample was taken to test for the substance (assuming there is a reported value in the Amount Detected column).

If there is sufficient evidence to indicate from where the substance originates, it will be listed under Typical Source.

Safeguard Your Drinking Water

Protection of drinking water is everyone's responsibility. You can help protect your community's drinking water source in several ways:

- Eliminate excess use of lawn and garden fertilizers and pesticides – they contain hazardous chemicals that can reach your drinking water source.
- Pick up after your pets.
- If you have your own septic system, properly maintain your system to reduce leaching to water sources or consider connecting to a public water system.
- Dispose of chemicals properly; take used motor oil to a recycling center.
- Volunteer in your community. Find a watershed or wellhead protection organization in your community and volunteer to help. If there are no active groups, consider starting one. Use U.S. EPA's Adopt Your Watershed to locate groups in your community.
- Organize a storm drain stenciling project with others in your neighborhood. Stencil a message next to the street drain reminding people.

Test Results

Our water is monitored for many different kinds of substances on a very strict sampling schedule, and the water we deliver must meet specific health standards. Here, we only show those substances that were detected in our water (a complete list of all our analytical results is available upon request). Remember that detecting a substance does not mean the water is unsafe to drink; our goal is to keep all detects below their respective maximum allowed levels.

The state recommends monitoring for certain substances less than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

Note: The average hardness for the City of Gig Harbor water is 59.0 mg/L.

Tap water samples were collected for lead and copper analyses from sample sites throughout the community

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH %ILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2020	1.3	1.3	0.137	0/30	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2020	15	0	4.9	0/30	No	Corrosion of household plumbing systems; Erosion of natural deposits

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	MCLG	AMOUNT DETECTED	RANGE LOW-HIGH	EXCEEDANCE	TYPICAL SOURCE
Iron (ppb)	2020	300	NA	320	NA	Yes	Leaching from natural deposits; Industrial wastes
Manganese (ppb)	2020	50	NA	91	NA	Yes	Leaching from natural deposits

Definitions

90th %ile: The levels reported for lead and copper represent the 90th percentile of the total number of sites tested. The 90th percentile is equal to or greater than 90% of our lead and copper detections.

AL (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

NA: Not applicable

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

SMCL (Secondary Maximum Contaminant Level): These standards are developed to protect aesthetic qualities of drinking water and are not health based.



Appendix K

2018 WATER QUALITY MONITORING SCHEDULE, 2017 AND 2020 WATER QUALITY REPORTS

Appendix K-1

WATER RIGHTS SELF-ASSESSMENT FORM

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 1

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – EXISTING STATUS

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		EXISTING CONSUMPTION		CURRENT WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. G2-* 01015C	Town of Gig Harbor	10/19/48	Well 1		400 gpm	238 afy (a)				
2. G2-00522C)	Town of Gig Harbor	4/5/71	Well 2 Well 10	116 afy (1)	330 gpm	336 afy 209 afy (a)				
3. G2-25078C	Town of Gig Harbor	11/15/78	Well 3	442 afy (2)	625 gpm	980 afy 538 afy (a)				
4. G2-27393C	City of Gig Harbor	8/8/88	Well 4	238 afy (3)	230 gpm					
5. G2-27794C	City of Gig Harbor	6/21/90	Well 5		500 gpm	336 afy				
6. G2-28102C	City of Gig Harbor	3/29/91	Well 6		1,000 gpm					
7. G2-29896	City of Gig Harbor	1/11/00	Well 6			896 afy				
8 .G2-*07773C	City of Gig Harbor.	9/2/65	Well 8		30 gpm	48 afy				
TOTAL	**********	*********	*********	**********	3,115	2,265	995.9 gpm	1,120.1 afy	2,119 gpm	1,144.9 afy

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		EXISTING CONSUMPTION THROUGH INTERTIE		CURRENT INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1. G2-XXXXXX (4)	City of Gig Harbor	5/25/11	Yes	1,000	1,000
2. G2-29937A	City of Gig Harbor	8/30/00	No	1,000	1,000
3.					

Note: (a) means additive/primary.

1) Well 10 is an additional well source to Well 2 (G2-00522C), but was not placed on line until 2010, thus its Qi production is not included in above table. Future update will show full use of 230 gpm (Qi).. Well 2 non-additive Qi of 116 is supplemental/non-additive to existing rights.
2) Well 3 non-additive Qa of 442 afy is supplemental to existing rights.
3) Well 4's non-additive Qa of 238 afy is non-additive/supplemental to additive Qa of Well 1 (G2-01015C). The Qi assigned to Well 4 (230 gpm) is additive and independent of Well 1 additive Qi.
4) Well No. 11 application is for 1,000 gpm and 1,000 A-ft/yr both non-additive to existing rights.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 2

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 6 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (6-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. G2-*01015C	Town of Gig Harbor	10/19/48	Well 1		400 gpm	238 afy (a)				
2. G2-00522C	Town of Gig Harbor	4/3/71	Well 2 Well 10	116 afy (1)	330 gpm	336 afy 209 afy (a)				
3. G2-25078C	Town of Gig Harbor	11/15/78	Well 3	442 afy (2)	625 gpm	980 afy 538 afy (a)				
4. G2-27393C	City of Gig Harbor	8/8/88	Well 4	238 afy (3)	230 gpm					
5. G2-27794C	City of Gig Harbor	6/21/90	Well 5		500 gpm	336 afy				
6. G2-28192C	City of Gig Harbor	3/29/91	Well 6		1,000 gpm					
7 G2-29896	City of Gig Harbor	1/11/00	Well 6			896 afy				
8. G2-*07773C	City of Gig Harbor	9/2/65	Well 8		30 gpm	48 afy				
TOTAL	**********	********	********	**********	3,115 gpm	2,265 afy	2,287 gpm	1,517 afy	828 gpm	748 afy

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested

2. G2-29937A	City of Gig Harbor	8/30/00		1,000	1,000

Note: (a) means additive/primary.

1) Well 10 is an additional well source to Well 2 (G2-00522C), but was not placed on line until 2010, thus its Qi production is not included in above table. Future update will show full use of 230 gpm (Qi).. Well 2 non-additive Qi of 116 is supplemental/non-additiveto existing rights.
2) Well 3 non-additive Qa of 442 afy is supplemental to existing rights.
3) Well 4's non-additive Qa of 238 afy is non-additive/supplemental to additive Qa of Well 1 (G2-01015C). The Qi assigned to Well 4 (230 gpm) is additive and independent of Well 1 additive Qi.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 3

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 20 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME/ NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (20-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. G2-*01015C	Town of Gig Harbor	10/19/48	Well 1		400 gpm	238 afy (a)				
2. G2-00522C	Town of Gig Harbor	4/3/71	Well 2 Well 10	116 afy (1)	330 gpm	336 afy 209 afy (a)				
3. G2-25078C	Town of Gig Harbor	11/15/78	Well 3	442 afy (2)	625 gpm	980 afy 538 afy (a)				
4. G2-27393C	City of Gig Harbor	8/8/88	Well 4	238 afy (3)	230 gpm					
5. G2-27794C	City of Gig Harbor	6/21/90	Well 5		500 gpm	336 afy				
6. G2-28192C	City of Gig Harbor	3/29/91	Well 6		1,000 gpm					
7 G2-29896	City of Gig Harbor	1/11/00	Well 6			896 afy				
8. G2-*07773C	City of Gig Harbor	9/2/65	Well 8		30 gpm	48 afy				
TOTAL	**********	********	********	**********	3,115 gpm	2,265 afy	2,502 gpm	1,658 afy	613 gpm	607 afy

INTERTIE NAME/ IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1.							
2.							
3.							
4.							
TOTAL	**********						

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested

2. G2-29937A	City of Gig Harbor	8/30/00		1,000	1,000

Note: (a) means additive/primary.

1) Well 10 is an additional well source to Well 2 (G2-00522C), but was not placed on line until 2010, thus its Qi production is not included in above table. Future update will show full use of 230 gpm (Qi).. Well 2 non-additive Qi of 116 is supplemental/non-additive to existing rights.
2) Well 3 non-additive Qa of 442 afy is supplemental to existing rights.
3) Well 4's non-additive Qa of 238 afy is non-additive/supplemental to additive Qa of Well 1 (G2-01015C). The Qi assigned to Well 4 (230 gpm) is additive and independent of Well 1 additive Qi.

Appendix K-2

CERTIFICATES OF WATER RIGHTS

Well 1

30°

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Appli. 1015
Cert. 590-A

Date Nov. 30, 1951

Record by Pete Sylte

Source Driller's Record

Location: State of WASHINGTON

County Pierce

Area

Map

Lots 19 & 20 Adams Add. to Town of Gig Harbor.

NE¼ NW¼ sec. 6 T. 21 N., R. 2E W.

DIAGRAM OF SECTION

Drilling Co. Pete Sylte

Address Tacoma, Wash.

Method of Drilling Date - 19

Owner Town of Gig Harbor

Address Gig Harbor, Wash.

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Top soil	3	3
	Sand	2½	5½
	Gravel	1 3/4	6'3"
	Gray Clay	3"	6½
	Compacted sand & gravel	4'3"	10'9"
	Clay	3"	11
	Gravel	3"	11'3"
	Compacted sand & gravel	3'6"	14'9"
	Gray clay	3"	15'
	Large stones compacted with sand & gravel	2	17'
	Compacted sand & gravel	2	19'
	Yellow clay	2	21'
	Compacted sand	7	28
	Gravel	6"	28'6"
	Compacted sand	9½	38
	Blue clay	4	42

Turn up (over

Sheet of sheets

WELL LOG.—Continued No_____/_____

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Depth forward	———	
	Compacted sand & gravel	1	43
	Dirty redish clay	4	47
	Compacted sand & gravel	2	49
	Hardpan	9	58
	Gravel & clay	4	62
	Hardpan	11	73
	Gravel & sand - water	2	75
	Hardpan	7	82
	Gravel	1	83
	Hardpan	9	92
	Mud & sand	9	101
	Hardpan	17	118
	Muddy sand & gravel	10	128
	Coarse sand	1	129
	Muddy sand & gravel	19	148
	Sand, gravel & muddy clay	13	161
	Packed sand with small amt. clay	11	172
	Hard silt	22	194
	Hardpan	19	213
	Hard silt	17	230
	Hardpan	30	260
	Cemented gravel	3	263
	Gravel	2	265
	Clay	15	280
	Hardpan coarse sand	5	285
	Fine sand with small amt.	3	288
	Hardpan	33	321
	Fine sand	1	322
	Hard silt, sand, some gravel	24	346
	Fine sand	12	358
	Hard packed sand	10	368
	Cemented gravel	7	375
	Pump Test:		
	Dim: 375' x 18" Elev. 60' Temp: 50°		
	SWL: 31' (Perf. 260-265') 3-2/61		
	DD:		
	Yield: 340 g.p.m.		
	Casing: 18" casing drilled to 83'. 10" inner casing set to 265'. 18" casing withdrawn to 73'. After gravel packing 10" casing perforated 73' to 83'		

S.F. 7448-46 REMINGTON INC-10 20 30-34

G. P. No. 730—1-49—1M. 8047.

CERTIFICATE RECORD No. 2 PAGE No. 590-A

STATE OF WASHINGTON, COUNTY OF Pierce

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY That TOWN OF GIG HARBOR, WASHINGTON

of ..., has made proof, to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the ground waters of a well located within Lots 19 and 20 of Adams Addition to the Town of Gig Harbor, Washington.

for the purpose of municipal supply under Ground Water Permit No. 226 issued by the State Supervisor of Hydraulics, and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume 2 at page 590-A; that the right hereby confirmed dates from October 18, 1948; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 400 gallons per minute; 238 acre-feet per year.

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

The Town of Gig Harbor, Pierce County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1949.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 21st day of April, 1951.

ENGINEERING DATA
O.K. MW

Thos J Birkhead
State Supervisor of Hydraulics

REPORT OF FINDINGS ON GROUND WATER Appli. 1015

NAME The Town of Gig Harbor

TYPE OF WORKS: well Date Of Examination 12-28-48

Dimensions: 18" x 120' Progress of Works started

QUANTITY ~~xxxxxxxx~~
Applied for: 400 g.p.m. acre feet per year

LOCATION Lot 19 and 20 of Adams Addition, Gig Harbor

USE: Municipal water supply

Irrigation- acreage: Present Planned Feasible

Municipal: Population 1700 as of 1973

Industrial:

Time Pump Will be Operated: daily

Other Water Rights of Applicant: none

Proximity to existing works, springs or streams:

H. R. Thurston N 300'

Water Bearing Zone:

RECOMMENDATIONS

Approved for 400 g.p.m. 238 acre-feet per year, subject to existing water rights.(1 acre-foot = 325,850 gallons)

The amount of water to be used by 1,700 people is based on each person using 200 gallons a day during the 3 warmer months and 100 gallons a day during the 9 cooler months. Two hundred and thirty-eight acre-feet will be produced annually at this rate.

Signed this 4th day of January, 1949

FBR

FRED B. ROBERTS
Ground Water Geologist

WELL 2
AAF 346

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG No. A-6570

Date 1-29-63, 19

Record by

Source

Location: State of WASHINGTON

County Pierce

Area

Map

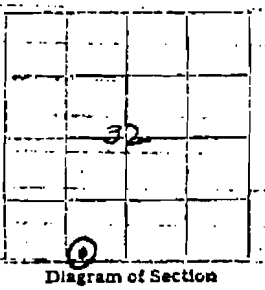


Diagram of Section

SE ¼ SW ¼ sec. 32 T. 22N., R. 2 E.

Drilling Co. Harbor Pump and Drilling Co., Inc.

Address Route 4, Box 4117, Gig Harbor, Wash.

Method of Drilling cable Date Sept. 10, 19 62

Owner Town of Gig Harbor

Address P. O. Box 145, Gig Harbor, Washington

Land surface, datum ft. above / below

Correlation	Material	Thickness (feet)	Depth (feet)
	Sand and gravel, hardpan	0	18
	Blue clay	18	30
	Sand, gravel and water	30	48
	Blue clay with layers of sand	48	73
	Medium sand to coarse gravel - water-bearing	73	84
	Mixed sand and gravel	84	90
	Hardpacked sand and gravel with water	90	99
	Large loose gravel & water	99	109
	Brown peat, clay & vegetation	109	111
	Water-bearing coarse sand & pea gravel	111	115
	Coarse sand & pea gravel with larger gravel - water-bearing	115	121

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up (over) Sheet of sheets

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

WELL LOG.—Continued No...../.....

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Depth forward	———	
	New well - test well - municipal		
	Casing: welded		
	10 in diam from 0 to 116 ft 7 in. - gage 280		
	Screens: Johnson Everdur		
	8 in diam, slot size 90, set from 116 to 121 ft		
	Water levels: Flowing - water controlled by cap with valve.		
	Well tests: Yield 425 gpm with 76 ft drawdown after 46 hrs.		
	Artesian flow 20 gpm - Date Sept., 1962		
	Temp. 50°		
	Diam. of well 10 in. - Depth drilled 121 ft		
	Depth of completed well 121 ft		

S. F. No. 7449—OS—6-61—2M.

City of Gig Harbor
3105 Judson Street
Gig Harbor, Washington 98335

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Gig Harbor
3105 Judson Street
Gig Harbor, Washington 98335

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 5, 1971	11759	G2-00522	G2-00522

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	TRIBUTARY OF (IF SURFACE WATERS)
Well 2	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	330	325 (partially supplemental)

QUANTITY/TYPE OF USE/PERIOD OF USE

209 Acre-feet per year (Primary)	Municipal supply	Year-round, as needed
116 Acre-feet per year (Supplemental)	Municipal supply	Year-round, as needed

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M	W.R.I.A.	COUNTY
SE¼ SW¼	32	22	2E	15	Pierce

PARCEL # 02-22-32-3-018

ADDITIONAL LEGAL IS ON PAGE 2

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M	W.R.I.A.	COUNTY
N/A	N/A	N/A	N/A	15	Pierce

PARCEL # N/A

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

700 feet West and 180 feet North of the South quarter corner of Section 32.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Gig Harbor as described in their water system plan 2000, within Pierce County, Washington.

PROVISIONS

All conditions and requirements contained in reports of examination or permits previously issued apply to this certificate unless specifically noted below.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC. Water use data shall be recorded *monthly* and shall be submitted *annually* to Ecology by *January 31st of each calendar year, (or more frequently if necessary).*

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit or Certificate #, source name, annual quantity used including units, maximum rate of diversion including units, and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting.

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.100.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in Chapter 90.14 RCW.

Given under my hand and the seal of this office at Olympia, Washington, this 3rd *day of* June, *2002.*

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Tom Fitzsimmons, Director
Department of Ecology

By _____
J. Mike Harris, Section Supervisor

ENGINEERING DATA
OK AW
ECY 040-1-2 (Rev. 8-97)

EXEMPT WELL CONSOLIDATION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
APPLICATION FOR CHANGE
REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 5, 1971	11759	G2-00522	G2-00522

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
3105 Judson Street	Gig Harbor	Washington	98335

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well 2

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	330	325 (partially supplemental)

QUANTITY, TYPE OF USE, PERIOD OF USE		
209 Acre-feet per year (Primary)	Municipal supply	Year-round, as needed
116 Acre-feet per year (Supplemental)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
700 feet West and 180 feet North of the South quarter corner of Section 32.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ SW¼	32	22	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Gig Harbor as described in their water system plan 2000, within Pierce County, Washington.

DESCRIPTION OF PROPOSED WORKS

Well 2, 10-inches by 121 feet deep.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	In-use

REPORT

BACKGROUND:

On October 31, 2001 Dave Brereton, on behalf of the City of Gig Harbor, filed an *Application for Change of Water Right*, to reflect the consolidation of two exempt ground water rights with the City's existing water system, as provided for in RCW 90.44.105. The water right certificate to be affected by this consolidation is G2-00522. The place of use is located on the Gig Harbor Peninsula within Water Resource Inventory Area 15, in Pierce County.

A public notice of the proposed change was published and no protests were received.

Based on the provisions of Chapters 90.03 and 90.44, Revised Code of Washington (RCW), and my investigation, I recommend the approval of these requested consolidations, and the issuance of a superseding certificate.

INVESTIGATIONS:

In consideration of this *Application for Change* I reviewed the information provided to me by the applicant, and the Washington State Department of Health. The Department of Ecology's records of applicable hydrogeological reports and recorded water rights were also reviewed.

The intent of this *Application for Change* is to supersede certificate G2-00522 to reflect the consolidation of exempt water rights held by two private parties – Kurt Sorenson and Alan Jahns. The owners of these exempt water systems have agreed to discontinue use of their wells, properly abandon the original sources, not construct any future exempt wells on these sites, and be supplied water by the City of Gig Harbor. In both cases, the City of Gig Harbor is willing to extend service, but lacks the water right capacity needed to expand their number of connections.

Existing City of Gig Harbor Water Rights:

Water Right #	Well #	GPM	Qa (primary)	Qa (supplemental)
590-C	Well 1	400	238	
G2-00522	Well 2	330	204	116
G2-25078	Well 3	750	538	442
G2-27393	Well 4	230	0	238
G2-27794	Well 5	500	336	0
G2-28102	Well 6	1,000	0	672
6018	Well 8	30	48	
Total			1,364 a-f/y	

Water Right Certificate G2-00522 has an April 5, 1971 priority date and authorizes the withdrawal of 330 gpm, and 320 acre-feet per year – of which 204 acre-feet are primary and 116 acre-feet are supplemental to the City's water right 590 for Well 1. Well 2 is located within the SE ¼ SW ¼ of Section 32, Township 22 North, Range 2 E.W.M.

Hydrogeological Assessment

Gig Harbor's service area is located in Water Resource Inventory Area 15, on the Gig Harbor Peninsula, Pierce County, Washington.

The occurrence of ground water on the Gig Harbor Peninsula has been described in a number of publications, including Water Supply Bulletin No. 18, by Garland & Molenaar, and the Gig Harbor Peninsula Ground Water Management Plan Task 5, Hydrogeologic Evaluation Report, prepared for the Tacoma-Pierce County Health Department, describing the Ground Water Management Area (GWMA).

The peninsula is a remnant of a glacial-drift plain that is nearly surrounded by marine bodies. Three main water-bearing units have been identified, the Colvos Sands Member of the Vashon Drift, the Salmon Springs Drift, and the pre-Salmon Springs deposits.

A complex sequence of unconsolidated and partially consolidated sediments blanket the peninsula. Alternating glacial and non-glacial periods of deposition created numerous aquifers and aquitards within Pierce County. Several aquifers and aquitards have been identified within the Gig Harbor area. Principal aquifers include locally-occurring perched ground water zones, the Upper Aquifer, the Sea Level Aquifer, and at least two deep aquifer systems below the Sea Level Aquifer.

In the Gig Harbor area the Upper and Sea Level aquifers are recharged almost exclusively from percolating rainfall. This is because connections to other mainland aquifers are limited by topography, and stream flows are minimal. Water is lost from the aquifer system by discharge either to a deeper aquifer, seepage to surface water steams, or release of ground water at the seawater interface.

Sorenson Well

The first well is located on property owned by Kurt Sorenson at 9615 Burnham Drive NW. The well is exempt from formal permitting and has been in use since 1966. The well is used to provide water to a single family residence and five mobile homes.

The property's average water demand has been estimated to be 3.0 acre-feet per year. This is based on a daily demand of 400 gallons per day per residential connection, including the irrigation of up to half an acre of lawn and garden.

A well log was not available for the Sorenson Well, but it is believed to be about 120 feet deep and was equipped to produce approximately 20 gpm.

The Sorenson well is located within the NW ¼ of Section 31, Township 22 North, Range 2 East, W.M., approximately a mile-and-a-half west of Well 2.

Jahn Well

The second exempt well is owned by Alan Jahns and is located at 7308 Pioneer Way. The well was constructed in June of 1933 and has been in continuous use for domestic supply and the irrigation of several acres of orchard.

This well was hand-dug and is only 20 feet deep. It has historically produced about 10 gpm.

The Jahn well is located within the NW ¼ of Section 8, Township 21 North, Range 2 East, W.M., approximately 2 miles south of Well 2.

I recommend a water duty for this site of 2 acre-feet, based on 900 gallons per day for the homestead and an additional 1.0 acre foot for a half acre of irrigation.

Evaluation of Well 2

Well 2 is an active production well that has been in use since its construction in September of 1962, without adverse affects to the environment or neighboring wells. The well is 121 feet deep and screened between the depths of 116 to 121 feet below ground surface. No reports of adverse effects to other water rights or surface water bodies have been received.

Well 2 is located within the SE ¼ SW ¼ of Section 32, Township 22 N., Range 2 E.W.M. The City of Gig Harbor does not intend to increase the pump capacity in Well 2, and will continue to operate the well at the authorized rate of 330 gpm.

All three of the subject wells are relatively shallow, and the two private wells may be consolidated with the City's well without impairment to existing rights.

CONCLUSION AND FINDINGS:

1. The original Report of Examination prepared for this water right permit found there was water available for the appropriation. That finding is not affected by this change application.

2. The water will continue to be put to beneficial use, for domestic water supply.

3. The change is not expected to impair any existing water rights, whether junior or senior. If an impairment of junior or senior water rights should occur, such impairment would be grounds for curtailment or cessation of any withdrawal resulting from the change which causes such impairment, or the right holder could provide such mitigation as to remedy the situation.

4. The change will not be detrimental to the public interest. The change is not expected to cause any detrimental environmental affects on the natural environment. The change is also found to promote the public interest by improving system reliability and reducing the costs of infrastructure.

Pursuant to RCW 90.44.060 and RCW 90.03.290, the Department of Ecology is required to find that: (1) water is available for appropriation/change; (2) the appropriation/change is for a beneficial use; (3) the appropriation/change will not impair existing water rights; and (4) the appropriation/change will not be detrimental to the public interest.

In accordance with Chapters 90.03 and 90.44 RCW, I find that this action is not detrimental to the public's welfare and will not impair existing rights. The Department of Ecology encourages the development of public water supply systems to provide water to regional areas and developments. The extension of service from the City of Gig Harbor to these residential connections will reduce the number of private wells in the area.

RECOMMENDATIONS:

I recommend the approval of the *Application for Change* and the issuance of Superseding Certificate G2-00522 in the amount of 330 gpm, and 325 acre-feet per year, of which 116 acre-feet is supplemental to existing rights and 209 acre-feet per year is primary supply, for municipal supply.

Prior to the issuance of the final water right certificate, Gig Harbor must file a Proof of Appropriation form indicating full beneficial use of the entire allocation, and a well driller's report indicating that the exempt wells have been properly decommissioned.

This superseding certificate is subject to the following provisions:

PROVISIONS:

"This approval in no way changes the priority date secured by Sorenson and Jahns and previous owners for exempt purposes established under 90.44.050."

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC. Water use data shall be recorded *monthly* and shall be submitted *annually* to Ecology by *January 31st of each calendar year, (or more frequently if necessary).*

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

Permittee or certificate holder, and its successor(s) shall provide data on chloride concentrations for the well authorized by this permit or certificate with analysis performed by a state accredited laboratory. Accreditation information may be obtained from Ecology's Quality Assurance Program at (360) 895-4649. Sampling shall occur in April and August of each year, with a copy of the laboratory results for both sampling events submitted by January 31 of the following year, to the Department of Ecology, Southwest Regional Office, Olympia, Washington.

If pumping of the well authorized by this permit or certificate causes chloride concentrations to exceed 100 milligrams per liter, immediate action shall be required to prevent concentrations from increasing (such as reducing the instantaneous withdrawal rate (gpm) of the well). If corrective measures fail to prevent chloride concentrations from exceeding said level in the future, permittee or certificate holder shall relinquish the option to perfect additional allocated quantities regardless of the stage of development.

The Water Resources Act of 1971, Chapter 90.54 RCW specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

REPORTED BY: Jill E Walsh Date: April 8, 2002

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a superseding certificate be issued under Ground Water Application Number G2-00522, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 8th day of April, 2002.

J. Mike Harris
Water Resources Supervisor
Southwest Regional Office

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. [illegible]
Permit No. 25078

(1) **OWNER:** Name Gig Harbor, Town of Address P.O. Box 145 Gig Harbor, WA

(2) **LOCATION OF WELL:** County Pierce SE¼ NW¼ Sec. 17 T. 21 N. R. 2E W.M.
Bearing and distance from section or subdivision corner 1240'N & 680'W of Cent of Sec 17

(3) **PROPOSED USE:** Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one) #3
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 16 inches.
Drilled 907 ft. Depth of completed well 901 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 16" Diam. from 0 ft. to 902 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐ SEE ATTACHED DRWG
Manufacturer's Name Johnson
Type Stainless Steel Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level ft.
Static level 330 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom?
Yield: 200 gal./min. with 28 ft. drawdown after 72 hrs.
SEE ATTACHED GRAPH

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

SEE ATTACHED GRAPH

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 99.5 Was a chemical analysis made? Yes ☒ No ☐

OK MH>

FCV 950-1-78 3-30-79

(10) **WELL LOG:**
Formation. Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Brown Hardpan	0	30
Brown Sand & Gravel	30	73
Brown Silty Sand	73	137
Brown Sand & Gravel	137	155
Brown Sand	155	169
Brown Sand & Gravel	169	171
Gravel/Trace Brn. Sand	171	174
Brown Sand	174	205
Brown Sand w/Gray Clay mix	205	210
Brown Sand	210	229
Brown Sand & Gravel	229	239
Brown Gravely Hardpan	239	244
Gray Gravely Clay	244	256
Brown Sandy Clay	256	307
Brown Sand, small gravel-H20	307	312
Muddy Brown Sand-No Water	312	322
Brn. Fine Sand/w Gravel-H20	322	419
Blue Silt	419	450
Gray Silty Clay	450	627
Blue Silty Clay w/some Sand	627	682
Sand & Silt	682	705
Medium Sand & Some Gravel	705	726
Clay & Sand Mixture	726	729
Gravel w/some Sand	729	734
Sand & Gravel	734	736
Sand w/some Gravel	736	754
Clay Layer w/Sand & Gravel	754	754.5
Sand & Gravel	754.5	790
Gray Clay	790	806
Gravel w/Sand	806	901
Brown Clay	901	909

Work started 2-6 19 78 Completed 9-22 19 78

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

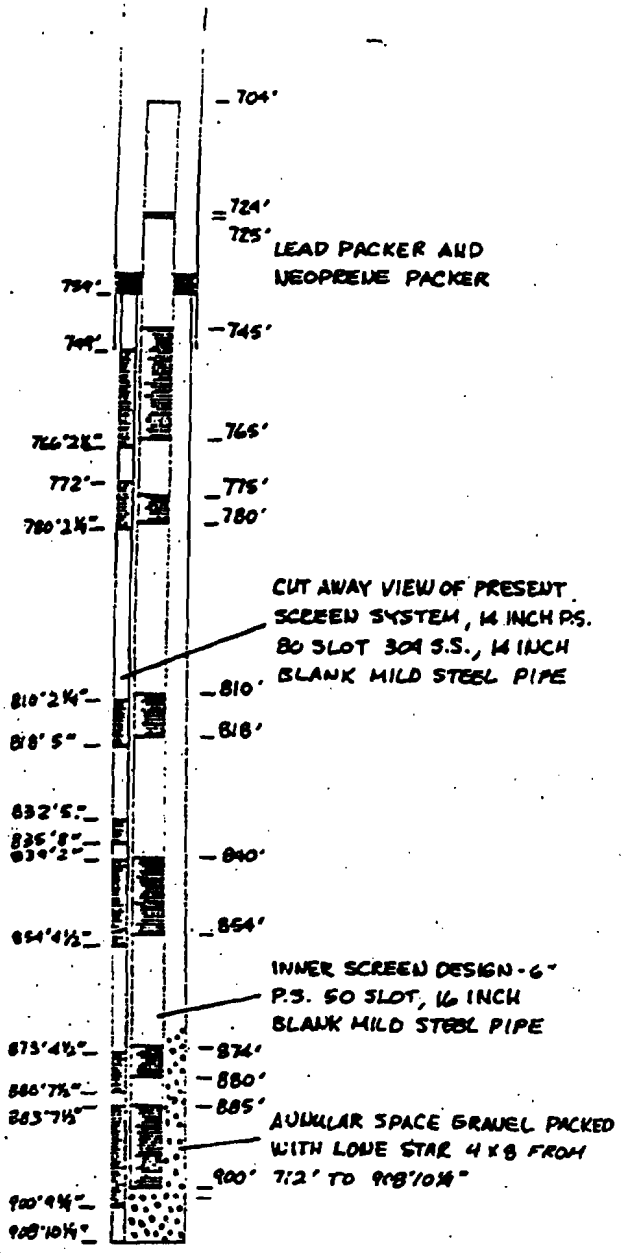
NAME Burt Well Drilling, Inc.
(Person, firm, or corporation) (Type or print)

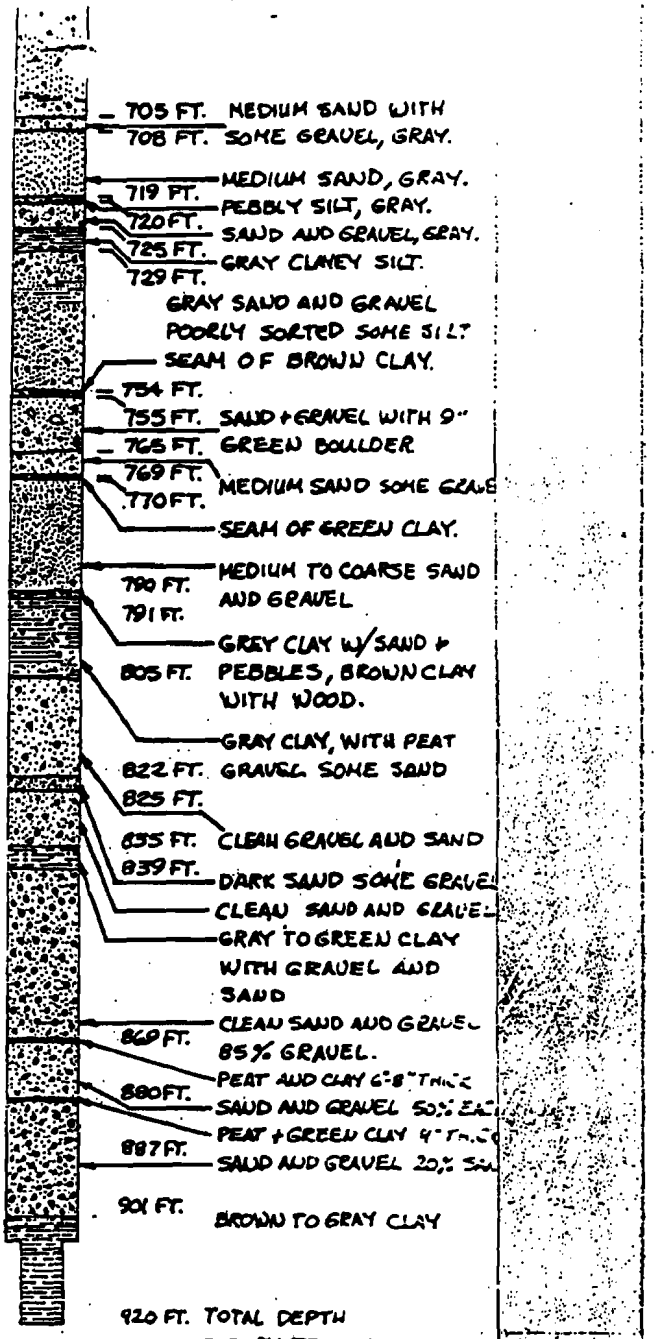
Address Rt. 1, Box 282 Poulsbo, WA 98370

[Signed] George O. Burt
(Well Driller)

License No. 0048 Date Oct. 10, 19 78

(USE ADDITIONAL SHEETS IF NECESSARY)


704'
724'
725'
LEAD PACKER AND NEOPRENE PACKER
745'
765'
775'
780'
CUT AWAY VIEW OF PRESENT SCREEN SYSTEM, 14 INCH P.S. 80 SLOT 304 S.S., 14 INCH BLANK MILD STEEL PIPE
810'
818'
840'
864'
INNER SCREEN DESIGN - 6" P.S. 50 SLOT, 16 INCH BLANK MILD STEEL PIPE
874'
880'
885'
ANNULAR SPACE GRAVEL PACKED WITH LONE STAR 4 x 8 FROM 712' TO 908'10¼"
900'


705 FT. MEDIUM SAND WITH
708 FT. SOME GRAVEL, GRAY.
MEDIUM SAND, GRAY.
719 FT. PEBBLY SILT, GRAY.
720 FT. SAND AND GRAVEL, GRAY.
725 FT. GRAY CLAYEY SILT.
729 FT.
GRAY SAND AND GRAVEL POORLY SORTED SOME SILT
SEAM OF BROWN CLAY.
754 FT.
755 FT. SAND + GRAVEL WITH 9"
765 FT. GREEN BOULDER
769 FT. MEDIUM SAND SOME GRAVEL
770 FT.
SEAM OF GREEN CLAY.
MEDIUM TO COARSE SAND
790 FT. AND GRAVEL
791 FT.
GREY CLAY W/SAND + PEBBLES, BROWN CLAY WITH WOOD.
805 FT.
GRAY CLAY, WITH PEAT
822 FT. GRAVEL SOME SAND
825 FT.
835 FT. CLEAN GRAVEL AND SAND
839 FT. DARK SAND SOME GRAVEL
CLEAN SAND AND GRAVEL
GRAY TO GREEN CLAY WITH GRAVEL AND SAND
CLEAN SAND AND GRAVEL
869 FT. 85% GRAVEL.
PEAT AND CLAY 6"-8" THICK
880 FT. SAND AND GRAVEL 50% SA
PEAT + GREEN CLAY 4" THICK
887 FT. SAND AND GRAVEL 20% SA
901 FT.
BROWN TO GRAY CLAY
920 FT. TOTAL DEPTH
ROTARY TEST HOLE

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
November 15, 1978	G 2-25078	G 2-25078 P	G 2-25078 C

NAME
TOWN OF GIG HARBOR

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 145	Gig Harbor	Washington	98335

This is to certify, that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well #3

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	625	980

QUANTITY, TYPE OF USE, PERIOD OF USE		
980 acre-feet per year	municipal supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
1240 feet north and 680 feet west from the center of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼	17	21	2 E.	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Gig Harbor.

PROVISIONS

"At such time as the Department of Ecology determines that regulation and management of the subject waters is necessary (i.e., measurement of instantaneous diversion or withdrawal and/or annual withdrawal) and in the public interest, an approved measuring device and/or meter shall be installed and maintained in accordance with Chapter 508-64 WAC."

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

Owing to the proximity of neighboring wells, the certificate holder is reminded of his responsibility towards same and advised that he may be required to regulate his withdrawal pumping rate if existing rights are injuriously affected.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia *Washington, this* 23rd *day of* October, *19* 79

WILSUR G. HALLAUER, DIRECTOR
Department of Ecology

ENGINEERING DATA
OK WD
JES

by E. W. Asselstine, Regional Manager

FOR COUNTY USE ONLY

d First Copy with
of Ecology
y — Owner's Copy
— Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

R: Name City of Gig Harbor Address P.O. Box 145, Gig Harbor, WA 98335

ATION OF WELL: County Pierce — NE ¼ SW ¼ Sec. 8 T. 21 N., R. 2E W.M.

tance from section or subdivision corner

POSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

OF WORK: Owner's number of well (if more than one).... 4
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

ENSIONS: Diameter of well 12 inches.
446 ft. Depth of completed well 443 ft.

STRUCTION DETAILS:

g installed: 12" Diam. from +1.7 ft. to 403.3 ft.
aded ☐ ____" Diam. from ____ ft. to ____ ft.
lded ☒ ____" Diam. from ____ ft. to ____ ft.

rations: Yes ☐ No ☒
e of perforator used
E of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

ens: Yes ☒ No ☐
nufacturer's Name Johnson
e Stainless W.W. Model No. 304
m 6"PS Slot size .030 from 399 ft. to 404 ft.
Diam 6"PS Slot size .030 from 409 ft. to 438 ft.

packed: Yes ☒ No ☐ Size of gravel CSS 8-12
vel placed from 380 ft. to 443 ft.

ce seal: Yes ☒ No ☐ To what depth? 21 ft.
terial used in seal Cement/Bentonite
d any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
thod of sealing strata off

P: Manufacturer's Name
Type: H.P.

R LEVELS: Land-surface elevation above mean sea level.... 296 ft.
262.85 ft. below top of well Date 6/9/88
ressure lbs. per square inch Date
rtesian water is controlled by (Cap, valve, etc.)

L TESTS: Drawdown is amount water level is lowered below static level
test made? Yes ☒ No ☐ If yes, by whom? Carr/Assoc
gal./min. with 83 ft. drawdown after 24 hrs.
" " "
" " "

(Time taken as zero when pump turned off) (water level from well top to water level) Time in Minutes

Water Level	Time	Water Level	Time	Water Level
302.48	60	287.99	420	272.22
298.23	100	284.44	1629	264.95
292.32	240	277.37	9032	262.85

test
t gal./min. with ft. drawdown after hrs.
g.p.m. Date
of water 11.5°C Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
SAND, brown	0	8
SAND, some gravel, brown	8	29
SAND, silty, brown	29	35
SAND & PEA GRAVEL, brown	35	40
SAND, silty, brown	40	53
SAND & GRAVEL, brown	53	77
SAND, silty, brown	77	109
SAND, some gravel, brown	109	155
SND & GRVL, silt-binder, gray	155	156
SILT, SAND, GRAVEL, layered	156	188
SAND, silty	188	194
SILT, SAND, GRAVEL	194	202
SAND, silty	202	208
SAND & GRAVEL, silty	208	213
SAND, silty	213	229
SND & GRVL, slt-binder, hard	229	237
SAND, silty, some gravel	237	248
CLAY with pebbles silty, gray	248	296
SAND, silty, organics, gray	296	330
SAND, fine-med, water-bearing	330	340
SILT, gray	340	347
SAND, medium, gray	347	350
SAND & GRAVEL, gray	350	351
SILT, gray, hard	351	365
SAND & GRAVEL, silty, wtr brg	365	378
SAND & GRAVEL, silt-bndr hard	378	384
CLAY, marine shells, hard	384	387
SILT, gray; colored SAND	387	394
GRVL, silty/sndy, lyrs slt/cly	394	401
SAND & GRAVEL, louse, wtr brg	401	407
GRVL, SND, CLAY, tight, gray	407	411
SAND, m-f, GRVL, gry, wtr brg	411	418
SND, m-f, tr slt/grvl wtr brg	418	440
SAND, m-f, gray, tight	440	444
SILT, gry; pyrite cement grvl	444	446

Work started 4/4 19 88 Completed 6/3 19 88

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Holt Well Drilling (Person, firm, or corporation) (Type or print)

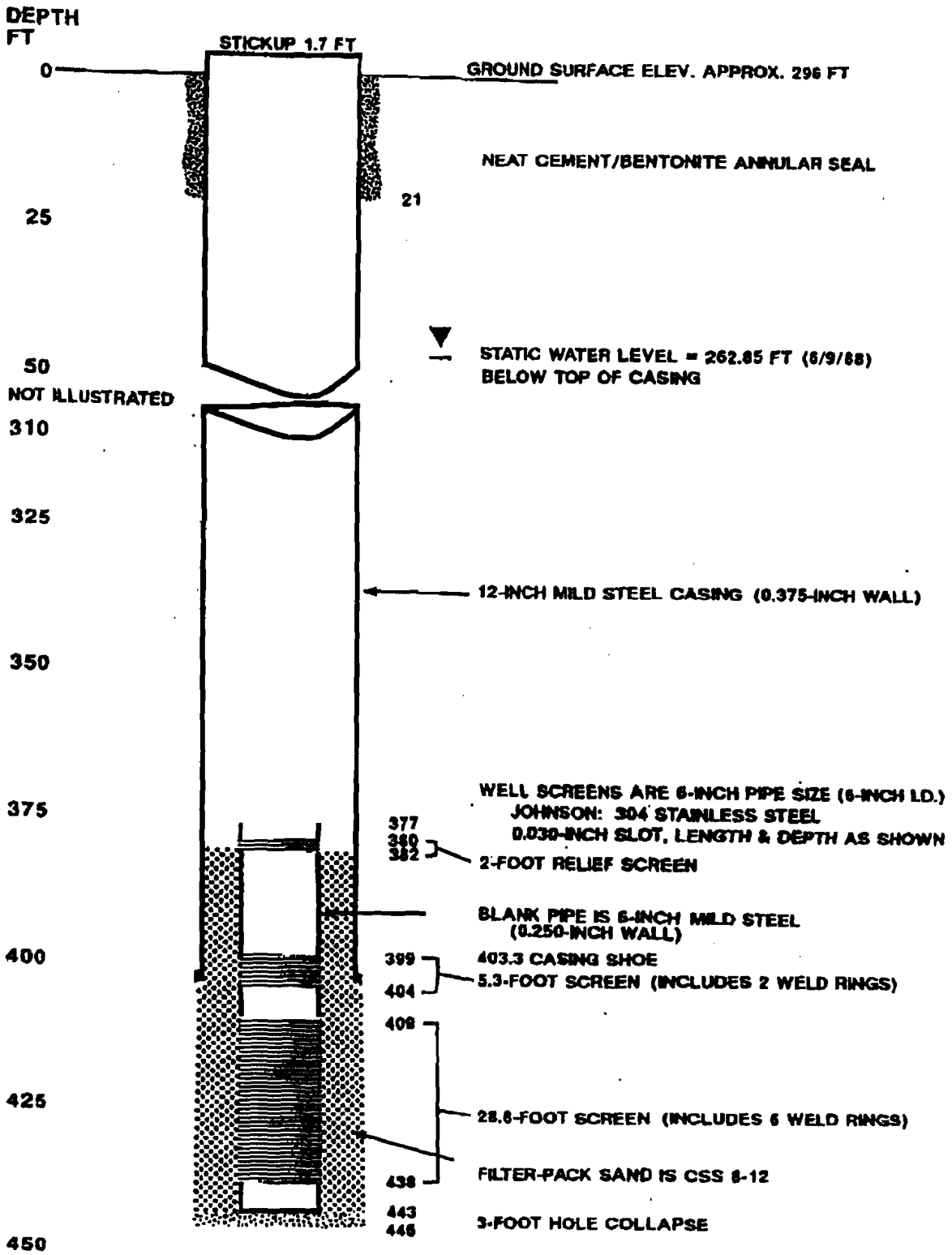
Address 10621 Todd Road East Puyallup, WA 98372

[Signed] (Well Driller)

License No. Date 19

FIGURE 2

GIG HARBOR WELL 4
CONSTRUCTION DETAILS



Carr/Associates

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ **Surface Water** (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ **Ground Water** (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 8, 1988	G2-27393	G2-27393 P	G2-27393 C

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Post Office Box 145	Gig Harbor	Washington	98335

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #4

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	230	238

QUANTITY, TYPE OF USE, PERIOD OF USE		
238 acre-feet per year	Municipal supply (supplemental to existing rights)	As needed

LOCATION OF DIVERSION/WITHDRAWAL

DESCRIPTION OF DIVERSION/WITHDRAWAL
2,500 feet north and 1,400 feet east of the southwest corner of Section 8.

LEGAL SUBDIVISION (1/4, 1/4 SEC. NUMBER)	SECTION	TOWNSHIP N.	RANGE E. OR W.	W.R.I.A.	COUNTY
NE¼SW¼	8	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	TOWNSHIP OR PLAT OR ADDITION

GENERAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Well located in the City of Gig Harbor Municipal Water Supply.

PERMIT/CERT. NUMBER G2-27393 C

PROVISIONS

he Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters f the state in the best public interest. Use of water may be subject to regulation at certain times, based on the ecessity to maintain water quantities sufficient for preservation of the natural environment.

When the chloride concentration exceeds 125 mg/L, the withdrawal rate shall be reduced or the pump setting aised to reduce the chloride level to below 125 mg/L. The well shall be monitored for chloride quarterly and ample results sent to the Department of Ecology.

An approved measuring device shall be monitored on a monthly basis and records sent to the Department of Ecology.

Water levels and quantities shall be monitored on a monthly basis and records sent to the Department of Ecology.

The right to the use of the water aforesaid is hereby confirmed is restricted to the limits of place of use herein described, except as provided in RCW 90.14.140, 90.44.100, and as follows:

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington

this 6th day of June, 19 91

Christine O. Gregoire, Director
Department of Ecology

ENGINEERING DATA
DK GD

by

FOR OFFICE USE ONLY

No. 06-07393 C

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ **Surface Water** (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ **Ground Water** (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 8, 1988	G2-27393		

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Post Office Box 145	Gig Harbor	Washington	98335

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #4

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	230	238

QUANTITY, TYPE OF USE, PERIOD OF USE		
238 acre-feet per year	Municipal supply (supplemental to existing rights)	As needed

LOCATION OF DIVERSION/WITHDRAWAL

DESCRIPTION OF DIVERSION/WITHDRAWAL
2,500 feet north and 1,400 feet east of the southwest corner of Section 8.

LOCATION (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE E. OR W.	W.R.I.A.	COUNTY
NE¼SW¼	8	21	2E	15	Pierce

RECORDED PLAT(S) OF PROPERTY

LOT	BLOCK	PLAT NAME OR SHORT FORM DESCRIPTION

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Gig Harbor Municipal Water Supply.

COPY

DESCRIPTION OF PROPOSED WORKS

A 30-hp submersible pump installed in a well with a 12-inch casing completed to a depth of 443 feet. Well discharges to a 6-inch pipe and aeration box and into two 250,000 gallon storage tanks. Stored water is transmitted to upper and lower service areas via a booster pump and 8-inch mains.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	March 1, 1991

COPY

REPORT

BACKGROUND

The priority date of this application is August 8, 1988. On that date, the City of Gig Harbor filed for a permit under the provisions of Chapters 90.03 and 90.44, Revised Code of Washington (RCW), to appropriate public ground water from a well in the amount of 230 gallons per minute (gpm) for municipal domestic supply.

A legal notice of the applicant's proposed appropriation was prepared by staff and mailed to the applicant with publication instructions. Public notice appeared in the "Peninsula Gateway" of Gig Harbor, Washington, on October 26 and November 2, 1988. No objections were received as a result of the public notice.

INVESTIGATIONS

I conducted a field examination of this project on July 26, 1989. Tom Heinecke, a city engineer, showed me the well site and pump house.

The project site is located on Grandview Street in Gig Harbor, Washington. The property surrounding the site is residential on three sides with a school to the west. The well in question is part of a municipal system.

Currently, the City of Gig Harbor has rights to a total of 1480 gpm and 980 acre-feet per year from three wells. The water right history is as follows:

Well No. 1, Water Right No. G 590-C, is for a primary supply of 400 gpm and 238 acre-feet per year.

Well No. 2, Water Right No. G 2-00522-C, is for 330 gpm and a total of 320 acre-feet per year of which 204 acre-feet is primary (new water required) and 116 acre-feet is supplemental to Water Right G 590-C.

Well No. 3, Water Right G 2-25078-C, is for 750 gpm and a total of 980 acre-feet per year of which 538 acre-feet is primary (new water required) and 442 acre-feet is supplemental to existing rights.

The City is taking Well No. 1 out of commission due to poor water quality (iron and manganese) and declining production. The City will retain the rights for a total of 980 acre-feet per year by putting Well No. 4 on line. Based on a pumping rate of 230 gpm, Well No. 4 must be pumped approximately 14 hours per day to yield the 238 acre-feet required to replace the loss of production of Well No. 1.

Well No. 4 is located approximately 1900 feet from salt water. Ground surface at the well site is approximately 250 feet above sea level. The well is screened between a depth of 443 and 399 feet, placing the bottom of the well 193 feet below sea level. The static water level in the well is 261.1 feet below the surface of the ground, which is 249 feet above sea level. When pumping the well at 200 gpm for 24 hours, the well was drawn down 322 feet, which places the pumping water level 47.3 feet below sea level.

Because of the depth and proximity of this well to salt water, I am concerned about salt water intrusion. I recommend that this well water be tested for chloride concentration once every three months. If the chloride concentration exceeds 125 mg/L, the withdrawal rate must be cut back to reduce the chloride level to below 125 mg/L.

CONCLUSIONS

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question and the appropriation as recommended is a beneficial use and will not impair existing rights or be detrimental to the public welfare.

RECOMMENDATIONS

I recommend approval of this application and issuance of a permit to allow appropriation of 230 gpm from a well for municipal domestic supply. The period of use is year-round as needed. The annual withdrawal from this well is 238 acre-feet supplemental to existing rights. The total annual withdrawal under all rights shall not exceed 980 acre-feet.

Approval is subject to the following provisions:

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Water Supply and Waste Section, Department of Social and Health Services, Mail Stop LD 11, Building 4, Olympia, Washington 98504, prior to any new construction or alterations of a public water supply.

When chloride concentration exceeds 125 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 125 mg/L. The well shall be monitored for chloride quarterly and sample results sent to the Department of Ecology.

An approved measuring device shall be installed and maintained in accordance with RCW 90.030.360 and WAC 508-64-020 through WAC 508-640-40.

Water levels and quantities shall be monitored on a monthly basis and records sent to the Department of Ecology.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

In accordance with WAC 173-160-205 wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations as appropriate. In general, wells shall be located at least 100 feet from a sewer, septic tank privy, or other source of contamination. Wells shall not be located within 1,000 feet of a solid waste landfill.

REPORTED BY: _____ DATE: _____

The statutory permit fee for this application is $20.00.

COPY

Boring Log and Construction Data for Well

Gig Harbor production Well No. 5

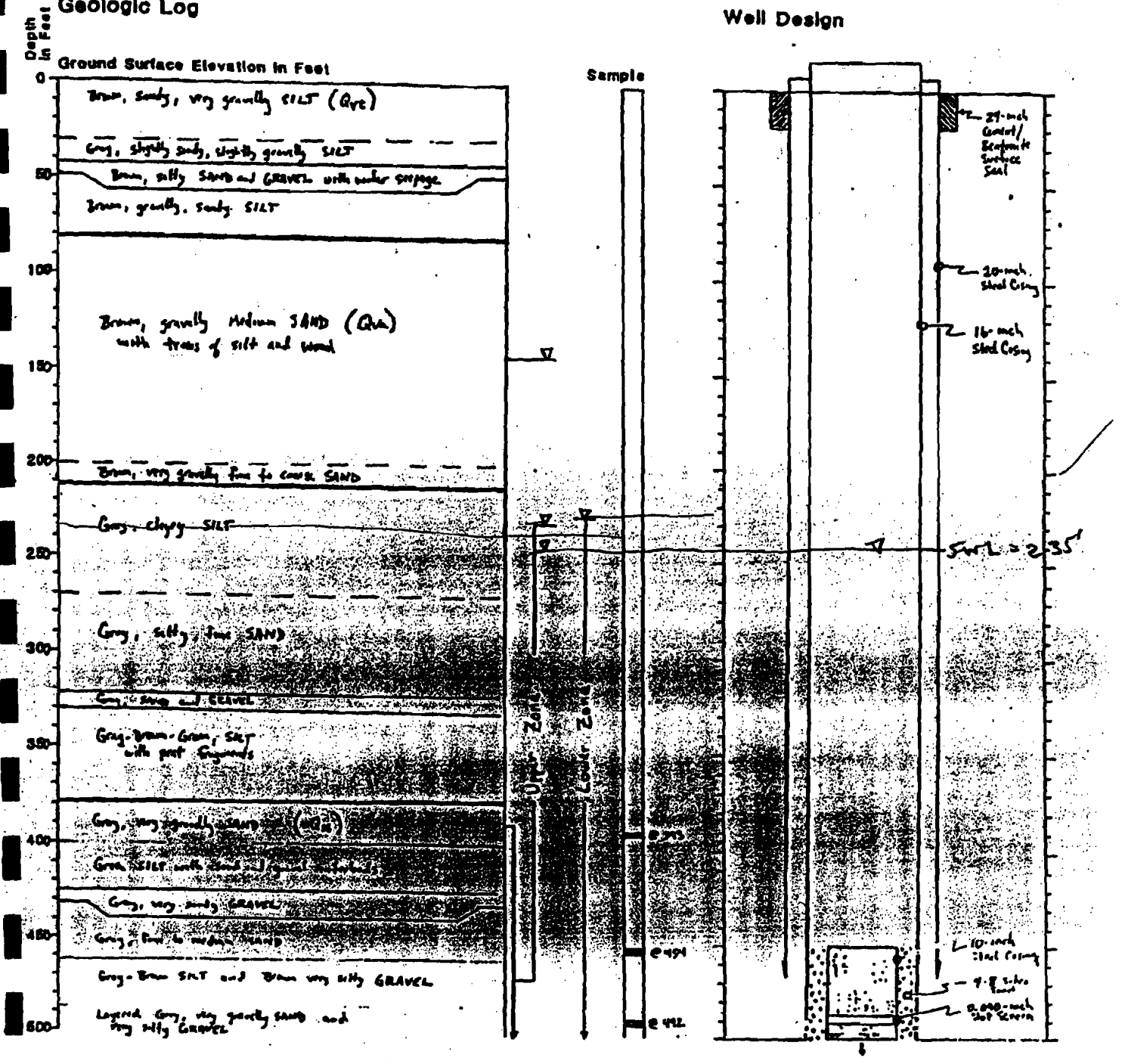


Figure 2
sheet 1 of 2

Boring Log and Construction Data for Well

Gig Harbor production Well No. 5

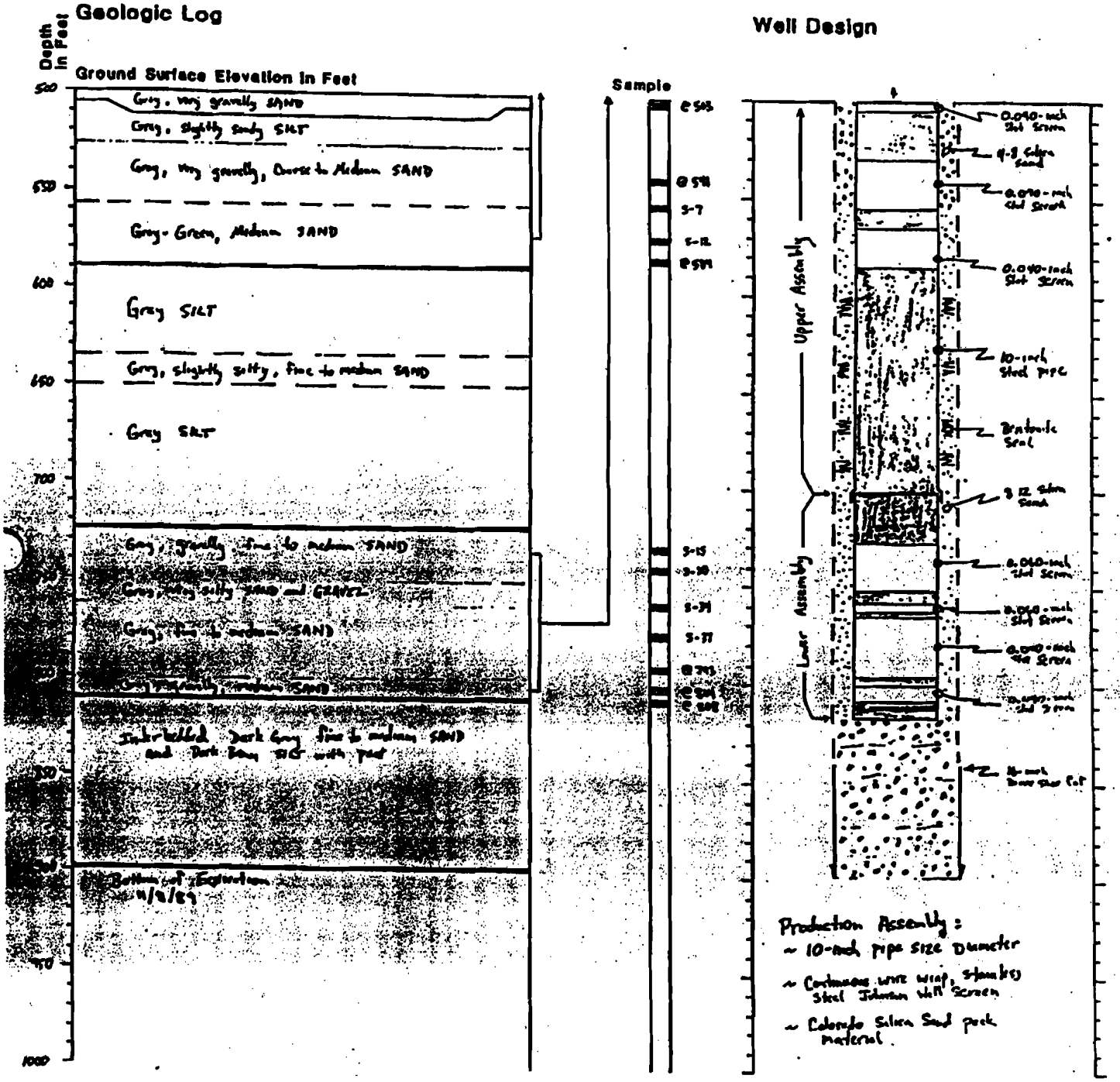


Figure 2
Sheet 2 of 2

City of Gig Harbor
3105 Judson Street
Gig Harbor, Washington 98335

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT
SUPERSEDING

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Gig Harbor
3105 Judson Street
Gig Harbor, Washington 98335

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 21, 1990	G2-27794	G2-27794	G2-27794

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	TRIBUTARY OF (IF SURFACE WATERS)
Well 5	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	500	336

QUANTITY/TYPE OF USE/PERIOD OF USE

336 Acre-feet per year Municipal supply Year-round, as needed

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	7	21	2E	15	Pierce

PARCEL # 4000050490

ADDITIONAL LEGAL IS ON PAGE 2

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
N/A	N/A	N/A	N/A	15	Pierce

PARCEL # N/A

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

1250 feet North and 550 feet West of Section 7.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Gig Harbor as described in a Department of Health approved water system plan.

PROVISIONS

All conditions and requirements contained in reports of examination or permits previously issued apply to this certificate unless specifically noted below.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, 90.44.450 and WAC 508-64-020 through –040, and WAC 508-12-030. Meter readings shall be recorded at least monthly.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the state. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all groundwaters within the state. Accordingly, the applicant shall monitor and provide an annual summary of the previous year's monthly water level data and monthly totals of water pumped for this well. The summary shall be submitted in tabular format to Ecology's Southwest Regional Office annually, during the month of

(continued on page 3)

The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.100.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in Chapter 90.14 RCW.

Given under my hand and the seal of this office at Olympia, Washington, this 18th *day of* January, *2002.*

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Tom Fitzsimmons, Director
Department of Ecology

By _____
J. Mike Harris, Section Supervisor

ENGINEERING DATA
OK
ECY 040-1-2 (Rev. 8-97)

Provisions Continued

February, or more frequently if requested by the Department.

Permittee or certificate holder, and its successor(s) shall provide data on chloride concentrations for the well authorized by this permit or certificate with analysis performed by a state accredited laboratory. Accreditation information may be obtained from Ecology's Quality Assurance Program at (360) 895-4649. Sampling shall occur in April and August of each year, with a copy of the laboratory results for both sampling events submitted by October 15 of the same year, to the Department of Ecology, Southwest Regional Office, Olympia, Washington.

If pumping of the well authorized by this permit or certificate causes chloride concentrations to exceed 100 milligrams per liter, immediate action shall be required to prevent concentrations from increasing (such as reducing the instantaneous withdrawal rate (gpm) of the well). If corrective measures fail to prevent chloride concentrations from exceeding said level in the future, permittee or certificate holder shall relinquish the option to perfect additional allocated quantities regardless of the stage of development.

DESCRIPTION OF PROPOSED WORKS

Well 5, an 817 foot X 16-inch well.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	In-use

REPORT

BACKGROUND:

On August 27, 2001 David Skinner, on behalf of the City of Gig Harbor, filed an *Application for Change of Water Right* to reflect the consolidation of an exempt ground water right with an existing water system, as provided for in RCW 90.44.105. The water right certificate to be affected by this consolidation is G2-27794. The place of use is located on the Gig Harbor Peninsula within Water Resource Inventory Area 15, in Pierce County.

A public notice of the proposed change was published and no protests were received.

Based on the provisions of Chapters 90.03 and 90.44, Revised Code of Washington (RCW), and my investigation, I recommend the denial of this requested consolidation, but the issuance of a superseding certificate to reflect other modifications as discussed below.

INVESTIGATIONS:

The subject well is located on property owned by Kurt Sorenson at 9615 Burnham Drive NW. The well is exempt from formal permitting and has been in use since 1966. The well is used to provide water to a single-family residence, and five mobile homes. The current owner wishes to discontinue the use of the well and instead be supplied water by the City of Gig Harbor. Gig Harbor is willing to extend service, but lacks the water right capacity needed to expand their number of connections. The property's current owners have agreed to decommission their well, and a replacement well will not be constructed.

The property's average water demand has been estimated to be 3.0 acre-feet per year. This is based on a daily demand of 400 gallons per day (gpd) per residential connection, including the irrigation of up to a half-acre of lawn and garden.

While I recognize the standing of the Sorenson exemption, I am unable to recommend the approval of the requested consolidation.

In order to approve a transfer, Ecology must be able to make the finding that the two wells are completed within the same body of public ground water. The Sorenson well is completed at a depth of 207 feet below ground level. The City's Well 5, however, is considerable deeper and is completed at 817 feet.

Existing City of Gig Harbor Water Rights:

Water Right #	Well #	GPM	Qa (primary)	Qa (supplemental)	Notes
590-C	Well 1	400	238		Not in use
G2-00522	Well 2	330	204	116	
G2-25078	Well 3	750	538	442	
G2-27393	Well 4	230	0	238	Replaced Well 1
G2-27794	*Well 5*	*500*	*88*	*248*	
G2-28102	Well 6	1,000	0	672	
6018	Well 8	30	48		
Total			1116 a-f/y		

Past water right permitting decisions have resulted in a need for clarification of the City of Gig Harbor's water rights. This Report of Examination should clarify the record.

My review of the City's water rights have identified the following issues:

- Previous Reports of Examination inappropriately required the relinquishment of the City of Gig Harbor's Ground Water Certificate 590-A. While the well associated with this water right has been decommissioned, the annual quantity is being produced by Well 4 under Ground Water Certificate No. G2-27393.

- Past descriptions of the City's water rights omitted Well 8, authorized under Ground Water Certificate 6018.

Water Allocation/Demand Forecasting

In order to meet future water needs, Gig Harbor applied for additional water rights in 1991. In December 1993, the City prepared and adopted an approved water system comprehensive plan in compliance with the requirements in the Growth Management Act. In that plan, the City anticipated service to a population of 6,421 by the year 2000 and 12,140 by the year 2020.

Water Right Permit G2-27794 was issued to the City of Gig Harbor in 1995 for Well 5, but instead of allocating adequate water to meet future needs as described in the City's water system plan, the Department of Ecology allocated a lesser amount of water. This permit was originally issued to meet only a 6-year planning horizon. While this approach was consistent with the Interim Guidelines established by the Departments of Ecology and Health for public water systems, it left the City of Gig Harbor woefully short of meeting their future needs.

I recommend that this certificate be superseded, and reissued in an amount that reflects the demand described in the 1993 WSP. To serve a population of 12,140 people with the current 142 gpd per capita, the City would have needed to secure rights to 1,944 acre-feet per year. As other primary water rights allocated to the City of Gig Harbor amount to 1,028 acre-feet per year, the City needed an additional 916 acre-feet. Re-allocating this water right to 336 acre-feet per year primary supply reduces this gap and increases the City's total primary allocation to 1364 acre-feet.

POW

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
APPLICATION FOR CHANGE
REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 21, 1990	G2-27794	G2-27794	G2-27794

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
3105 Judson Street	Gig Harbor	Washington	98335

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well 5

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	500	336

QUANTITY, TYPE OF USE, PERIOD OF USE		
336 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
1250 feet North and 550 feet West of Section 7.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	7	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Gig Harbor as described in a Department of Health approved water system plan.

Updated City of Gig Harbor Water Rights

Water Right #	Well #	GPM	Qa (primary)	Qa (supplemental)	Notes
590-C	Well 1	400	238		Not in use
G2-00522	Well 2	330	204	116	
G2-25078	Well 3	750	538	442	
G2-27393	Well 4	230	0	238	Replaced Well 1
G2-27794	*Well 5*	*500*	*336*	*0*	
G2-28102	Well 6	1,000	0	672	
6018	Well 8	30	48		Rushmore Well
Total			1,364 a-f/y		

Today, the City of Gig Harbor has a population approaching 7,000, and within the next 20 years anticipates serving a population of 27,000. To meet this future demand the City has filed two new applications.

Evaluation of Well 5

Well 5 is an active production well that has been in use without adverse affects for over 6 years. The well is screened between the depths of 702 to 817 feet below ground surface. No reports of adverse effects to other water rights or surface water bodies have been received. The well is capable of producing 336 acre-feet of water per year, and has produced this quantity in the past under its supplemental authorization.

The City has complied with the provisions of Certificate of Water Right G2-27794. Regular chloride levels taken from Well 5 indicate that sea water intrusion has not occurred as a result of its operation.

CONCLUSION:

In accordance with Chapters 90.03 and 90.44 RCW, I find that the Exempt Well Consolidation proposed under this Application for Change does not meet statutory required findings and is denied.

I recommend an administrative change is appropriate and a superseding Certificate of Water Right G2-27794 be issued.

RECOMMENDATIONS:

I recommend the denial of the *Application for Change (Consolidation)*. Additionally, I recommend issuance of a Superseding Certificate for G2-27794 in the amount of 500 gpm, and 336 primary acre-feet per year for municipal supply. Water is available and will continue to be put to beneficial use, and this action is not detrimental to the public's welfare and will not impair existing rights.

This superseding certificate is subject to the following provisions:

PROVISIONS:

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, 90.44.450 and WAC 508-64-020 through -040, and WAC 508-12-030. Meter readings shall be recorded at least monthly.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The Water Resources Act of 1971, Chapter 90.54 RCW specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the state. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all groundwaters within the state. Accordingly, the applicant shall monitor and provide an annual summary of the previous year's monthly water level data and monthly totals of water pumped for this well. The summary shall be submitted in tabular format to Ecology's Southwest Regional Office annually, during the month of February, or more frequently if requested by the Department.

Permittee or certificate holder and its successor(s) shall provide data on chloride concentrations for the well authorized by this permit or certificate with analysis performed by a state accredited laboratory. Accreditation information may be obtained from Ecology's Quality Assurance Program at (360) 895-4649. Sampling shall occur in April and August of each year, with a copy of the laboratory results for both sampling events submitted by October 15 of the same year, to the Department of Ecology, Southwest Regional Office, Olympia, Washington.

If pumping of the well authorized by this permit or certificate causes chloride concentrations to exceed 100 milligrams per liter, immediate action shall be required to prevent concentrations from increasing (such as reducing the instantaneous withdrawal rate (gpm) of the well). If corrective measures fail to prevent chloride concentrations from exceeding said level in the future, permittee or certificate holder shall relinquish the option to perfect additional allocated quantities regardless of the stage of development.

REPORTED BY: Neil E Wahl Date: December 31, 2001

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a Superseding Certificate be issued under Ground Water Application Number G2-27794, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 31st day of December, 2001.

J. Mike Harris
Water Resources Supervisor
Southwest Regional Office

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 21, 1990	G2-27794	G2-27794	G2-27794

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Post Box 145	Gig Harbor	Washington	98335-0145

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #5

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	500	336

QUANTITY, TYPE OF USE, PERIOD OF USE		
88 acre-feet per year (primary supply)	Municipal supply	Year-round, as needed
248 acre-feet per year (supplemental supply)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1250 feet north and 550 feet west of the center of Section 7.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼NW¼	7	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Gig Harbor.

PROVISIONS

"Given the potential for salt-water intrusion, monitoring and reporting of water levels and chloride concentration in City of Gig Harbor Wells 3, 4, 5, and 6, is required as specified below:

Chloride concentration analysis shall be performed prior to system use, then annually when the system is in use, by a accredited laboratory. The resulting data shall be submitted to the Department of Ecology, Southwest Regional Office, annually.

If the chloride concentration exceeds 100 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 100 mg/L.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the State. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all ground waters within the State. Accordingly, the applicant shall monitor and provide an annual summary of the previous year's monthly water level data and monthly totals of water pumped from these wells. The summary shall be submitted in tabular forma: to Ecology's Southwest Regional Office annually, during the month of February, or more frequently if requested by the Department.

"Future detection of elevated chloride levels may result in requirements to raise pumping levels and reduce the amount of water withdrawn."

This permit is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington,

this 5th *day of* September, *19* 95.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK GB

by Gale Thompson

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments hereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments hereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 21, 1990	G2-27794		

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	ZIP CODE
Post Box 145	Gig Harbor	Washington	98335-0145

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #5

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
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APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1250 feet north and 550 feet west of the center of Section 7.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼NW¼	7	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Gig Harbor.

DESCRIPTION OF PROPOSED WORKS

An 817' x 16" well equipped with a pump capable of withdrawing 500 gpm.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	In use

REPORT

I recommend that Application No. G 2-27794 be approved, and a permit issued to allow the withdrawal of public ground water for municipal supply to the City of Gig Harbor.

BACKGROUND:

Pursuant to Chapter 90.44 Revised Code of Washington (RCW), Ben Yazici, for the City of Gig Harbor, applied for a permit to appropriate public groundwater from a well, known as Well 5. The City requested 500 gallons per minute (gpm), to provide municipal supply to the area served by the City of Gig Harbor. The application was accepted for processing and assigned a priority date of June 21, 1990.

In addition to this application for Well 5, additional water has been requested under Application G 2-28102, for a well known as Well 6. Both applications are being evaluated concurrently.

A Temporary Permit was issued on June 29, 1990 authorizing the testing and use of this well. Testing was completed by September 19, 1990. The Temporary Permit is valid during the pendency of the application, or until revoked by the Department of Ecology.

A legal notice of the proposed appropriation was published in the "Peninsula Gateway" of Gig Harbor, Washington. No protests to the proposed appropriation were received.

The following Report of Examination documents the Department's inspections and research.

INVESTIGATIONS:

Jill Van Hulle and I conducted a field investigation of the project site. Representatives from the City were not present during the site visit, but were subsequently contacted by telephone. Other inquiry included:

- Analysis of the document entitled Design and Testing Report, Well 5, by Hart-Crowser, Inc., consultant for the City.
- Analysis of the document entitled Gig Harbor Well 5 Test Results, by Robinson & Noble, Inc., consultant for the City.
- Analysis of the document entitled Production Well 6, Construction and Testing Report, by Carr/Associates, consultant for the City.
- Review of the document entitled Gig Harbor Peninsula Ground Water Management Program, by EMCON Northwest, Inc., and Adolfson Associates, Inc., consultants for the Gig Harbor Ground Water Advisory Committee.
- Review of the document entitled City of Gig Harbor, Water Utility, General Comments, by the City of Gig Harbor.
- Review of Department of Ecology records of recorded water rights and well construction reports in the vicinity of the project site.

Location and Description of Site

Well 5 is located approximately 1 mile southwest of Gig Harbor, within the North Creek Estates development. The well, along with associated pumps, flowmeters and measuring devices, is located within a small well house. Well 6 (Application G2-28102) is located adjacent to the well house. Increasing residential use is typical of the surrounding area.

Report Continued

System Description

Well 5 was constructed by Holt Drilling, Inc., between September 8, 1989 and January 23, 1990. The well was drilled using the cable tool method to a total depth of 899 feet, and completed as follows:

Well depth:	817 feet
Casing diameter:	20 and 16 inch
Static water level:	232 feet below land surface
Site Elevation:	±240 feet above msl
Screen diameter	10 inch
Screened depth:	702-817 feet (sand packed)
Yield:	500 gpm

The City plans to use this well for an average of 10 hours per day, pumping 336 acre-feet per year (AF/Y). The well will be intertied with the existing water system to serve present and future water needs.

Aquifer Characteristics and Testing

Well 5 is completed in an aquifer consisting primarily of gravelly, fine to medium sand, with some silty layers. Two overlying aquifers were identified by Hart-Crowser during construction of Well 5, and these overlying aquifers are composed of similar materials. The consultants infer from well logs and regional geology, that the Well 5 aquifer appears to be separated from the bottom of the Tacoma Narrows by a 135-foot thick layer composed primarily of silt. They speculate that this silt layer will help restrict the migration of salt water into the aquifer.

Hart-Crowser conducted a 6-hour pump test on Well 5 on January 23, 1990. Based on the test results, they recommended a maximum pumping rate of 500 gpm, and pump placement at 450 to 460 feet below ground surface in order to maintain about 30 feet of water above the pump during pumping. They found that Well 5 is capable of a pumping rate of 500 gpm for extended periods, but also recommended that the long-term continuous rate not exceed 400 gpm until additional water-level monitoring data were collected. They recommended water-level monitoring and completion of a 24-hour pumping test.

Robinson & Noble conducted a 24-hour pumping test on September 11 and 12, 1990. The well was pumped at an average rate of 508 gpm. The water level began to stabilize after about 400 minutes of pumping, with a resultant final drawdown of 129.6 feet after 24 hours. Well 3, located approximately 8,000 feet southeast of Well 5, and completed in the same water-bearing zone as Well 5, was monitored during testing. According to the consultant, water-level measurements in Well 3 were inconclusive as to whether Well 5 caused any drawdown in Well 3. After approximately 500 minutes of pumping Well 5, the pump in Well 3 was turned on and ran for 10.8 hours at 750 gpm. This pumping of Well 3 caused approximately 2 feet of additional drawdown in Well 5. Based on this effect, the consultant speculates that Well 5 pumping may have created a similar drawdown in Well 3, but the airline, used to measure water levels in Well 3, may not have been accurate enough to measure this amount of drawdown if it occurred.

The following aquifer characteristics were calculated from the test data:

- Transmissivity was calculated as 7,500 gpd/ft from the drawdown data for both the 6-hour and 24-hour tests.
- Specific capacity was calculated as 3.9 gpm/ft of drawdown for the 24-hour pumping period.

Based on the 24-hour test data, Robinson & Noble recommended a pumping rate of 500 gpm or less, which would produce a drawdown of about 130 feet, and a pumping water level about 100 feet below sea level. They calculated that after 100 days of continuous pumping, a drawdown of 10 feet or less is expected at the Tacoma Narrows shoreline (6,500 feet distant), which would leave the aquifer's static water level above sea level at the Tacoma Narrows, thereby precluding salt-water invasion into the aquifer. However, they do not give the basis, calculations, or line of reasoning for their conclusion of drawdown at the Tacoma Narrows.

Ecology staff do not necessarily agree with the Robinson & Noble estimate of drawdown at Tacoma Narrows or their conclusion concerning the potential for salt-water intrusion. First, the salt-water body of Gig Harbor is closer than the Tacoma Narrows to Well 5 (4400 feet away), and represents a potential source for salt-water intrusion.

Furthermore, the Theis equation, which is normally used to predict future drawdown at different times and distances from a pumping well, assumes the aquifer receives no recharge during the pumping period. Because a recharge boundary was encountered during the 24-hour pumping test in this case, the Theis equation cannot be used to predict long-term drawdown.

Never the less, assuming the same aquifer values and pumping rate as in the Robinson & Noble report, our calculations using the Theis equation predict that after 100 days of pumping, 48 feet of drawdown would occur 6500 feet away (Tacoma Narrows), and 54 feet of drawdown would occur 4400 feet away (Gig Harbor). If Well 5 is pumped at 500 gpm only 12 hours per day, the Theis equation predicts 24 feet and 27 feet of drawdown, at 6500 feet and 4400 feet, respectively. Because of the recharge boundary encountered during the test, we know that the actual drawdown will be much less than these predictions, but it is difficult to estimate how much less.

Nevertheless, even if we assume that Robinson and Noble's estimate of 10 feet of drawdown at the Tacoma Narrows shoreline is reasonable, we do not necessarily agree that this would leave the aquifer's static level above sea level. Note the following water-level measurements made by Robinson & Noble (9-11-90) and Carr/Associates (12-11-91):

	Water Level Elevation (ft. MSL)	
	9-11-90	12-11-91
Well 5 (6500 feet from Tacoma Narrows shoreline)	25.1	25.3
Well 3 (2500 feet from Tacoma Narrows shoreline)	8	16.7

These water levels suggest a shoreward hydraulic gradient in the aquifer. By extrapolating this gradient eastward, the water level in the aquifer at the Tacoma Narrows shoreline (2500 feet east of Well 3) would have been -2 feet MSL on 9/11/90, and 11 feet MSL on 12/11/90. Therefore, under these assumptions, an estimated drawdown of 10 feet at Tacoma Narrows would drop the aquifer water level at the shoreline to near or below sea level, thereby increasing the potential for salt-water intrusion.

During Carr/Associates' testing of Well 6 (completed 18 feet from Well 5, and discussed under Application No. G2-28102), it was found that the water levels in all four of the City's wells (3, 4, 5, and 6) are responsive to tidal fluctuations in Puget Sound, but they observed no interference in Wells 3, 4 or 5 during the Well 6 pumping test. It should be noted that Wells 3 and 5 are completed in a deeper water-bearing zone than Well 6, and Well 4 appears to be completed in a higher water-bearing zone than Well 6. They further conclude that because recent water-quality testing has shown only background levels of chlorides (1 to 4 mg/L) in Wells 3, 5, and 6, there is no current suggestion of salt-water encroachment into the aquifers.

The fact that recent chloride analyses still show background levels is a positive sign. However, given the potential for salt-water intrusion as discussed above, monitoring and reporting of water levels and chloride concentration in Well 5 will be required as a provision of this permit. Similar monitoring and reporting will also be required for Wells 3, 4 and 6. The sparseness of wells in this deep aquifer, and the apparent separation of the aquifer from the bottom of the Tacoma Narrows by a thick silt layer, should help reduce the potential for salt-water intrusion into the aquifer. However, future detection of elevated chloride levels may result in requirements to raise pumping levels and reduce the amount of water withdrawn.

Water Right Summary and Needs Assessment

Under the Chelan Agreement of 1990, water allocations will be determined through regional water resource plans. To meet the water supply needs of the large municipal utilities, during the time that regional water resource plans are being developed, the Department of Ecology is currently issuing water rights using a 6-year planning horizon. Using information provided by Ben Yazici, it is estimated that the City could be serving 5,291 customers by the year 1999.

Report Continued

The City of Gig Harbor holds the following Water Right Certificates:

Certificates	GPM	Primary*	Supplemental**
Well #1-Cert. 590-A (abandoned)	400 gpm	238 acre-feet***	
Well #2-Cert. G2-00522	330 gpm	204 acre-feet	116 acre-feet
Well #3-Cert. G2-25078	625 gpm	538 acre-feet	442 acre-feet
Well #4-Cert. G2-27393	230 gpm		238 acre-feet (standby)
Totals	1,185 gpm	742 acre-feet	796 acre-feet

* Primary rights are issued for an additional annual quantity.

**Supplemental rights are issued to allow additional instantaneous withdrawal, but do not allocate an increased annual withdrawal.

***Well #1 has been abandoned. Because the City does not intend to replace this well, the right associated with this well is not counted in the above summary, and should be relinquished back to the state.

Additional water withdrawal has been requested under Application G2-28102, for Well 6. Well 6 is capable of a withdrawal of 1,000 gpm, and the City is requesting authorization to utilize this well for approximately 10 hours per day.

In 1999 the City of Gig Harbor could be serving a projected population of 5,291. Average per capita use has remained steady at approximately 140 gpd/c, and this figure has been used for planning purposes. The City currently holds withdrawal rights for 742 AF/Y (primary). To serve a population of 5,291, an average of 0.74 MGD or 830 AF/Y, a quantity more than that currently authorized, will be required. To meet the projected need, the City is constructing additional wells to increase pumping capacity. Additional allocations will be considered primary supply, in quantities up to 830 AF/Y. Allocations over 830 AF/Y will be authorized as supplemental supply.

The City intends to pump this well an average of 10 hours per day, producing 336 AF/Y. To meet the City's projected 6 year need of 830 AF/Y, this permit should be issued to allow a withdrawal of an additional 88 AF/Y for primary supply, and a total of 248 AF/Y for supplemental supply.

Effect on Existing Rights

The following groundwater records are on file with Department of Ecology:

- A total of 7 groundwater rights, and 1 ground water permit, have been issued within a half mile of the subject well. A total of 364 gpm and 98.5 AF/Y have been permitted. All withdrawals are from water bearing zones located above the subject withdrawal point.
- Six well logs are on file for the area within half a mile of the subject well. All wells are completed in gravel formations, above the subject well at depths ranging from 15' to 194'.

It is unlikely that withdrawals from Gig Harbor's Well 5 will interfere with the production of neighboring wells.

CONCLUSION:

In accordance with Chapter 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation is for a beneficial use, and should not impair existing rights or be detrimental to the public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit to allow appropriation of 500 gpm, 336 AF/Y, from this well to provide municipal supply to the City of Gig Harbor, as follows:

- 88 AF/Y as a primary right,
- 248 AF/Y as supplemental to existing rights.

The period of use shall be year-round, as needed.

This permit shall be subject to the following provisions:

"As Well #1 has been abandoned, and the City does not intend to replace this well, the associated right (Certificate No. 590-A) shall be relinquished back to the state, prior to certification of this right."

"Given the potential for salt-water intrusion, monitoring and reporting of water levels and chloride concentration in City of Gig Harbor Wells 3, 4, 5, and 6, is required as specified below:

Chloride concentration analysis shall be performed prior to system use, then quarterly when the system is in use, by a laboratory accredited by the Department of Ecology. The resulting data shall be submitted to the Department of Ecology, Southwest Regional Office. If the chloride concentration exceeds 100 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 100 mg/L.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the State. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all ground waters within the State. Accordingly, the applicant shall monitor and provide an annual summary of the previous year's monthly water level data and monthly totals of water pumped for this well. The summary shall be submitted in tabular format to Ecology's Southwest Regional Office annually, during the month of February, or more frequently if requested by the Department.

Future detection of elevated chloride levels may result in requirements to raise pumping levels and reduce the amount of water withdrawn."

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop LD-11, Building 3, Olympia, Washington 98504, prior to any new construction or alterations of a public water supply system.

All water wells constructed within the State shall meet the minimum standards for well construction and maintenance as provided under RCW 18.104, Washington Water Well Construction Act of 1972, and Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells.

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990 (attached), and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

REPORTED BY: _____ Date: January 21, 1994

The statutory permit fee for th' application is $20.00.

Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 065763

Water Right Permit No. G2-28102

(1) OWNER: Name City of Gig Harbor Address 3105 Judson St., P.O. Box 145, Gig Harbor, WA98

LOCATION OF WELL: County Pierce SE ¼ NW ¼ Sec 7 T21 N., R 2E W.M.

(1a) STREET ADDDRESS OF WELL (or nearest address) Intersection of 74th St. NW & 47th Ave.ct., NW GH98

(2) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☒ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) Well 6

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☒ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 16 inches. Drilled 597 feet. Depth of completed well 566 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 16 " Diam. from +1.5 ft. to 495 ft.
Welded ☒ Liner installed ☐ Threaded ☐ " Diam. from ft. to ft.
" Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Cook
Type 304 Stainless Model No. Pipe Size
Diam. 14 Slot size 0.050 from 496 ft. to 508.5 ft.
Diam. 14 Slot size 0.090 from 532.5 ft. to 561 ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 67 ft.
Material used in seal Cement/bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

PUMP: Manufacturer's Name
Type: H.P.

WATER LEVELS: Land-surface elevation above mean sea level 255 ft.
Static level 226.43 ft. below top of well Date 12/11/91
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom Carr/Assoc.
Yield: 800 gal./min. with 28.52 ft. drawdown after 24 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
0	254.95	5	239.13	60	234.87
1	240.20	10	238.07	415	231.46
2	240.10	16	237.27	1350	229.31

Date of test 12/11 to 12/12/91
Bailer test gal./min. with ft. drawdown after hrs.
Airlest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water 49 1/2° F Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Sand, silty, big rock at 12ft	0	12
Sand, silty and Gravel	12	29
Silt, gray with Sand & Gravel	29	40
Sand, silty, gry, seepage	40	48
Sand, silty & Gravel, brn.	48	67
Sand, silty & Gravel	67	75
Sand & Gravel, loose	75	80
Sand & Gravel	80	95
Sand, occ. Gravel, brn.	95	120
Sand, occ. Gravel, dry, brn.	120	152
Sand & Gravel, with Silt layers, red-brn., wood, W.B.	152	185
Sand, Silt layers, brn., heave	185	203
Sand, gry, heave	203	220
Cly, gry.	220	234
Clay & Silt, gry.	234	266
Sand, fine, & Silt	266	282
Sand, fine to medium, heave	282	322
Sand, medium, with Gravel, some Silt	322	331
Silt, green-brn, & gry, with peat & wood	331	348
Silt, green-brn, & gry	348	361
Silt, Sand, & Gravel, Tight	361	378
Silt, Sand, & Gravel	378	383
Sand & Gravel, loose	383	395
Sand, medium-coarse, & Gravel	395	404
Sand & Silt, occ. Gravel	404	419
Sand, medium-coarse, & Gravel	419	433
Sand, medium, heave	433	461
Silt, green, brown, gray	461	471
Sand, silty & Sand	471	480
Gravel, & fine Sand	480	491
Gravel, Silty, & Sand, tight	491	495

Work started 8/30, 19. Completed 12/24, 19 91

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 10621 Todd Road East, Puyallup, WA

(Signed) (WELL DRILLER) License No.

Contractor's Registration No. Date 19

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Well #6

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 065783

Water Right Permit No. G2-28102

(1) OWNER: Name City of Gig Harbor Address 3105 Judson St. PO Box 145, GH 983

(2) LOCATION OF WELL: County Pierce SE ¼ NW ¼ Sec 7 T 21 N., R 2E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Intersection of 74th St NW & 47th Ave Ct NW GH 983

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) Well 6

Abandoned ☐ New well ☐ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well _____ inches. Drilled _____ feet. Depth of completed well _____ ft.

(6) CONSTRUCTION DETAILS:

Casing Installed: _____" Diam. from _____ ft. to _____ ft.
Welded ☐ Liner Installed ☐ Threaded ☐ _____" Diam. from _____ ft. to _____ ft.
_____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☐
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☐ No ☐ To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

"	"	"	"
"	"	"	"

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Sand, coarse, & Gravel	495	508
Silt, gray	508	530
Sand & Gravel, medium to coarse, W.B.	530	563
Sand, medium, green	563	592

Work started 8/30, 19. Completed 12/24, 1991

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 10621 Todd Road East Puyallup, WA

(Signed) _____ License No. _____ (WELL DRILLER)

Contractor's Registration No. _____ Date _____, 19__

(USE ADDITIONAL SHEETS IF NECESSARY)

City of Gig Harbor
3510 Grandview Street
Gig Harbor, Washington 98335

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Gig Harbor
3510 Grandview Street
Gig Harbor, Washington 98335

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
January 14, 2000	G2-29896	G2-29896	G2-29896

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown..

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	TRIBUTARY OF (IF SURFACE WATERS)
Well (#6)	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	1000 (Non-additive)	896

QUANTITY/TYPE OF USE/PERIOD OF USE

896 Acre-feet per year Municipal supply Year-round, as needed

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	7	21	2E	15	Pierce

PARCEL # 4000050490

ADDITIONAL LEGAL IS ON PAGE 2

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
N/A	N/A	N/A	N/A	15	Pierce

PARCEL # N/A

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

1230 feet North and 550 feet West of the center of Section 7.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Serving existing and future water service area of Gig Harbor. The place of use of this water right is the service area described in the Water System Plan approved by the Washington State Department of Health. RCW 90.03.386 may have the effect of revising the place of use of this water right if the criteria in section RCW 90.03.386(2) are met.

PROVISIONS

All conditions and requirements contained in reports of examination or permits previously issued apply to this certificate unless specifically noted below.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded daily. The maximum monthly rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of each calendar year. Ecology is requiring submittal of daily meter readings to collect seasonal information for water resource planning, management and compliance.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

(continued on page)

The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.386.

Given under my hand and the seal of this office at Olympia, Washington, this 19th *day of* April *, 2005.*

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Linda Hoffman, Director
Department of Ecology

By _____
Thomas Loranger, Section Manager

OK JW

Provisions Continued

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

Permittee or certificate holder, and its successor(s) shall provide data on chloride concentrations for the well authorized by this permit or certificate with analysis performed by a state accredited laboratory. Accreditation information may be obtained from Ecology's Quality Assurance Program at (360) 895-4649. Sampling shall occur in April and August of each year, with a copy of the laboratory results for both sampling events submitted by January 31 of the following year, to the Department of Ecology, Southwest Regional Office, Olympia, Washington.

If pumping of the well authorized by this permit or certificate causes chloride concentrations to exceed 100 milligrams per liter, immediate action shall be required to prevent concentrations from increasing (such as reducing the instantaneous withdrawal rate (gpm) of the well). If corrective measures fail to prevent chloride concentrations from exceeding said level in the future, permittee or certificate holder shall relinquish the option to perfect additional allocated quantities regardless of the stage of development.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
January 14, 2000	G2-29896		

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
3105 Judson Street	Gig Harbor	Washington	98335

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well (#6)

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	1000 (Non-additive)	896

QUANTITY, TYPE OF USE, PERIOD OF USE		
896 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
1230 feet North and 550 feet West of the center of Section 7.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NW¼	7	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Serving existing and future water service area of Gig Harbor. The place of use of this water right is the service area described in the Water System Plan approved by the Washington State Department of Health. RCW 90.03.386 may have the effect of revising the place of use of this water right if the criteria in section RCW 90.03.386(2) are met.

DESCRIPTION OF PROPOSED WORKS

One 14-inch diameter well 592 feet deep. Constructed with 12.5 feet of screen from approximately 496 to 508.5 feet below ground surface and 28.5 feet of screen from 532.5 to 561 feet below ground surface.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	In-use

REPORT

BACKGROUND:

On January 14, 2000, the City of Gig Harbor (the City) filed an application (G2-29896) for a permit to appropriate public groundwater from a well in the amount of 1,000 gallons per minute (gpm) for municipal supply. The project site is located on the Gig Harbor Peninsula in Water Resource Inventory Area 15 – The Kitsap Peninsula.

Notice of the proposed appropriation was published in *The Peninsula Gateway* on July 9, 2003 and July 16, 2003, and no formal protest was received by Ecology within the thirty day comment period.

This application has been processed under the Department of Ecology (Ecology) Cost-Reimbursement Program, under agreement between Ecology and Golder Associates Inc. (Golder). Golder reviewed available documents pertaining to the City's application site conditions, historical water use, projected water demand, existing right-holders and seniority of pending applications potentially affected by the application. This report has been prepared with the level of detail directed and approved by Ecology.

INVESTIGATION:

Golder reviewed the information submitted with the application and pertinent Ecology records, including relevant geologic and hydrogeologic reports. Golder evaluated the potential effects of the proposed appropriation upon existing and senior groundwater and surface water rights. The findings of this evaluation are summarized below.

Project

The City of Gig Harbor is located in northwest Pierce County on the Kitsap Peninsula, directly across the Tacoma Narrows passage from the City of Tacoma. The City limit boundaries encompass over fifty percent of the Gig Harbor Urban Growth Area, and for the most part the City's water service area lies within these corporate limits.

The Gig Harbor City limits encompass an area of approximately 2,800 acres, of which 1,240 are served directly by the city. The remaining 1,560 acres are supplied by a combination of private wells and service from other purveyors who supply water within the City's UGA. These systems include Stroh's Water, Rainier View's Olympic Mall water system, the Quail Run Water System, and the Cedar Crest and Peacock Hill Water Systems, both operated by the Washington Water Company.

The City of Gig Harbor owns and operates four active wells which serve water to the customers within their water service area. The City has two main pressure zones with Wells No. 2 and Well No. 4 serving the lower zone, and Wells 3 and 5 serving the City's high pressure zone.

The intent of this application is to secure additional primary water rights from the City's Well 6 to meet the City's future demand. Well 6 will be operated in conjunction with Wells 3 and 5 to serve the uppermost pressure zone.

Currently, withdrawals for the City of Gig Harbor are authorized by the following water rights:

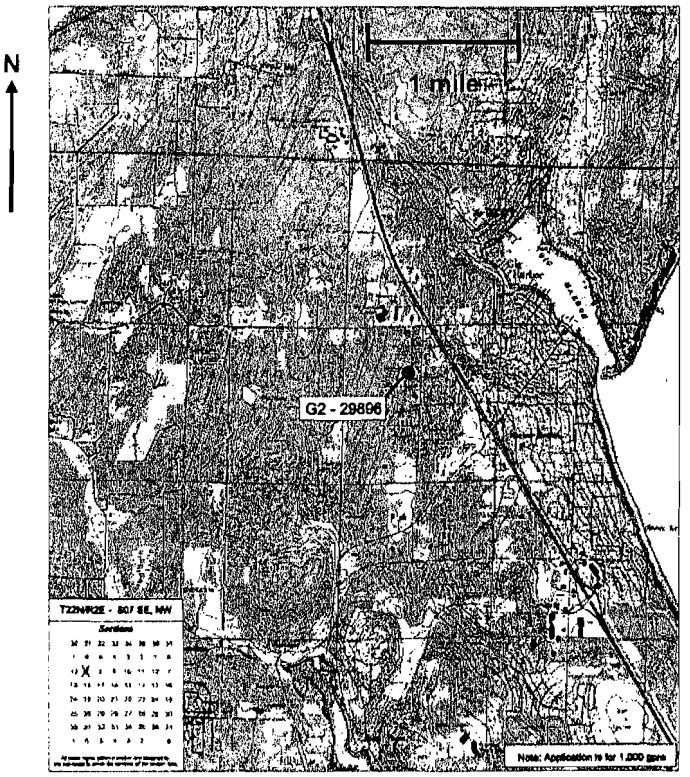
Water Right #	Well #	GPM	Qa (primary)	Qa (supplemental)	Notes
590-C	Well 1	400	238		Not in use
G2-00522	Well 2	330	209	116	
G2-25078	Well 3	625	538	442	
G2-27393	Well 4	230	0	238	Replaces Well 1
G2-27794	Well 5	500	336	0	
G2-28102	Well 6	1,000	0	672	
6018	Well 8	30	48		Rushmore Well
Total		2,715	1369 a-f/y		

City Wells

In 1949, the City developed Well 1, a 320-foot well located in what is now the downtown business area. This well is no longer used by the City and has been abandoned. As the system expanded over the years, new wells were developed to improve the system's capacity. Well 2 was drilled to a depth of 121 feet in 1962 at the head of Gig Harbor Bay and has a maximum instantaneous withdrawal rate of 330 gallons per minute. Well 4, which is 443 feet deep, was completed 1988, but was not brought online as a full-time production well until 1995. In 1990 and 1991, the City constructed Wells 5 and 6. Well 6 has been online since 1992.

Site Description

Gig Harbor Well 6 is located on the east-central portion of the Gig Harbor Peninsula, in the SE ¼, NW ¼ Section 7, Township 21 North, Range 1 East. Gig Harbor (salt water) is located approximately 5,000 feet northeast of Well 6.



Well 6 was drilled to a depth of 592 feet in 1991 by Holt Drilling, Inc. The wellhead elevation is approximately 255 ft amsl. The well is screened between 496 and 508.5 feet bgs (241 to 253.5 ft below msl) with 50-slot stainless steel well screen and between 532.5 and 561 feet bgs (277.5 to 306 ft below msl) with 90-slot stainless steel well screen. The static water level at time of drilling (12/11/91) was 226.4 ft bgs (28.6 feet amsl).

The legal description of the property on which the water is to be used, as shown on the application, is the area "serving the existing and future water service area of Gig Harbor". However, with the passage of 2E2SHB 1338 – known as the 'Municipal Water Law', changes to the water code mean that the purveyor's place of use will be governed by the service area designated in an appropriate Water System Planning document. Pursuant to updates to RCW 90.03, the City of Gig Harbor water system is designated as a municipal water system.

Hydrogeologic/Hydrologic Assessment

A version of the WRATS database (current as of December 2003) was queried to determine existing water rights within the radius of influence of Well 6. Well logs on file at Ecology were also examined to determine the hydrogeologic conditions in the vicinity of the water right application. Information on regional hydrogeologic data was obtained from the following resource material:

Borden, R.K. and Troost, K.G. 2001. Late Pleistocene Stratigraphy in the South-Central Puget Lowland, Pierce County, Washington. Washington Division of Geology and Earth Resources Report of Investigations 33, Washington State Department of Natural Resources.

Drost, B. W. 1982. Water Resources of the Gig Harbor Peninsula and Adjacent Areas, Washington, U.S. Geological Survey.

EMCON. 1992. Gig Harbor Peninsula Ground Water Management Plan Task 5 Hydrogeologic Evaluation Report.

Garling, M. E., Dee Molenaar, and et al. 1965. Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands, State of Washington, Department of Conservation, Washington Division of Water Resources.

Golder Associates. 2002. Phase II Level 1 Data Compilation and Preliminary Assessment Report. Redmond, Washington.

Golder Associates. 2003. Kitsap Watershed Planning (WRIA 15) Water Quality Technical Assessment. Redmond, Washington.

Golder Associates. 2004. Kitsap Watershed Planning (WRIA 15) Instream Flow Assessment Step C Final Report. Redmond, Washington.

Jones, M. A. 1996. Thickness of Unconsolidated Deposits in the Puget Sound Lowland, Washington and British Columbia, a Contribution of the Regional Aquifer-System Analysis Program. Tacoma, Washington: U.S. Geological Survey.

Kahle, S. C. 1998. Hydrogeology of Naval Submarine Base Bangor and Vicinity, Kitsap County, Washington, U.S. Geological Survey.

Noble, J. B. 1990. Proposed Revision of Nomenclature for the Pleistocene Stratigraphy of Coastal Pierce County, Washington, Washington Division of Geology and Earth Resources.

The Gig Harbor Peninsula is located in northwestern Pierce County, at the southern end of the Puget Lowland, within WRIA 15 (Kitsap Basin). The Gig Harbor Peninsula is part of the extensive glacial drift plain comprising the Puget Lowland, which was formed by at least six glaciations that occurred in the region during the last 2 million years (Kahle, 1998). The Gig Harbor Peninsula is connected to the larger Kitsap Peninsula and is surrounded on three sides by marine embayments. A complex sequence of unconsolidated and semi-consolidated sediments comprise the Gig Harbor Peninsula. The sediments include advance and recessional glacial deposits, and fluvial

and lacustrine interglacial sediments. The total thickness of the sedimentary sequence on the Peninsula ranges between 1,200 and 2,000 feet (Jones, 1996). The sediments are underlain by Miocene volcanic and sedimentary bedrock (Garling et al., 1965).

Garling et al. (1965) describes a typical glacial sequence on the Gig Harbor Peninsula as consisting of the following units, listed from youngest (top) to oldest (bottom):

- Recessional outwash (a discontinuous mantle of sand and gravel overlying the till; often found on hilltops);
- Till (normally a gray to bluish-gray compact and unsorted mixture of cobbles and pebbles in a binder of sandy silt and clay); and
- Advance outwash (primarily consists of gravels and coarse sands capped by the overlying till).

Groundwater on the Gig Harbor Peninsula is primarily produced from three aquifers, referred to as the Vashon, Sea Level and Deep Aquifers. The geologic units comprising the aquifers are outlined below after EMCON (1992) and Borden and Troost (2001):

- Vashon Aquifer: Vashon recessional outwash, till, advance outwash/glaciolacustrine silt/clay (Lawton Clay)/Olympia beds/Pre-Olympia drift. Water table conditions exist in much of the Vashon Aquifer. The water level in the advance outwash generally mimics surface topography;
- Sea Level Aquifer: Salmon Springs Drift/Double Bluff Drift. The Sea Level Aquifer is characterized by a low elevation potentiometric surface (up to 135 feet above mean sea level); and
- Deep Aquifer: Permeable layers within the pre-Salmon Springs deposits. At least two productive zones have been identified as comprising the Deep Aquifer. Water level data for the Deep Aquifer is sparse, but several water level measurements indicate that the potentiometric surface is generally less than 100 feet amsl. The extent and configuration of the deep aquifer(s) is poorly understood.

All three aquifers are confined where the unit is fully saturated and overlain by a low permeable unit, however water table conditions have been observed in the Vashon Aquifer (Garling et al., 1965). Shallow, perched groundwater zones exist in several locations on the peninsula where lenses of sand and gravel occur within lower permeable material. Water levels in the perched groundwater zones are slightly higher than those in the Vashon Aquifer. Table 1 provides a summary of the hydrostratigraphy of the Gig Harbor Peninsula. EMCON (1992) developed hydrogeologic cross-sections showing the extents of the three aquifers. The cross-sections show that the Vashon Aquifer is continuous across much of the Gig Harbor Peninsula, with the exception of deeply incised areas such as Wollochet Bay and Gig Harbor. The Sea Level Aquifer is present throughout the Gig Harbor Peninsula. Borehole information for the two permeable units comprising the Deep Aquifer is very limited, and the lateral extents of the Deep Aquifer are not known (EMCON, 1992).

The peninsula is drained by multiple small streams that discharge directly to marine water. Annual precipitation on the Gig Harbor peninsula ranges from 40 to 52 inches/year (in/yr) (Golder 2002). Precipitation on the peninsula infiltrates into the ground, runs off to streams, or is lost to evapo-transpiration. It is estimated that between 13% (Drost 1982) and 18% (Golder 2004) of precipitation is available for groundwater recharge (after contribution to baseflow is made).

The water that infiltrates the ground flows vertically downward to recharge the three aquifers found beneath the Peninsula. Recharge to the Deep Aquifer may come from areas outside of the peninsula. Horizontal flow directions of groundwater within aquifers is generally from areas of higher head to areas of lower head. Drost (1982) cites a generally downward component to groundwater flow on the Peninsula, with groundwater generally flowing toward marine water bodies and to surface drainage channels.

Hydrologic Analysis

Well 6 is removing water from the Deep Aquifer. The thickness of the Deep Aquifer in the vicinity of Well 6 is unknown because few if any wells penetrate the unit in this area of the Gig Harbor Peninsula. Based on the geologic description available on the well log, Well 6 is removing water from water bearing zones comprising the upper 178 feet of the Deep Aquifer. The well log indicates that water bearing sand and gravel was encountered at 383 feet bgs (128 feet below msl). This layer likely represents the top of the Deep Aquifer. Well 6 was pump tested in at the time of drilling (12/11/91) and yielded 800 gpm with 28.4 feet of drawdown after 24 hours.

Surface infiltration and downward percolation of precipitation recharges the Deep Aquifer. The areal extent over which recharge to the Deep Aquifer occurs is unknown. There is currently not sufficient data to determine the exact direction of flow and gradient of the potentiometric surface in the Deep Aquifer.

Neighboring Water Users

Water rights and well logs for wells completed in the Deep Aquifer were examined in order to determine if pumping in Well 6 would impair other water right holders. The closest well (certificate G2-26966C – Haven of Rest Cemetery) is located approximately 1.3 miles (6,900 feet) north of Well 6. The potentiometric surface for the Deep Aquifer is not well defined because several water-producing units comprise the aquifer and few wells are completed in the Deep Aquifer. The current understanding of the Deep Aquifer potentiometric surface is that it mimics ground elevation, (i.e. the highest heads are beneath the highest topography). Based on the observed pumping levels in Well 6, certificate G2-26966C is unlikely to be impacted by increased pumping in Well 6.

In shallower aquifers above the Deep Aquifer, the following Water Right Certificates were located within approximately one mile of Well 6:

- 16 wells completed in the Vashon Aquifer;
- Eight wells completed in the Sea Level Aquifer; and
- Two wells have not yet been drilled.

Wells completed in the Vashon and Sea Level Aquifers within a one mile radius of Well 6 are not likely to be affected by withdrawals in Well 6. A radius of one mile was selected for a search radius based on aquifer properties. The well log for Well 6 indicates the presence of silty clay between 220 and 266 feet bgs and silty sand and gravel between 331 and 383 feet bgs. This low permeability unit above the Deep Aquifer likely prevents direct communication with the shallower aquifers. Therefore, certificated water right holders will not be prevented from withdrawing their allotted amounts of water as a result of pumping in Well 6.

Effects to Surface Water

Minimum instream flows were established in 1981 through Chapter 173-515-040 WAC, the Instream Resources Protection Program for the Kitsap Water Resource Inventory Area (WRIA) 15. Any groundwater withdrawals with priority dates later than the closure dates stated in the WAC must not impair instream flows.

The well log for Well 6 indicates that the elevation of the screened interval of the well is 241 to 253.5 feet below msl. Additionally, the log indicates the presence of silty clay between 220 and 266 feet bgs and silty sand and gravel between 331 and 383 feet bgs which likely prevents hydraulic communication between layers occurring above and below them.

Well 6 lies approximately 0.6 miles south of nearest perennial tributary of North Creek. WAC 173-515-040 has closed North Creek to consumptive withdrawals year round. However, based on the depth of Well 6 and the presence of the low permeability unit that lies above the screened interval, withdrawals from Gig Harbor Well 6 are not anticipated to impair surface flows in North Creek. Effects, if any, would be likely to occur within the reach of the stream that is tidally influenced. Existing information on groundwater flow gradients in the deep aquifer indicate that Well 6 is intercepting groundwater that would otherwise discharge to marine water.

Seawater Intrusion

Given the coastal nature of the Gig Harbor Peninsula, seawater intrusion is always a potential concern, not just for Well 6 but for other wells that may be completed downgradient in the Sea Level and deeper aquifers. Well 6 has been in operation for over 12 years, and the currently issued water right permit G2-28102 includes requirements for regular monitoring of chloride levels. Historically, monitoring of this particular well has not detected any elevation of chloride levels beyond background level.

Water Allocation/Demand Forecasting

In 1998, the City completed the annexation of the Gig Harbor North and Olympic Mall areas. Today, the City of Gig Harbor has a population approaching 7,000, and by 2019 anticipates a population of 26,305 within the Urban Growth Area boundary, (City of Gig Harbor June 2001 Comprehensive Water System Plan). To meet this future demand the City has filed two new applications.

In order to meet future water needs, Gig Harbor applied for additional water rights in 1991. Application G2-29896 requests additional withdrawals from Well 6, and Application G2-29937 was filed for a proposed well to be located in the Gig Harbor North area.

The City of Gig Harbor has estimated that by the year 2024 they will need 2,265 acre-feet. As primary/additive water rights allocated to the City of Gig Harbor amount to 1,369 acre-feet per year, the City needs additional rights amounting 896 acre-feet per year.

Well 6 is currently equipped to produce 1000 gpm, but generally operates more efficiently at a constant rate of 800 gpm. This well is capable of generating the full 896 acre-feet required to meet the City 2024 demand.

FINDINGS AND CONCLUSION:

- Well 6 is located on the east central portion of the Gig Harbor Peninsula, in the SE ¼, NW ¼ Section 7, Township 21 North, Range 1 East. Well 6 is completed in the Deep Aquifer system. Pumping in Well 6 is not likely to affect neighboring water users. The nearest well in the Deep Aquifer with a water right is located over one mile away from Well 6. Given the depth of Well 6 and presence of low permeability material above Deep Aquifer, withdrawals are not expected to affect wells completed in the Vashon or Sea Level Aquifers.

- While the well is located within WRIA 15, which is regulated by WAC 173-515-040, it is unlikely that withdrawals from the well will affect surface water bodies in the basin. This well is completed in an aquifer system that discharges to the Puget Sound, and is not in hydrologic continuity with other surface waters in the basin. The well is completed below sea level, and the well log indicates the presence of the low permeability unit above the screened interval. Consequently, withdrawals from Gig Harbor Well 6 will not impair surface flows. Effects to surface water, if any, would be likely to occur within the reach of the stream that is tidally influenced.

- This appropriation is for a beneficial use, and will not impair existing rights or be detrimental to public welfare.

RECOMMENDATIONS:

I recommend that this application be approved and a permit be issued to allow maximum instantaneous appropriation of 1000 gallons per minute from Well 6 (non-additive), and 896 acre-feet per year for municipal supply as an additive/primary allocation. The period of use is year-round as needed.

This permit is subject to the following provisions.

PROVISIONS:

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.
Water use data shall be recorded daily. The maximum monthly rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of each calendar year. Ecology is requiring submittal of daily meter readings to collect seasonal information for water resource planning, management and compliance.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

Permittee or certificate holder, and its successor(s) shall provide data on chloride concentrations for the well authorized by this permit or certificate with analysis performed by a state accredited laboratory. Accreditation information may be obtained from Ecology's Quality Assurance Program at (360) 895-4649. Sampling shall occur in April and August of each year, with a copy of the laboratory results for both sampling events submitted by January 31 of the following year, to the Department of Ecology, Southwest Regional Office, Olympia, Washington.

If pumping of the well authorized by this permit or certificate causes chloride concentrations to exceed 100 milligrams per liter, immediate action shall be required to prevent concentrations from increasing (such as reducing the instantaneous withdrawal rate (gpm) of the well). If corrective measures fail to prevent chloride concentrations from exceeding said level in the future, permittee or certificate holder shall relinquish the option to perfect additional allocated quantities regardless of the stage of development.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

REPORTED BY: Jill Ewald Date: October 7, 2004

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-29896, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 7th day of October, 2004.

Thomas Loranger
Water Resources Section Manager
Southwest Regional Office

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ **Surface Water** (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ **Ground Water** (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
March 29, 1991	G2-28102	G2-28102	G2-28102

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Post Office Box 145	Gig Harbor	Washington	98335-0145

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount acually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #6

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	1,000	672 (supplemental supply)

QUANTITY, TYPE OF USE, PERIOD OF USE		
672 acre-feet per year (Supplemental supply)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1230 feet north and 550 feet west of the center of Section 7.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E OR W.) W.M.	W.R.I.A.	COUNTY
SE¼NW¼	7	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Gig Harbor.

PROVISIONS

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

Issuance of this water right may be subject to implementation of the minimum requirements established in the Conservation Planning Requirements, Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant may be required to prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

Chloride concentration analysis shall be performed prior to system use, then quarterly when the system is in use, by a laboratory accredited by the Department of Ecology. The resulting data shall be submitted to the Department of Ecology, Southwest Regional Office annually, in the month of February.

If the chloride concentration exceeds 100 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 100 mg/L.

Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the State. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all ground waters within the State. Accordingly, the applicant shall monitor and provide an annual summary of the previous year's monthly water level data and monthly totals of water pumped for this well. The summary shall be submitted in tabular format to Ecology's Southwest Regional Office annually, during the month of February, or more frequently if requested by the Department.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington,

this 26th *day of* October, *19* 95.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK

by Gale Blomstrom

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
March 29, 1991	G2-28102		

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	ZIP CODE
Post Office Box 145	Gig Harbor	Washington	98335-0145

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #6

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	1,000	672 (supplemental supply)

QUANTITY, TYPE OF USE, PERIOD OF USE		
672 acre-feet per year (Supplemental supply)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1230 feet north and 550 feet west of the center of Section 7.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼NW¼	7	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Gig Harbor.

DESCRIPTION OF PROPOSED WORKS

A 566 foot deep well equipped with a pump capable of withdrawing 1,000 gpm.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	In use

REPORT

I recommend that Application No. G 2-28102 be approved, and a permit issued allowing the withdrawal of public ground water for municipal supply.

BACKGROUND:

Pursuant to Chapter 90.44 Revised Code of Washington (RCW), Ben Yazici, for the City of Gig Harbor, applied for a permit to appropriate public groundwater from a well, known as Well 6. The City requested 500 gallons per minute (gpm), to provide municipal supply to the area served by the City. The application was accepted for processing and assigned a priority date of March 29, 1991.

A Temporary Permit was issued on August 15, 1991 authorizing the construction and testing of this well at a rate of 500 gpm. On October 25, 1991 an amendment to the Temporary Permit was issued, allowing withdrawal of up to 800 gpm for testing purposes.

A legal notice of the proposed appropriation was published in the "Peninsula Gateway" of Gig Harbor, Washington. No protests to the proposed appropriation were received. Testing showed the aquifer to be more productive than originally thought, and the applicant requested that the affidavit be amended to increase the instantaneous withdrawal from 500 gpm to 1,000 gpm. The legal notice was republished, and although no protests were received, two letters of concern were submitted. Both letter writers expressed concern about ground water supplies and water quality in the Gig Harbor area. Those concerns are addressed within the body of this report.

The following Report of Examination documents the Departments inspections and research.

INVESTIGATIONS:

Jill Van Hulle and I conducted a field investigation of the project site. Representatives from the City present were not present during the site visit, but Ben Yazici, Director of Public Works, was subsequently contacted by telephone. Other inquiry included:

- Analysis of the document entitled Design and Testing Report, Well 5, by Hart-Crowser, Inc., consultant for the City.
- Analysis of the document entitled Gig Harbor Well 5 Test Results, by Robinson & Noble, Inc., consultant for the City.
- Analysis of the document entitled Production Well 6, Construction and Testing Report, Carr/Associates, consultant for the City.
- Review of the document entitled Gig Harbor Peninsula Ground Water Management Program, by EMCON Northwest, Inc., and Adolfson Associates, Inc., consultants for the City.
- Review of the document entitled City of Gig Harbor, Water Utility, General Comments, by the City of Gig Harbor.
- Scrutiny of state records applicable to this site.

Location and Description of Site

The well site is located approximately 1 mile southwest of Gig Harbor, within the North Creek Estates development. Well 5 (Application No. G2-27794) is located approximately 20 feet north of Well 6, inside a small well house. Increasing residential use is typical of the surrounding area.

System Description

Well 6 was constructed by Holt Drilling, Inc., between August 30, 1991 and December 24, 1991. The well was drilled using the cable tool method to a total depth of 592 feet, and completed as follows:

Well depth:	566 feet
Casing diameter:	16 inch and 14 inch
Static water level:	226 feet
Elevation:	±240 feet above msl
Pump size:	N/A
Screened depth:	485-561
Yield:	1,000 gpm

The City intends to intertie this well with the existing water system to serve present and future water needs.

Aquifer Characteristics and Testing

Well 6 is completed in an aquifer formation that was identified during construction of Well 5, as a productive water bearing zone. The formation consists primarily of gravelly, fine to medium sand, with some silty horizons. An upper water bearing zone was found to be susceptible to contamination, and a 67 foot surface seal was placed around the well to isolate the uppermost aquifer.

On December 10 and 11, 1991, Carr/Associates, Consulting Hydrogeologists, conducted step and 24 hour pumping tests of Well #6. Based on the test results, they recommended a maximum pumping rate of 1,000 gpm.

Water levels in all four of the City's wells were monitored during the 24 hour test. The water levels were not affected by pumping of Well 6, however it was found that the water levels in all four of the City's wells are responsive to tidal fluctuations in Puget Sound. The consultant concluded that the chloride test results from the City wells completed in the deep aquifer are showing only background levels of chloride, with no suggestion of salt water encroachment.

Transmissivity (permeability) of the aquifer was calculated as 42,500 gpd/ft, from drawdown and recovery measurements. Storativity was not determined.

Given the depth of the well, and intervening 135 foot thick silt layer separating the aquifer from salt water, the likelihood of salt water intrusion into the aquifer is slight. However, due to the paucity of data concerning the potential for salt water intrusion into this aquifer, periodic chloride monitoring and reporting will be a provision of the permit.

The consultants found that Well 6 is capable of a pumping rate of 1,000 gpm for extended periods. The applicants plan to use this well for an average of 10 hours per day, pumping 672 acre-feet per year (AF/Y).

Water Right Summary and Needs Assessment

Under the Chelan Agreement of 1990, priorities for water allocation will be determined through regional water resource plans. To meet the water supply needs of the large municipal utilities, during the time that regional water resource plans are being developed, the Department of Ecology is currently issuing water rights using a 6 year planning horizon. Using information provided by Ben Yazici, it is estimated that the City could be serving a population of 5,291 by the year 1999.

The City of Gig Harbor holds the following Water Right Certificates:

Certificates		Primary*	Supplemental**
Well #1 - Cert. 590-A (abandoned)	400 gpm	238 acre-feet	
Well #2 - Cert. G2-00522	330 gpm	204 acre-feet	116 acre-feet
Well #3 - Cert. G2-25078	625 gpm	538 acre-feet	442 acre-feet
Well #4 - Cert. G2-27393	230 gpm		238 acre-feet (standby)
	1,185 gpm	742 acre-feet	796 acre-feet

* Primary rights are issued for an additional annual quantity.
**Supplemental rights are issued to allow additional instantaneous withdrawal, but do not allocate an increased annual withdrawal.

In 1999 the City of Gig Harbor could be serving a projected population of 5,291. Average per capita use has remained steady at approximately 140 gpd/c, and this figure has been used for planning purposes. The City currently holds withdrawal rights for 742 AF/Y (primary). To serve a population of 5,291, an average of 0.74 MGD or 830 AF/Y, a quantity more than that currently authorized, will be required.

Application No G2-27794 (Well 5) was evaluated concurrently with this application. Issuance of a permit allowing the withdrawal of 500 gpm and an additional 88 AF/Y for primary supply, and a total of 248 AF/Y for supplemental supply, was recommended to enable the City to meet projected needs. Any additional allocations will be considered supplemental supply.

The City intends to pump this well an average of 10 hours per day, producing 672 AF/Y. To meet the City's needs of additional instantaneous withdrawal, this permit should be issued to allow a withdrawal of a total of 672 AF/Y for supplemental supply to existing rights.

Effect on Existing Rights

The following groundwater records are on file with Department of Ecology:

- A total of 7 groundwater certificates, and 1 ground water permit, have been issued within a half mile of the subject well. A total of 364 gpm and 98.5 AF/Y have been permitted. All withdrawals are from water bearing zones located above the subject withdrawal point.
- Six well logs are on file for the area within half a mile of the subject well. All wells are completed in gravel formations, above the subject well at depths ranging from 15' to 194'.

Because of the thick confining layers isolating the aquifer, and the lack of ground water development in the production aquifer, it is highly unlikely that withdrawals from Gig Harbor's Well 6 will interfere with the production of neighboring wells.

Consideration of Public Concerns

Paulette Erickson and Nancy Hansen submitted letters of concern to this office regarding ground water supplies and water quality in the Gig Harbor area. Both parties have experienced problems with high iron content and/or insufficient pressure. Although these are legitimate concerns, they are the venue of the City or water purveyor, and denial of a permit is not warranted.

CONCLUSION:

In accordance with Chapter 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation is for a beneficial use, and should not impair existing rights or be detrimental to the public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit to allow appropriation of 1,000 gpm, 672 AF/Y, as supplemental supply, from this well to provide municipal supply to the City of Gig Harbor.

The period of use shall be year-round, as needed.

This permit shall be subject to all applicable state regulations and to the following provisions:

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop LD-11, Building 3, Olympia, Washington 98504, prior to any new construction or alterations of a public water supply system.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

All water wells constructed within the State shall meet the minimum standards for well construction and maintenance as provided under RCW 18.104, Washington Water Well Construction Act of 1972, and Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells.

In conjunction with the State Department of Health bacteriological sampling the applicant shall test water quality for chloride concentration once every three months. Water samples shall be gathered and analyzed in accordance with Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985, or equivalent methods. Chloride concentration analysis shall be performed by a laboratory accredited by the Department of Ecology for the tests to be conducted. Accreditation information may be obtained for Ecology's quality Assurance Program at (206) 895-4649.

When the chloride concentration exceeds 100 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 100 mg/L.

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990 (attached), and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The applicant is advised that notice of proof of appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent diversion facilities have been installed, and the system is currently in use. This includes installation of a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served, and fulfillment of all other terms of this permit.

REPORTED BY: Tom Davis Date: April 18, 1994

The statutory permit fee for this application is $20.00.

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use
Fee Paid 1,000
Date 8/30/00

G2-29937A

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name City of Gig Harbor Home Tel: ( ) -

Mailing Address 3105 Judson Street Work Tel: (253) 851 - 8145

City Gig Harbor State WA Zip+4 98335 + 5136 FAX: (253) 853 - 7597

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☐ Same as above

Name David Skinner Home Tel: ( ) -

Mailing Address 3105 Judson Street Work Tel: (253) 851 - 8145

City Gig Harbor State WA Zip+4 98335 + 5136 FAX: (253) 853 - 7597

Relationship to applicant Public Works Director

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than 1,000 ☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of domestic/public supply. **ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE.** (See instructions.) *NOTE: A tax parcel number or a plat number is not sufficient.*

Estimate a maximum annual quantity to be used in acre-foot per year: 1,000 acre-feet per year

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:

From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions:	A permit is desired for one well(s).
Source flows into (name of body of water):	Size & depth of well(s): 16" casing: Well depth to be 100' or greater

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner:

Approximately 2025 feet north and 2200 feet west of the southeast corner of section 30

1/4 of	1/4 of 1/4 of	Section	Township	Range (E/W)	County	If location of source is platted, complete the following: Lot	Block	Subdivision / Plat
NW	SE	30	22N	2E	Pierce			

For Ecology Use: Date Received 8-30-00 Priority Date 8-30-00

SEPA: Exempt/Not Exempt FERC License # Dept. Of Health #

Date Accepted As Complete By Date Returned By

ECY 040-1-14
Rev. 7/97

APPLICATION

Appl. No. G2-29937A

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: City of Gig Harbor

B. Briefly describe your proposed water system. (See instructions.)

The proposed well will supplement the City of Gig Harbor's existing water system, which includes four active wells, five storage tanks, and approximately 1,400 service Connections. The proposed well will be equipped with a pump capable of producing 1,000 gpm. A New reservoir will likely be built near the proposed well.

Well construction reports for the City's existing wells are attached to this Application.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION.
SEE PAGE 4 OF THIS APPLICATION

Section 6. DOMESTIC/PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested: _____ Type of connection See page 4 of this application
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☒ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.* The proposed well will supplement the City of Gig Harbor's existing water system.

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the Washington State Department of Health? ☒ YES ☐ NO
If yes, when was it approved? 1994 Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☒ YES ☐ NO
If yes, when was it approved? 1994 Please attach the current approved version of your plan.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Completed for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: _____

B. List total number of acres for other specified agricultural uses:

Use _____ Acres _____
Use _____ Acres _____
Use _____ Acres _____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 2000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no.: _____

E. Farm uses:
Stockwater - Total # of animals _____ Animal Type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Use this page to continue your answers to any questions on the application. Please indicate section number before answer.

Section 3. The place of use will be the area served by the City of Gig Harbor, as described in the City's Water System Comprehensive Plan.

Section 5(c). The City has existing water rights for its well's No. 1,2,3,4,5 and 6. These Water rights have DOE Certificate Nos. as follows:

590-C
G2-00552
G2-25078C
G2-27393
G2-27794
G2-28102

Section 6(a). The City's water system will serve an estimated 2,400 mixed residential and commercial connections in the year 2020

(c). The City's Water System Comprehensive Plan is currently being updated. The front page of the 1994 plan is attached to this application.

(d). The City's Conservation plan is included in the Water System Comprehensive Plan.

Section II (b). The City will secure a 100' radius sanitary control restrictive covenant around the proposed well.

We are returning your application for the following reason(s):	
_____ Examination fee was not enclosed	APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98509-5128
_____ Section number(s) _____ is/are incomplete	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:	
Please provide the additional information requested above and return your application by _____ _____ *(date).*	

Ecology staff_____ Date_____

Ecology is an Equal Opportunity and Affirmative Action employer.

To receive this document in alternative format, contact the Water Resources Program at (360) 407-6604 (Voice) or (360) 407-6006 (TDD).

APPLICATION

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☒ YES ☐ NO

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

From State Route 16 Northbound, take the Burhnam Drive/Swede Hill interchange. Proceed East on East-West Road for three-quarters of a mile. Then North one-quarter of a mile to the propose well site.

Section 10. REQUIRED MAP

A. Attach a map of the project. (**See instructions.**)

A map is attached.

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☐ YES ☒ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

The City water system is a public utility that serves residents and businesses within its water service area.

B. Does the applicant own the land on which the water source is located? ☐ YES ☒ NO
If no, submit a copy of agreement:

The well facility will be turned over to the City as specified in the attached Preannexation Agreement for Gig Harbor North.

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

[signature] 8/28/00
Applicant (or authorized representative) Date

SAME
Landowner for place of use (if same as applicant, write "same") Date

The Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 7773
Permit No. 7303

(1) OWNER: Name Peninsula Water Development Co. Inc. Address Gig Harbor, Wn.

(2) LOCATION OF WELL: County Pierce 1250'W. & 1250'S. from E. ¼ Cor. NE ¼ SE ¼ Sec. 17 T. 21 N., R. 2E W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic X Industrial ☐ Municipal ☐ Commercial
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well X Method: Dug ☐ Bored ☐
Deepened ☐ Cable X Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10" inches.
Drilled 555 ft. Depth of completed well 242 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from 0 ft. to 349 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded X 10" Diam. from 10 ft. to 349 ft.

Perforations: Yes X No ☐
Type of perforator used 8 holes every Ft.
SIZE of perforations in. by in.
perforations from 338 ft. to 348 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes X No ☐
Manufacturer's Name Johnson's
Type Stainless Steel Model No.
Diam. 8" Slot size 22 from 227 ft. to 222 ft.
Diam. 8" Slot size 30 from 232 ft. to 222 ft.

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

WATER LEVELS: Land-surface elevation above mean sea level 161 ft.
Static level 207 ft. below top of well Date 9/17/65
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes X No ☐ If yes, by whom? Driller
30 gal./min. with 15 ft. drawdown after 40 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 9/30/65
50 gal./min. with 7 ft. drawdown after 5 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Augered hole	0	13
Brown gravel - hard pan	13	52
Hard dry brown sand	52	125
Blue clay	125	135
Dry gray sand	135	164
Coarse gravel hardpan	164	166
Dry, coarse sand & gravel	166	177
Clean, dry sand	177	193
Clean, dry gravel	193	198
Muddy sand & gravel	198	215
Conglomerated sand & seepage	215	220
Clean water sand - Med.	220	227
Blue clay	227	259
Blue clay - hardpan	259	285
Blue clay silt	285	300
Solid blue clay	300	312
Blue clay silt	312	320
Blue clay, solid	320	338
Water - sand & gravel	338	344
Hardpacked gravel	344	349
Loose sand & gravel & big rocks		
W/layers of clay hardpan	349	355
Loose coarse Sand & small grav	355	358
Hardpacked gravel W/hard pan		
seams	358	361
Loose gray sand	361	363
Gray sand & cemented with dry		
sand & clay seams	363	403
Blue clay	403	404
Fine silty gray sand	404	450
Hard silty clay W/silt layers	450	555
Reduced casing to 8" @ 349' and went to 555'		
Pulled out all 8", 10" Casing filled with		
crushed gravel 240' to 350'. Cut 10" off		
at 232' & 8" and 231' & Installed Screens		

Work started August 23, 1965 Completed October 14, 1965

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME HARBOR PUMP & DRILLING CO., INC.
(Person, firm, or corporation) (Type or print)
Address Rt. 5 Box 5110 Gig Harbor, Wash.

[Signed] Jim Miller & (Well Driller)

License No. D149036-68 Date March 26, 1968

(USE ADDITIONAL SHEETS IF NECESSARY)

City of Gig Harbor
3105 Judson Street
Gig Harbor, Washington 98335

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT
SUPERSEDING

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Gig Harbor
3105 Judson Street
Gig Harbor, Washington 98335

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
September 2, 1965	7773	7303	6018

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	TRIBUTARY OF (IF SURFACE WATERS)
Well 8	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	30	48

QUANTITY/TYPE OF USE/PERIOD OF USE

48 Acre-feet per year | Municipal supply | Year-round, as needed

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼ SE¼	17	21	2E	15	Pierce

PARCEL # 7355400430

ADDITIONAL LEGAL IS ON PAGE 2

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
N/A	N/A	N/A	N/A	15	Pierce

PARCEL # N/A

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

1250 feet West and 1250 feet South from the East quarter corner of Section 17.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

The water service area for the City of Gig Harbor, as described in the City's Water System Comprehensive Plan and as outlined on the map included with this water right record.

PROVISIONS

All conditions and requirements contained in reports of examination or permits previously issued apply to this certificate unless specifically noted below.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, 90.44.450 and WAC 508-64-020 through -040, and WAC 508-12-030. Meter readings shall be recorded at least monthly.

Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the state. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all groundwaters within the state. Accordingly, the applicant shall monitor and provide an annual summary of the previous year's monthly water level data and monthly totals of water pumped for this well. The summary shall be submitted in tabular format to Ecology's Southwest Regional Office annually, during the month of February, or more frequently if requested by the Department.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.100.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in Chapter 90.14 RCW.

Given under my hand and the seal of this office at Olympia, Washington, this 31st *day of* December, *2001.*

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Tom Fitzsimmons, Director
Department of Ecology

By _____
J. Mike Harris, Section Supervisor

ENGINEERING DATA
OK _____
ECY 040-1-2 (Rev 8-97)

POU

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
APPLICATION FOR CHANGE
REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
September 2, 1965	7773	7303	6018

NAME
City of Gig Harbor

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
3105 Judson Street	Gig Harbor	Washington	98335

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well 8

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	30	48

QUANTITY, TYPE OF USE, PERIOD OF USE		
48 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
1250 feet West and 1250 feet South from the East quarter corner of Section 17.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼ SE¼	17	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The water service area for the City of Gig Harbor, as described in the City's Water System Comprehensive Plan and as outlined on the map included with this water right record.

DESCRIPTION OF PROPOSED WORKS

Well 8, 10-inch casing to 241 feet deep.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	In-use

REPORT

BACKGROUND:

On January 8, 2001, the City of Gig Harbor filed an *Application for Change* to change the place of use of an existing water right certificate. The request was filed under the original water right number 6018-A.

A public notice of the proposed change was published, and no protests were received.

Based on the provisions of Chapters 90.03 and 90.44, Revised Code of Washington (RCW), and the following information, I recommend issuance of a superseding certificate.

INVESTIGATIONS:

Ground water certificate 6018-A has a priority date of September 2, 1965. The certificate was originally issued to Peninsula Water Development Company Inc., and authorizes the withdrawal of 30 gallons per minute and 48 acre-feet per year for community domestic supply. In 1971 the Harbor Water Company acquired the well and associated water system. In 1991, Harbor Water Company conveyed the well to the City of Gig Harbor.

Gig Harbor refers to the well as Well 8. The well is 241 feet deep and was completed with an 8-inch casing.
This system was constructed primarily to serve the water needs of the Rushmore Subdivision, located on Reid Road. The well is now incorporated into the City of Gig Harbor's water system, and the residents of the original Rushmore sub-division are supplied water from the City's distribution system. The applicant provided power records and other information to substantiate use from Well 8. The right is fully perfected and eligible to be changed.

The intent of this *Application for Change* is to change the place of use to reflect the City of Gig Harbor's water service area. No increase in the withdrawal rate or annual allocation is requested by the application. The water will remain in use for domestic supply.

CONCLUSION:

When considering an application for change to a water right, Ecology must determine that the proposed change can be made without detriment or injury to existing water rights or to water rights for which applications have been filed. Factors considered when determining potential impact include the following:

- No Impairment to Existing Rights:

  No additional water will be withdrawn under this proposed change. There has been no documented history of pumping interference between existing wells in the area and this well, nor is it anticipated that modifying the place of use would cause any impairment to any existing ground water rights.

- No Detriment to the Public Welfare:

  There are no findings through this investigation to indicate that there would be any detrimental impact to the public welfare through issuance of the proposed change. The Department of Ecology supports the development of public water systems to serve the domestic water needs of communities such as Gig Harbor.

- No Enhancement of the Original Right:

  No withdrawal of water over and above what has been historically put to beneficial use would be authorized through approval of this change.

In accordance with Chapters 90.03 and 90.44 RCW, I find that changing the place of use on certificate 6018-A is not detrimental to the public's welfare and will not impair existing rights.

RECOMMENDATIONS:

I recommend the approval of the *Application for Change* and the issuance of a Superseding Certificate in the amount of 30 gpm, and 48 acre-feet per year.

This certificate is subject to the following provisions:

PROVISIONS:

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, 90.44.450 and WAC 508-64-020 through -040, and WAC 508-12-030. Meter readings shall be recorded at least monthly.

Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the state. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all groundwaters within the state. Accordingly, the applicant shall monitor and provide an annual summary of the previous year's monthly water level data and monthly totals of water pumped for this well. The summary shall be submitted in tabular format to Ecology's Southwest Regional Office annually, during the month of February, or more frequently if requested by the Department.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

REPORTED BY: Jim E Walsh Date: October 12, 2001

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER Superseding Certificate No. 6018 be issued, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 12th day of October, 2001.

J. Mike Harris
Water Resources Supervisor
Southwest Regional Office

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No.

Permit No.

(1) OWNER: Name WADE PARROW Address Gig Harbor, WA 98335

(2) LOCATION OF WELL: County PIERCE CO. — SW ¼ NW ¼ Sec. 31 T. 22 N., R. 2E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 401 ft. Depth of completed well 375 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from +3 ft. to 335 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name JOHNSON * See Log
Type STAINLESS Model No.
Diam. 6 Slot size 0.020 from 335 ft. to 340 ft.
Diam. 6 Slot size 0.020 from 356 ft. to 366 ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Jacuzzi
Type: Submersible H.P. 5

(8) WATER LEVELS: Land-surface elevation above mean sea level ± 140 ft.
Static level 108 ft. below top of well Date 4/21/87
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Carr/Assoc
Yield: 37 gal./min. with 77 ft. drawdown after 21 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
2.5	161.45	30	115.90	90	110.74
10.0	130.93	45	113.32		

Date of test 4/21-22/87
Baller test gal./min with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Fill, sand, gravel	0	5
Silty, clayey sand, some grvl	5	17
Silty, sandy clay, gray	17	37
Sand & gravel, silty, gray	37	43
Silty, clayey sand	43	70
Sandy silt, clay, layered	70	81
Clay, blue	81	92
Sand, clay, gray, water-bear.	92	95
Silty, sandy clay, blue	95	109
Clay, plastic, sticky, blue	109	152
Sand, grvl, silt, gray, wtr-bear.	152	160
Silt, sand, layered, wtr-bearng	160	167
Clay, sand, pea gravel, gray	167	176
Clay, gravel & sand, wtr-bear.	176	180
Clay, plastic, sml rocks, gray	180	219
Silt, clayey silt	219	234
Gravelly silt	234	243
Silt, clayey silt, occas rocks	243	271
Gravelly sand, wood & mica-tr.	271	286
Silty sand, grvl, wood, cobbles	286	297
Coarse sand, occas gvl, wood	297	303
Grvl, hard, sandy, silty lyrs	303	313
Siltbound gravel, sandy	313	320
Sand, grvl, layered, wtr-bearng	320	329
Sand, brn silt, gray silt, hard	329	334
Sand-blk & red, grvl-blk & grn, water-bearing	334	363
Sand & grvl, blk & grn, w-bear	363	380
Sand & grvl, silt, water-bear.	380	390
Gravelly sand, water-bearing	390	395
Sand, fine, grn, water-bearing	395	401

Note: H2S from 380 - 401 ft.
* 8" 0.030 frm 332 - 340
8" 0.030 " 355 - 375
8" 0.060 " 378 - 385

Work started 10/21, 19 86 Completed 4/22, 19 87

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME MATHEWS WELL DRILLING (Person, firm, or corporation) (Type or print)

Address P.O. Box 1643 POULSBO WA 98370

[Signed] Jon C. Mathews (Well Driller)

License No. 1137 Date 5/21, 19 87

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1 20

ROBINSON NOBLE SALTBUSH INC. Established 1947
GROUNDWATER & ENVIRONMENTAL SCIENTISTS

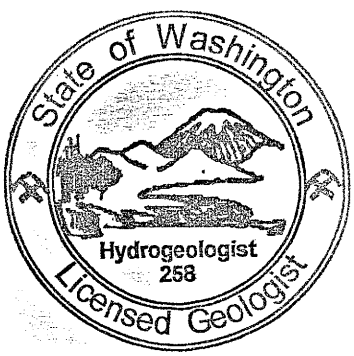
CITY OF GIG HARBOR
WELL 10
CONSTRUCTION AND TESTING REPORT

MAY 2009

by

Matt K. Rakow
Project Geologist

Douglas C. Dow, LHG
Senior Associate Hydrogeologist



3011 South Huson Street, Suite A Tacoma, Washington 98409 ▪ (253) 475-7711 ▪ Fax: (253) 472-5846
e-mail: mail@robinson-noble.com

CITY OF GIG HARBOR
WELL 10
CONSTRUCTION AND TESTING REPORT
MAY 2009

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WELL CONSTRUCTION **3**

WELL DEVELOPMENT **4**

WELL TESTING **4**

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APPENDIX B

WATER WELL REPORT FORMS FOR WELLS 2 AND 10
GRAIN SIZE ANALYSES
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WELL 2 WATER LEVEL GRAPHICS
LABORATORY WATER QUALITY RESULTS

CITY OF GIG HARBOR
WELL 10
CONSTRUCTION AND TESTING REPORT
MAY 2009

Introduction

This report presents Robinson, Noble & Saltbush's findings and recommendations based on observation of construction, well screen design and development, and conducting a pumping test of Well 10 for the City of Gig Harbor (City), Washington. The Washington State Department of Health (Health) requires hydrogeologic evaluation of a 24-hour, constant-rate, individual well test prior to source approval. A Robinson, Noble & Saltbush hydrogeologist prepared a test plan, supervised testing, and evaluated the test results. The City's drilling contractor, Holocene Drilling Inc. (Holocene) of Edgewood, Washington, conducted the test. Water samples were collected by our hydrogeologist and analyzed by Water Management Laboratories for all Group A water system parameters.

Background

The City contracted with Holocene to construct Well 10 in the City's Crescent Creek Park, located at the north end of Gig Harbor on parcel number 02-22-32-3-018 in the SE 1/4 of the SW 1/4 of Section 32, Township 22 North, Range 2 East, in Pierce County (Figure 1). The Tacoma-Pierce County Health Department conducted a site survey and approved of the Well 10 site. The City's Well 2 is also located in the park and currently operates at a pumping rate of about 300 gallons per minute (gpm).

Table 1: Well Data

	Well 2	Well 10
Construction Date	1963	2009
Diameter (inches)	10	12
Depth Drilled (feet)	121	157
Completion Interval (ft)	116-121	96.5-136.5
Static Water Level (ft)	2.16	13.84
Land Surface Elevation (ft)	25	35
Measuring Point Stickup (ft)	0	2
SWL Elevation (ft)	22.84	21.16

Land surface elevations given on Table 1 were estimated from contours shown on a well location map provided by the City. The static water levels were taken at the start of the 26-hour constant rate well test on April 14, 2009. The water level for Well 2 was taken from the sensor digital readout in the Well 2 pump house. The water level in Well 10 was measured directly with an electric tape.

Water Rights

The City has water rights for Well 2 allowing the withdrawal of 330 gpm and 209 acre-feet per year (afy) of additive rights and 116 afy of non-additive rights*. The stated purpose of the right is for municipal supply.

The City filed an application with the Washington State Department of Ecology (Ecology) for a new additive water right for Well 10 requesting 800 gpm and 750 afy. The application's priority date is May 29, 2008. Well 10 was drilled as an additional point of withdrawal under the Well 2 water right.

Table 2: City of Gig Harbor Water Right Information

Water Right Number	Well Using Water Right	Q_i (gpm)	Q_A (afy)	NOTES
G2-00522C	Well 2	330	209	116 afy non-additive
G2-30473A	Well 10	800	750	Application

Hydrogeology

Crescent Creek (stream number 321) drains a watershed of approximately 4.5 square miles and discharges into the north end of Gig Harbor. The Creek is tidal from the end of the harbor across Vernhardson Street into the City Park where Wells 2 and 10 are located. Crescent Creek is closed to new withdrawals under WAC 173-515-040. Mitigation may be required if an additive water right is pursued by the City for Well 10 and it is determined that the increased withdrawal would have a negative impact on the creek.

The hydrogeology of the area is best described in the "Gig Harbor Peninsula Ground Water Management Area Task 5 Hydrogeologic Evaluation Report" prepared in March 1992 for the Tacoma-Pierce County Health Department by Sweet-Edwards/Emcon, Inc. and Robinson & Noble, Inc. Wells 2 and 10 are completed in the Sea Level Aquifer approximately 60 to 100 feet below sea level. The Sea Level Aquifer is confined by a layer of gray silt/blue clay approximately 30 feet thick that may be part of the Kitsap formation. The Sea Level Aquifer ultimately discharges to Puget Sound and may discharge into the deeper reaches of Gig Harbor. The actual gradient and flow direction of water in this aquifer has not been determined. Water quality results from all City wells completed below sea level have not shown any indication of sea water intrusion.

* Ecology revised its terms of use for water rights in 2006 under Policy 1040 in order to help clarify the meaning of its previous terms "primary" and "supplemental". In general, the new term "additive" replaces "primary" and non-additive replaces "supplemental." See the policy document on Ecology's website for additional information.

Well Construction

Well 10 was drilled to a depth of 157 feet below ground surface (bgs) by Holocene with cable-tool equipment. Drilling started with the placement of a temporary 24-inch casing to a depth of 60 feet. Because of the possibility of flowing artesian conditions at this site (as exhibited at Well 2 during its construction), a 20-inch steel casing was placed in the open 24-inch borehole at a depth of 62 feet and sealed in the borehole with cement as the 24-inch casing was withdrawn. Drilling continued with 16-inch casing to a depth of 157 feet. The hydrogeologic log and completion details are shown on Figure 2 and described on the Water Well Report form attached as part of Appendix B.

The sediments penetrated by the drill are shown on Figure 2 and include 11 feet of brown silty sand and gravel overlying seven feet of compact brown silt-bound sand with gravel (glacial till) and six feet of blue clayey silt with occasional gravel. The first water was observed in a brown gravel and sand between 24 and 42 feet. Gray silt was observed from 42 to 76 feet bgs comprising the confining layer overlying the artesian aquifer.

The gray sand and gravel aquifer extends from 76 feet below ground surface to the bottom of the drilled well at a depth of 157 feet. The lower portion of the aquifer below 137 feet showed lenses of brown silt. Between 145 and 157 feet where drilling was stopped, the drill penetrated a gray silty sand with occasional gravel. Although the zones below 137 feet are saturated, they were not considered permeable enough to be included into the screened section of Well 10.

The drilling was stopped at 157 feet below ground surface because enough penetration had been achieved to allow for an adequate tail pipe. A cement plug was placed inside the 16-inch casing from 154 to 157 feet to stop heaving sand from entering the well and interfering with the casing cut at 149.5 feet.

Aquifer material samples were collected by the driller and our hydrogeologist during construction. Selected samples were sieved in Robinson, Noble & Saltbush's soils laboratory. The sieve analyses are summarized in Figure 3. Individual sample grain-size analyses are included in Appendix B. Based on these samples and our field observations, we recommended a well screen design of 0.040-inch slot, Type 304 stainless-steel, wire-wrap well screen surrounded by 8x12 size Colorado Silica sand. The well screen assembly details are listed in Table 3. The well screen was installed between 96.5 and 136.5 feet bgs. The sand pack was placed in the annulus between the 16-inch casing and 12-inch well screen assembly from 62 to 146.5 feet. The 12-inch casing was brought to land surface, and the 16-inch casing was pulled back to 96 feet. The 16-inch casing shoe remnant was left in the hole between 149.5 and 157 feet.

Table 3: Well Screen Assembly Details

Item	Top (feet bgs)	Bottom (feet bgs)	Comments
Riser	+2	96.5	12-inch mild steel pipe
0.040-inch slot screen	96.5	136.5	Type 304 stainless steel
Tailpipe	136.5	146.5	12-inch mild steel pipe & plate bottom

Notes: All screens are 11.80-inch inside diameter.
All screens are Type 304 stainless steel, v-wire construction and standard strength.
All measurements are referenced to ground surface at the time of well construction.
Filter sand is 8x12 size Colorado Silica Sand.

Well Development

The sand pack placed outside the screen assembly was settled using the spudding action of the cable-tool drill rig with a rubber-disc development swab. After one run through the 40 feet of screen at 15-minute intervals per two feet of screen, the pack sand had settled and was only dropping a few inches per time interval. Very little aquifer sand penetrated through the pack sand into the well. The driller was then directed to make long pulls of the development swab from the bottom of the well screen to the top of the well. This action pulled water over the top of the well and settled the pack sand nine feet after the first four pulls, seven more feet after the next three pulls, and three feet after five additional pulls. More pack sand was added and development continued with long pulls and normal surging with the spudding action of the rig.

One gallon of Baroid's Aqua Clear PFD (phosphate-free dispersant) was injected into the well screen in order to mobilize silt and clay-sized particles from the aquifer formation. Surge development continued, and several long pulls showed that the water became more silty after the Aqua Clear treatment. Development was considered complete when the pack sand stopped dropping and very little fine-grained material was entering the well during development. Holocene then bailed the tail pipe clean and started installation of the test pump.

Well Testing

Holocene installed a submersible pump into the 12-inch casing with the intake at a depth of 86 feet. A step-rate pumping test was conducted on April 13th followed by the 26-hour constant rate test on April 14th and 15th. These tests were monitored in Well 10 with a pressure transducer/data logger set to measure the water level every minute. A recording barometer was also placed at the well site for the test period. The records of both transducers are presented in Figure 4. Water levels in Well 2 were measured with the City's SCADA system of data loggers and pressure transducers, and backed up with manual measurements made by our hydrogeologist. A graphic representation of the Well 2 water level data is included in Appendix B. The tidal changes in Gig Harbor were measured and recorded with a pressure transducer/data logger installed at the end of the pier at the County boat launch facility located on the east side of Gig Harbor. The pier is situated approximately one-half mile south of the City Park. The tidal changes are shown on Figure 4.

A tidal change of over 13 feet in Gig Harbor on April 12th, before the start of testing, caused less that one foot of water level fluctuation in Well 10. It is likely that this change is due to a loading affect over the confining layer and not to a direct connection between the Sea Level Aquifer and the harbor. The minimal barometric changes recorded could not be directly correlated to changes in water level at Well 10.

Step-Rate Pumping Test Results

Well 10 was tested at three different production rates at one-hour intervals. The production rates ranged from 396 to 551 gpm. Immediately after the pump was started at 396 gpm, water clarity was slightly turbid. Within 10 minutes of production at this rate, the water was clearing. Little to no sand was produced throughout the step-rate test. The results of the step-rate test indicated the aquifer was a good source with a calculated specific capacity of about 8 gallons per minute per foot of drawdown (gpm/ft). A record of water levels measured by the Well 10 pressure transducer during the step rate test is shown in Figure 5.

The results of the step-rate test are included in Table 4 below.

Table 4: Pumping Test Results

Discharge Rate (gpm)	Elapsed Time (minutes)	Drawdown (feet)	Specific Capacity (gpm/ft)
396	60	39.55	10
505	60	58.68	8.6
551	30	66.1	8.3
400	26 hours	64.86	6.16

Constant Rate Pumping Test Results

Based on the step-rate test results, a pumping rate of 500 gpm was selected for the constant-rate test. The test was started, but after three hours, the pumping water level dropped to the bottom of the one-inch sounding tube at 83 feet. Consequently, the pumping rate was reduced to 400 gpm after 225 minutes of pumping. It remained at that rate through the remainder of the 26 hours of testing. The water level drawdown below the static water level of 15.84 feet was 64.86 feet, indicating a specific capacity of 6.2 gpm/ft. During the 26-hour test, manual measurements were initially collected by our hydrogeologist and later by Holocene at selected one-hour intervals. The manual measurements are included in Appendix B. Figure 6, attached in Appendix A, displays the transducer measurements of the overall drawdown curve of the 26-hour constant rate test.

The pumping water level in Well 10, after 26 hours, was 17 feet above the top of the well screen. The pumping water level in a high production well should never be allowed to draw down inside the well screen. This practice can cause cascading water, air entrainment, reduced well efficiency, increased encrustation potential, and a shorter operational life for the well.

Recovery measurements of Well 10 were also recorded with the transducer and backed by manual measurements. Twenty-two hours after pumping stopped, the water level was 19.01 feet below the measuring point. After 26 hours of recovery, the water level of 18.56 feet was 2.72 feet below the pre-test static water level. Figure 7, attached in Appendix A, displays the overall recovery trend of Well 10.

The 26 hour test of Well 10 lowered the water level in Well 2, at a distance of 200 feet, 40.39 feet. This amount of interference suggests that the aquifer is likely a narrow valley with recharge coming mainly from an up valley source.

Transmissivity

Transmissivity (T) is a measure of the ability of the aquifer material to transmit water. It is a calculated value of the full-aquifer thickness and is equivalent to the amount of water that would flow through a vertical, one-foot wide strip of the aquifer in one day if a unit gradient were applied. It should be noted that groundwater gradients are quite small and the transmissivity value cannot, therefore, be used directly as a statement of groundwater flow. Transmissivity is calculated from drawdown and recovery patterns, such as those illustrated in Figures 6 and 7. The transmissivity was calculated using the Jacob/Theis, modified, non-equilibrium formula from the pumping rate and the slope of the drawdown and recovery graphs.

The aquifer is likely a narrow valley with low permeability boundaries on each side and the majority of source water entering the aquifer by infiltration somewhere up valley. Figure 6 shows a steepening drawdown curve requiring flow rate adjustments in order to maintain a 500 gpm pumping rate. The early part of the drawdown between seven and 25 minutes shows a T of about 9,400 gpd/ft. After the first flow rate adjustment was made the slope steepened and the T declined to 5,000 gpd/ft. After the second adjustment the T declined even further and the pumping water level dropped below the transducer causing the flat line shown on Figure 6 from about 180 to 210 minutes. The flow rate was reduced to 400 gpm at 225 minutes into the test and the slope is seen to be constant between 300 minutes and the end of the 26-hours on Figure 6. The T for that slope is calculated at 15,000 gpd/ft. However, the recovery slope shown on Figure 7 is not influenced by changes in pumping rate and shows a T of 7,500 as the aquifer is recharged from its source. The T calculated from the early drawdown slope and the recovery T values are 9,400 and 7,500 gpd/ft respectively. The T for the Sea Level Aquifer at Well 10 is approximately 8,400 gpd/ft.

Water Quality Testing

Water samples were collected after 26 hours of continuous pumping and sent to Water Management Laboratories for Group A drinking water analysis. Laboratory reports are included in Appendix B.

Inorganic Test Results

Water pumped during the test was sand free with no noticeable adverse taste or odor. Water temperature was 50 degrees Fahrenheit. The results of inorganic water quality analyses from Well 10 showed all parameters except iron and manganese to be below the Washington State Department of Health's maximum contaminant levels (MCL) required for safe drinking water. Iron was sampled at 0.73 mg/L compared to an MCL of 0.3 mg/L. Manganese exceeded the MCL of 0.05 mg/L with a sampled result of 0.11 mg/L. The value for turbidity exceeded the Health's trigger level of 1 NTU with a test result of 2.8 NTU. The water had a hardness level of 83 mg/L.

Our experience has shown that after the well is put into normal service, the turbidity will decrease. A reduction in turbidity may also cause a reduction in iron and/or manganese concentrations. This is because colloidally suspended compounds that are part of the turbidity can be falsely read as dissolved iron or manganese by the laboratory equipment.

Volatile Organic Test Results

Analysis performed by Water Management Laboratories shows all measured parameters to be below the detection level for each compound.

Radionuclide Test Results

Radionuclide analysis for gross alpha, gross beta, and radium 228 was not available at report publication.

Bacteriological Test Results

Bacteriological analysis results showed no coliform bacteria present.

Sea Water Intrusion Potential

Since Well 10 is located within approximately 600 feet of Gig Harbor, it is considered at risk and must be monitored for saltwater intrusion during testing. At a minimum, water quality testing for chloride and specific conductance is required at 1, 12 and 24 hours. Our hydrogeologist collected the samples for laboratory analysis. The test results are listed in Table 5. Laboratory results are included in the Appendix.

Table 5: Chloride and Conductivity Test Results

	Chloride (mg/L)	Electrical Conductivity (uS/cm)
Well 10		
26-Hour Test (400 gpm)		
1 Hour	7	157
12 Hours	7	158
24 Hours	7	159

Operation of Well 10 showed stable chloride and conductivity levels in the aquifer. The Sea Level Aquifer does not appear to have a direct connection to salt water at the north end of Gig Harbor. The lack of tidal response in the aquifer suggests that the minor tidal water level fluctuation is the result of tidal loading above the confining layer in the harbor rather than direct inflow and outflow of sea water in the aquifer. Gig Harbor is relatively shallow at the north end of the bay. The aquifer likely discharges either into deeper parts of the harbor about one-half mile south or even further south into Puget Sound.

Lateral intrusion of sea water into an aquifer is possible if the normal seaward gradient is reversed. The pumping water level in Well 2 or Well 10 (they will not operate together) is below sea level when operating. However, the City's water quality history with Well 2 has shown no increase in chloride or conductivity, which are the early indicators of sea water intrusion.

Wellhead Protection Area Preliminary Delineation

Health requires a preliminary delineation of the Wellhead Protection Area (WHPA) for all new groundwater sources. Pertinent information detailing the new sources is contained in the "Ground Water Contamination Susceptibility Assessment Survey Form" (Version 2.2) completed for each well being prepared by the City. Well 10 will ultimately become the primary source, and Well 2 will be the backup source. Only one delineation is presented here, as both wells utilize the same water right amount of 330 gpm and 209 acre feet per year and will not be pumped at the same time.

A WHPA is defined as the surrounding surface and subsurface area through which potential contaminants are likely to pass and eventually reach a well supplying public water. This area is known as the well's zone of contribution or capture zone. Data are usually insufficient to completely and accurately define the exact size and shape of the capture zone. For this reason, a series of approximation methods are used to delineate a WHPA.

These methods, in order of increasing complexity, are:

- Calculated Fixed Radius
- Analytical Models
- Hydrogeologic Mapping
- Numerical Flow/Transport Models

Hydrogeologic data are not available to provide a more sophisticated preliminary delineation than the calculated fixed radius illustrated on Figure 8.

The 6-month and 1-, 5-, and 10-year intervals shown were interpolated from Appendix E in the Washington State Wellhead Protection Program Guidance Document. The screened interval is 40 feet and the annual consumption is 209 acre feet or 68.1 million gallons. The calculated fixed radius capture zones shown on Figure 1 for the 6-month and 1-, 5-, and 10-year intervals are 505, 714, 1600, and 2263 feet respectively. The 5- and 10-year time of travel capture zones ex-

tends beyond the valley sides and into Gig Harbor. Our experience has shown that more sophisticated methods would likely show an elongated oval extending northward up Crescent valley. However, the wells are protected from surface sources of contamination by the 25 to 30 foot thick silt/clay confining layer logged from about 40 to 75 feet below ground surface.

Findings

Well 10:

- produced 400 gpm for 26 hours,
- is completed between 96.5 and 136.5 feet below ground surface in a confined sand and gravel aquifer,
- has an aquifer transmissivity of about 8,400 gpd/ft,
- produces water of acceptable quality with a temperature of 50 degrees Fahrenheit, and
- shows no indication of sea water intrusion.

Conclusions and Recommendations

Well 10 penetrates a confined, sand and gravel aquifer found between 75 and 139 feet below ground surface (60 to 100 feet below sea level). This aquifer is the same as tapped by Well 2.

Robinson, Noble & Saltbush recommends that the City install a variable-speed production pump into the 12-inch riser pipe with the pump intake at a depth of about 95 feet below ground surface. Two one-inch inside-diameter water level monitoring pipes should be installed with the pump, along with an automatic shut-off probe, to a depth of 90 feet. The pump should have a maximum discharge rate of 500 gpm against a pumping lift of 95 feet, plus system requirements. The 500 gpm rate can be used for peaking periods that should not exceed 24-hours in duration. We recommend installation of a computer controlled variable-speed pump that will reduce the pumping rate as required to maintain a pumping water level of approximately 90 feet. The pump should be capable of producing between 300 and 500 gpm to allow full use of the current 330 gpm water right amount with the potential for additional withdrawal of up to 170 gpm more in the future.

Water levels must be closely monitored until the well's operational characteristics are fully understood by the City. Once Well 10 is in operation, the City should record the instantaneous pumping rate and total volume pumped each time a pumping water level is measured. The City should plot this water level data at least annually to monitor the health of the aquifer and the well's efficiency. Robinson, Noble, & Saltbush would be pleased to provide hydrogeologic expertise for these evaluation efforts.

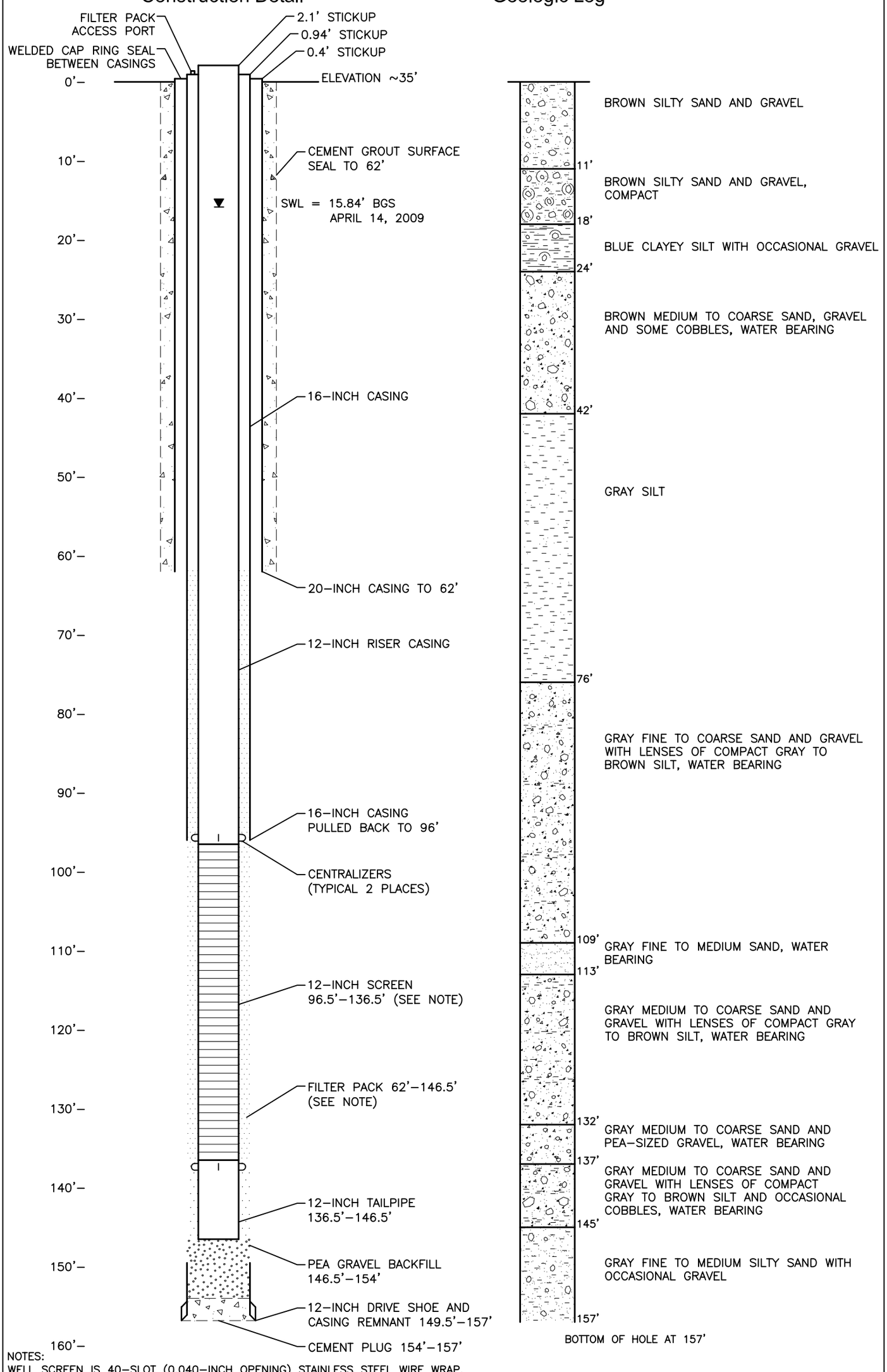
The statements, conclusions, and recommendations provided in this report are to be exclusively used within the context of this document. They are based upon generally accepted hydrogeologic practices and are the result of analysis by Robinson, Noble & Saltbush, Inc. staff. This report, including any attachments to it, is for the exclusive use of the City of Gig Harbor. Unless specifically stated in the document, no warranty, expressed or implied, is made.

APPENDIX A



ROBINSON NOBLE SALTBUSH INC. GROUNDWATER & ENVIRONMENTAL SCIENTISTS	Note: Basemap taken from USGS Gig Harbor Quadrangle	PM: BGC May 2009	1326-012A Scale 1" = 2000'	Pierce County T 22 N/R 02 E - 32P

Figure 1
Vicinity Map
City of Gig Harbor: Well 10 Construction Project



NOTES:
WELL SCREEN IS 40-SLOT (0.040-INCH OPENING) STAINLESS STEEL WIRE WRAP.
FILTER PACK AT 60'-136.5' IS 8x12 AND PACK AT 136.5'-146.5' IS 10x20, BOTH PACKS ARE COLORADO SILICA SAND PRODUCT.

ROBINSON NOBLE SALTBUSH INC.
GROUNDWATER & ENVIRONMENTAL SCIENTISTS

PM: BGC
May 2009
1326-012A

Pierce County
T 22 N/R 02 E - 32P

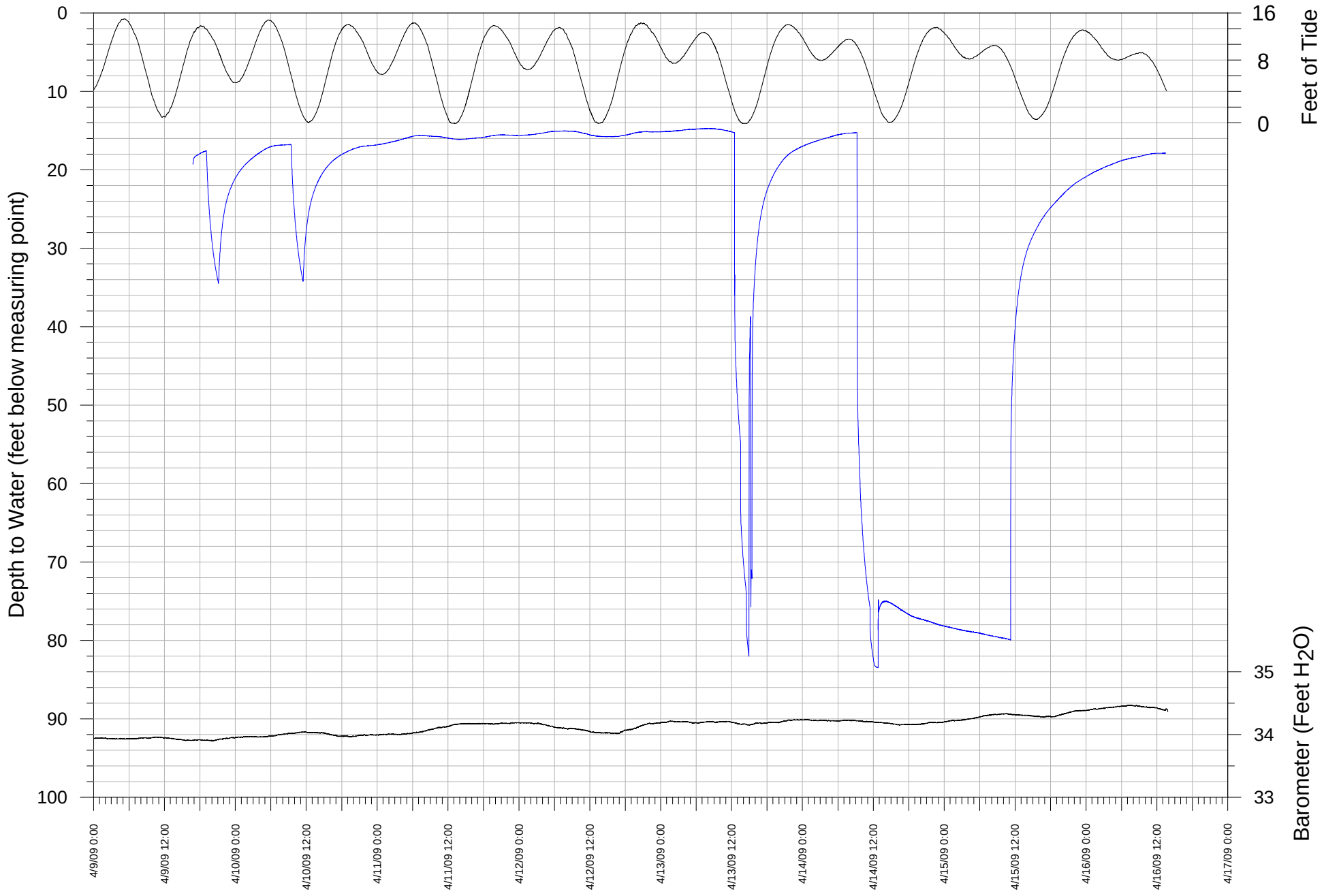
Figure 2
Construction Detail and Geologic Log for Well 10
City of Gig Harbor



ROBINSON NOBLE SALTBUSH INC. Established 1947
GROUNDWATER & ENVIRONMENTAL SCIENTISTS

Date: May 2009
Job No. 1326-012A
PM: BCG

Figure 3
Vertical Grain Size Distribution
Gig Harbor Well 10 Construction

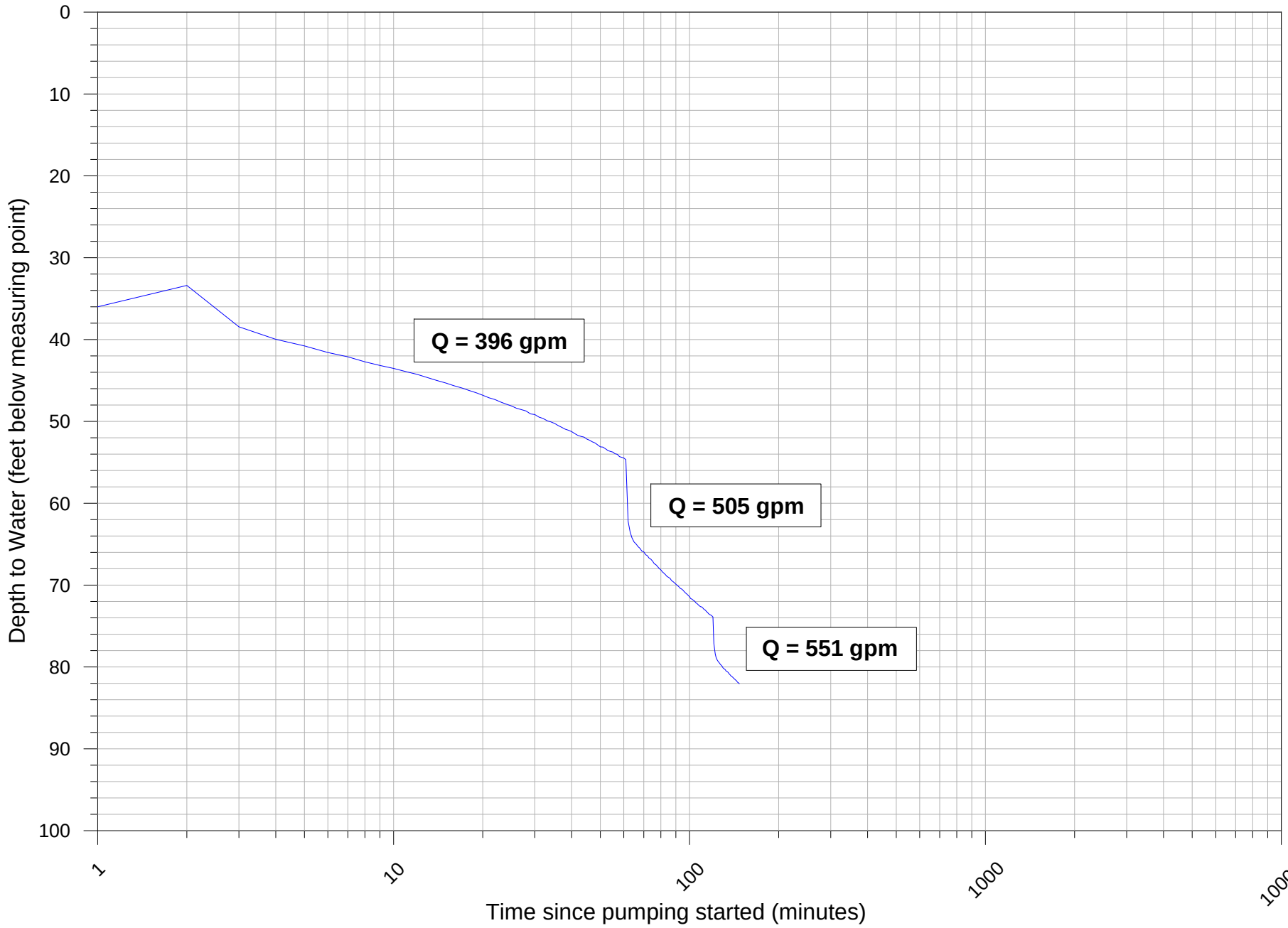


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GROUNDWATER & ENVIRONMENTAL SCIENTISTS

Date: May 2009
Job#: 1326-012A
PM: BCG

Pressure Transducer
One-minute Interval
Static Water Level = 18.67' bmp

Figure 4
Well 10 Hydrograph and Barometric Log
City of Gig Harbor

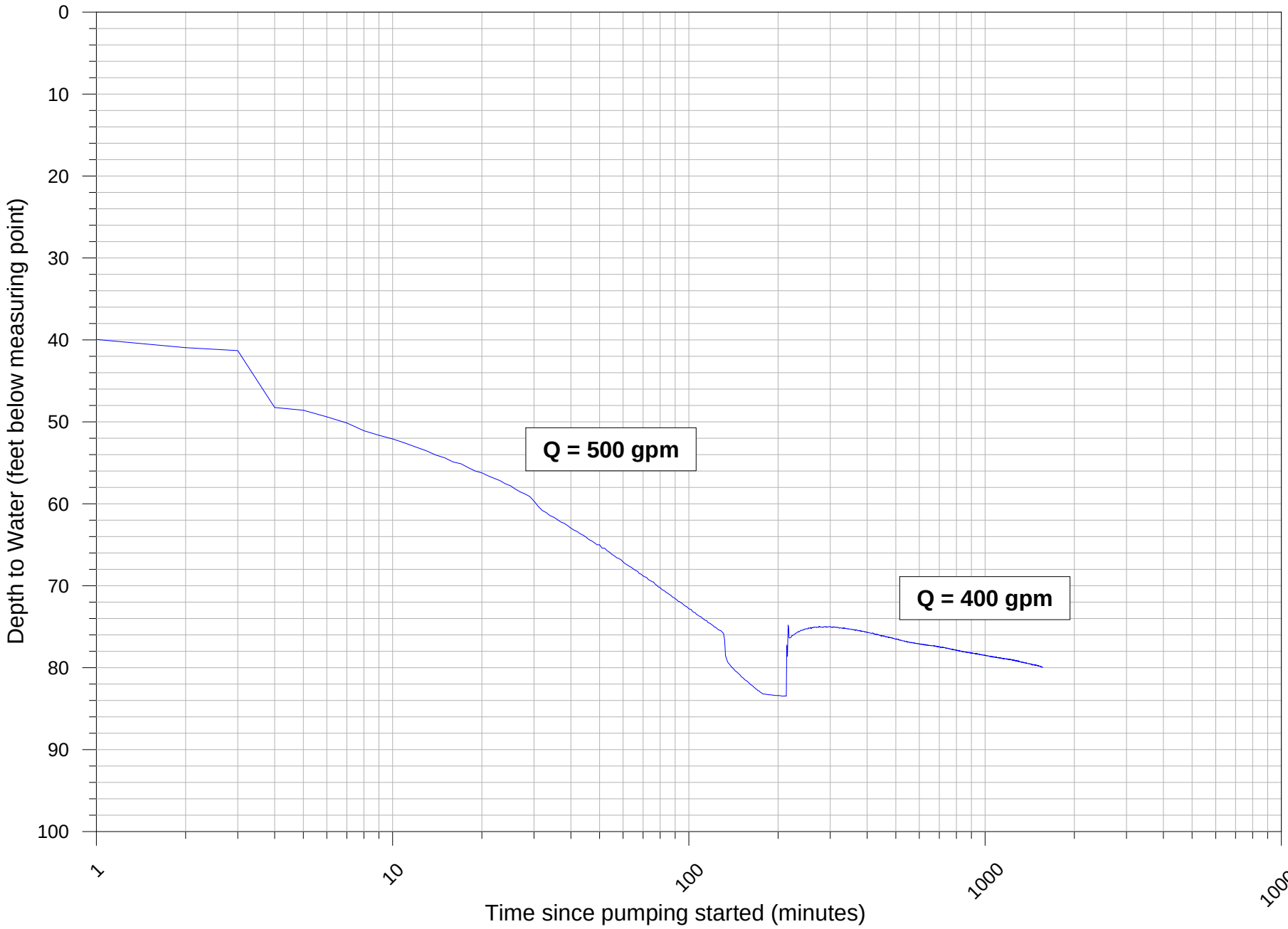


ROBINSON NOBLE SALTBUSH INC. Established 1947
GROUNDWATER & ENVIRONMENTAL SCIENTISTS

Date: May 2009
Job#: 1326-012A
PM: BCG

Drawdown Plot (04/13/09)
Maximum Pumping Rate: 551 gpm
Static Water Level = 15.70' bmp

Figure 5
Well 10 Step-Rate Pumping Test
City of Gig Harbor

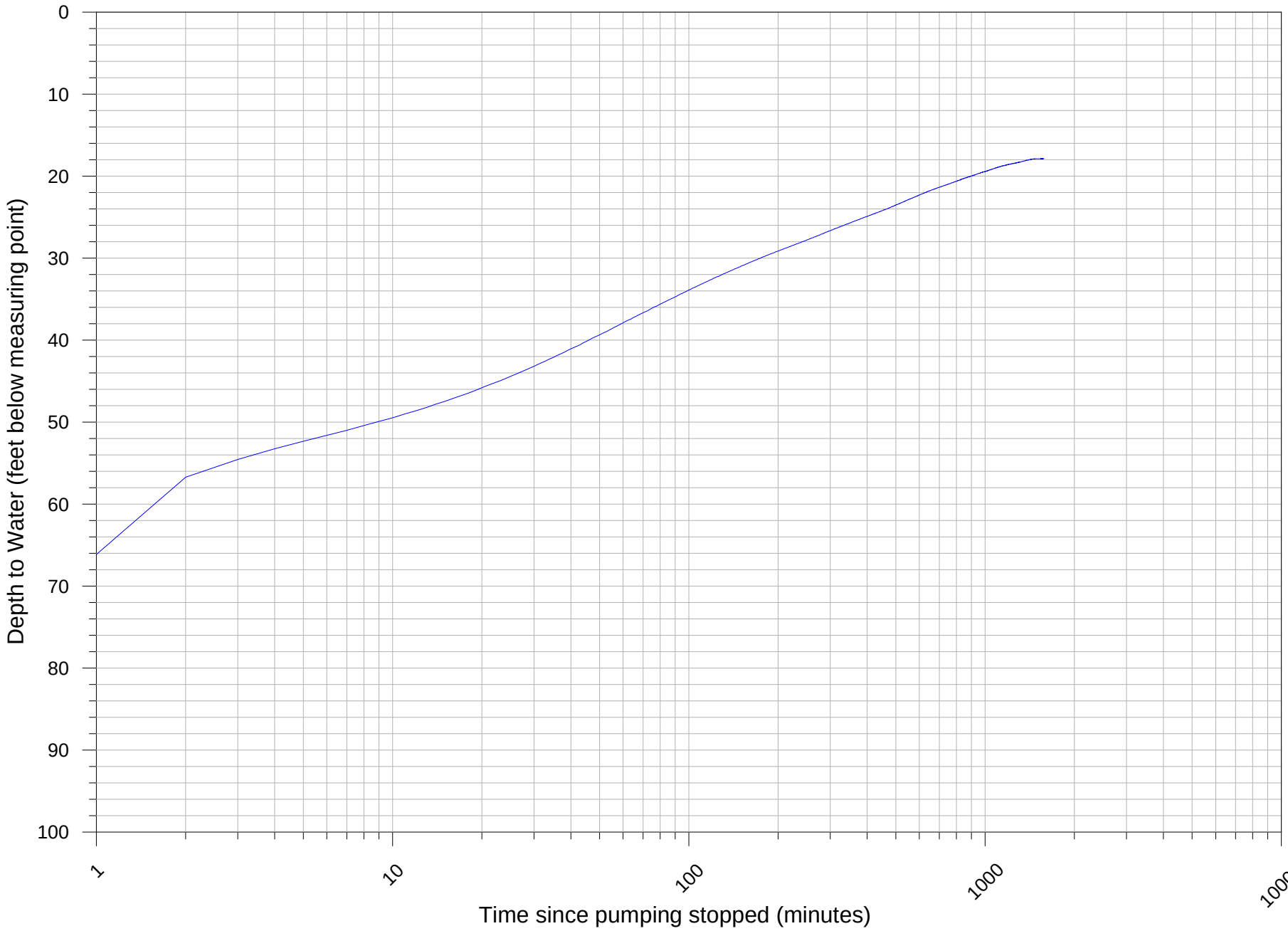


ROBINSON NOBLE SALTBUSH INC. Established 1947
GROUNDWATER & ENVIRONMENTAL SCIENTISTS

Date: May 2009
Job#: 1326-012A
PM: BCG

Drawdown Plot (04/14/09-4/15/09)
Average Pumping Rate: 415 gpm
Static Water Level = 15.84' bmp

Figure 6
Well 10 Drawdown during 26-hour Test
City of Gig Harbor

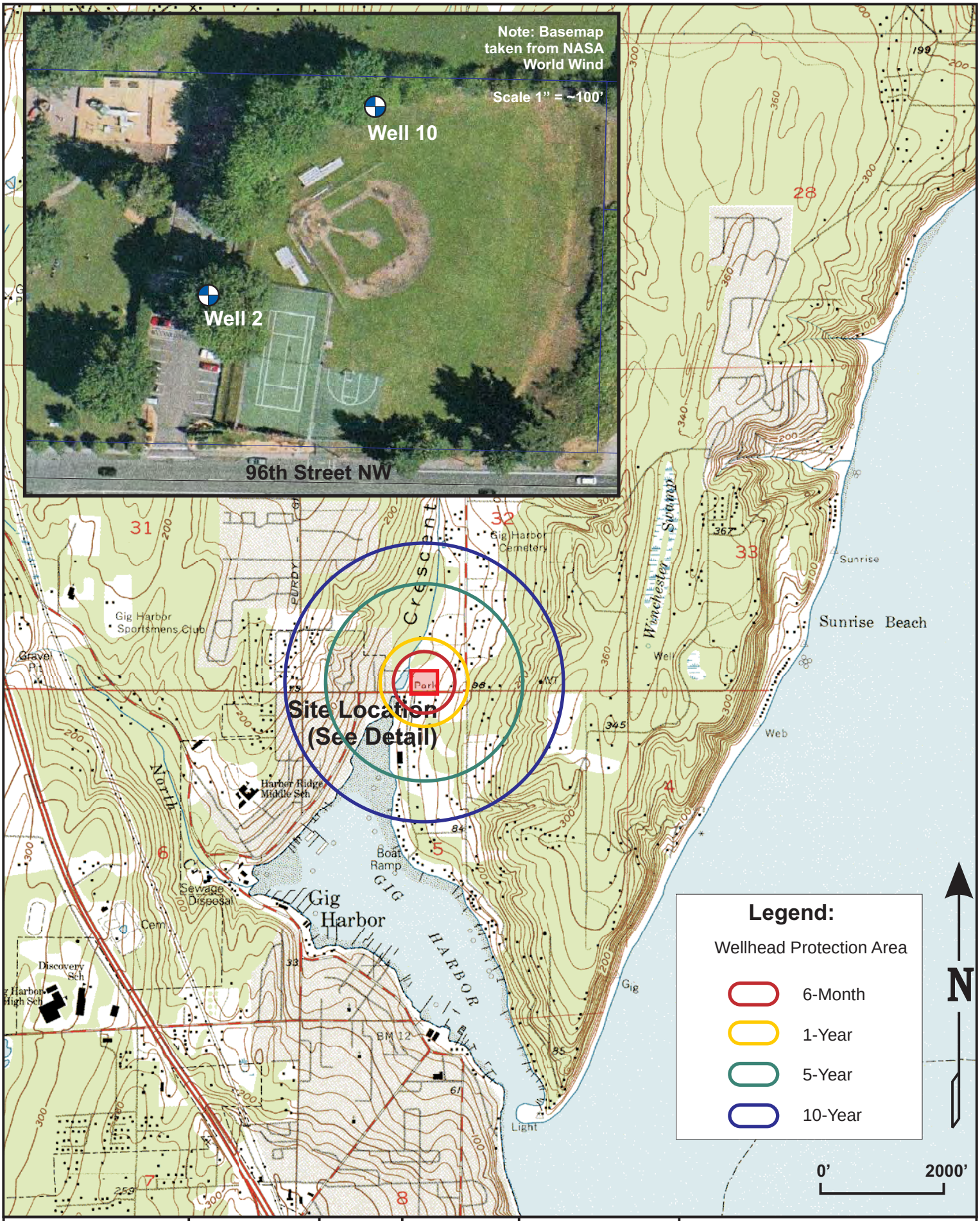


ROBINSON NOBLE SALTBUSH INC. Established 1947
GROUNDWATER & ENVIRONMENTAL SCIENTISTS

Date: May 2009
Job#: 1326-012A
PM: BCG

Recovery Plot (04/15/09-04/16/09)
Static Water Level: 15.84' bmp

Figure 7
Well 10 Recovery from 26-hour Test
City of Gig Harbor



ROBINSON NOBLE SALTBUSH INC. GROUNDWATER & ENVIRONMENTAL SCIENTISTS	Note: Basemap taken from USGS Gig Harbor Quadrangle	PM: BGC May 2009	1326-012A Scale 1" = 2000'	Pierce County T 22 N/R 02 E - 32P	Figure 8 Wellhead Protection Area City of Gig Harbor: Well 10 Construction Project

APPENDIX B

WATER WELL REPORT FORMS FOR WELLS 2 AND 10

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission *("x" in circle)*

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number _____

PROPOSED USE: ☐ Domestic ☐ Industrial ☒ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) 10

☒ New well ☐ Reconditioned *Method :* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☒ Cable ☐ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 16 inches, drilled 157 ft. Depth of completed well 147 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 16" Diam. from 0 ft. to 157 ft.
☐ Liner installed _____" Diam. from _____ ft. to _____ ft.
☐ Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: ☐ Yes ☒ No

Type of perforator used _____

SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☒ Yes ☐ No ☐ K-Pac Location _____

Manufacturer's Name Johnson

Type S.S. Model No. PS

Diam. 12 Slot size 0.040 from 96.5 ft. to 136.5 ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☒ Yes ☐ No Size of gravel/sand 8x12

Materials placed from 60 ft. to 137 ft.

Surface Seal: ☒ Yes ☐ No To what depth? 64 ft.

Material used in seal Cement

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level 35 ft.

Static level 15.84 ft. below top of well Date 4-14-09

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? R&N

Yield: 505 gal./min. with 51.9 ft. drawdown after 1 hrs.

Yield: 400 gal./min. with 65.2 ft. drawdown after 12 hrs.

Yield: 400 gal./min. with 64.5 ft. drawdown after 24 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
5 min	53.05	30 min	43.82	____	____
10 min	50.13	60 min	38.61	____	____
15 min	48.19	____	____	____	____

Date of test Bailer test _____ gal./min. with _____ ft. drawdown after __ hrs.

Airtest gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water 50 F Was a chemical analysis made? ☒ Yes ☐ No

CURRENT

Notice of Intent No. _____

Unique Ecology Well ID Tag No. _____

Water Right Permit No. G2-00522

Property Owner Name City of Gig Harbor

Well Street Address 3303 Vernhardson St (Cresent Creek Park)

City Gig Harbor County Pierce

Location SE 1/4-1/4 SW 1/4 Sec 32 Twn 22N R 02E

EWM ☒ Or WWM ☐

Lat/Long (s, t, r Still REQUIRED) Lat Deg _____ Min _____ Sec _____ Long Deg _____ Min _____ Sec _____

Tax Parcel No. 02-22-32-3-018

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Brown silty sand & gravel	0	11
Brown compact silty sand & gravel	11	18
Blue clayey silt w/ some gravel	18	24
Brown medium to coarse sand & gravel, some cobbles, wb	24	42
Gray silt	42	76
Gray fine to coarse sand & gravel with lenses of		
compact gray to brown silt, wb	76	109
Gray fine to medium sand, wb	109	113
Gray medium to coarse sand & gravel with lenses of		
compact gray to brown silt, wb	113	132
Gray medium to coarse sand and pea gravel, wb	132	137
Gray medium to coarse sand & gravel with lenses of		
compact gray to brown silt, wb	137	145
Gray fine to medium silty sand with some gravel	145	157

Start Date 2-3-2009 Completed Date 4-15-2009

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Driller or trainee License No. _____

Name (Print Last, First) Niederkorn , Jim

Driller/Engineer/Trainee Signature

IF TRAINEE: Driller's License No:

Driller's Signature:

Drilling Company Holocene Drilling

Address 10621 Todd Road East

City, State, Zip Edgewood , WA, 98372-2527

Contractor's Registration No._____ Date _____

Ecology is an Equal Opportunity Employer

The Department of Ecology does NOT Warra the Data and/or the Information on this Well Re

WELL 2
AAF 346

Qi 330

Qa 909 P
116 S
325

Confession

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

WELL LOG No. A-6570

Date 1-29-63, 19

Record by

Source

Location: State of WASHINGTON

County Pierce

Area

Map

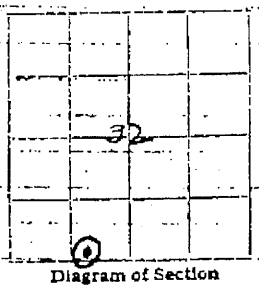


Diagram of Section

SE ¼ SW ¼ sec. 32 T. 22N., R. 2 E. W.

Drilling Co. Harbor Pump and Drilling Co., Inc.

Address Route 4, Box 4117, Gig Harbor, Wash.

Method of Drilling cable Date Sept. 10, 19 62

Owner Town of Gig Harbor

Address P. O. Box 145, Gig Harbor, Washington

Land surface, datum ft. above / below

Correlation	Material	Thickness (feet)	Depth (feet)	
	Sand and gravel, hardpan	0	18	
	Blue clay	18	30	
	Sand, gravel and water	30	48	
	Blue clay with layers of sand	48	73	
	Medium sand to coarse gravel - water-bearing	73	84	10
	Mixed sand and gravel	84	90	
	Hardpacked sand and gravel with water	90	99	(?)
	Large loose gravel & water	99	109	10
	Brown peat, clay & vegetation	109	111	
	Water-bearing coarse sand & pea gravel	111	115	5
	Coarse sand & pea gravel with larger gravel - water-bearing	115	121	5

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up (over) Sheet of sheets

The Department of Ecology does NOT Warra the Data and/or the Information on this Well Re

WELL LOG.—Continued No...../.....

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Depth forward		
	New well - test well - municipal		
	Casing: welded		
	10 in diam from 0 to 116 ft 7 in. - gage 280		
	Screens: Johnson Everdur		
	8 in diam, slot size 90, set from 116 to 121 ft		
	Water levels: Flowing - water controlled by cap with valve.		
	Well tests: Yield 425 gpm with 76 ft drawdown after 46 hrs.		
	Artesian flow 20 gpm - Date Sept., 1962		
	Temp. 50°		
	Diam. of well 10 in. - Depth drilled 121 ft		
	Depth of completed well 121 ft.		

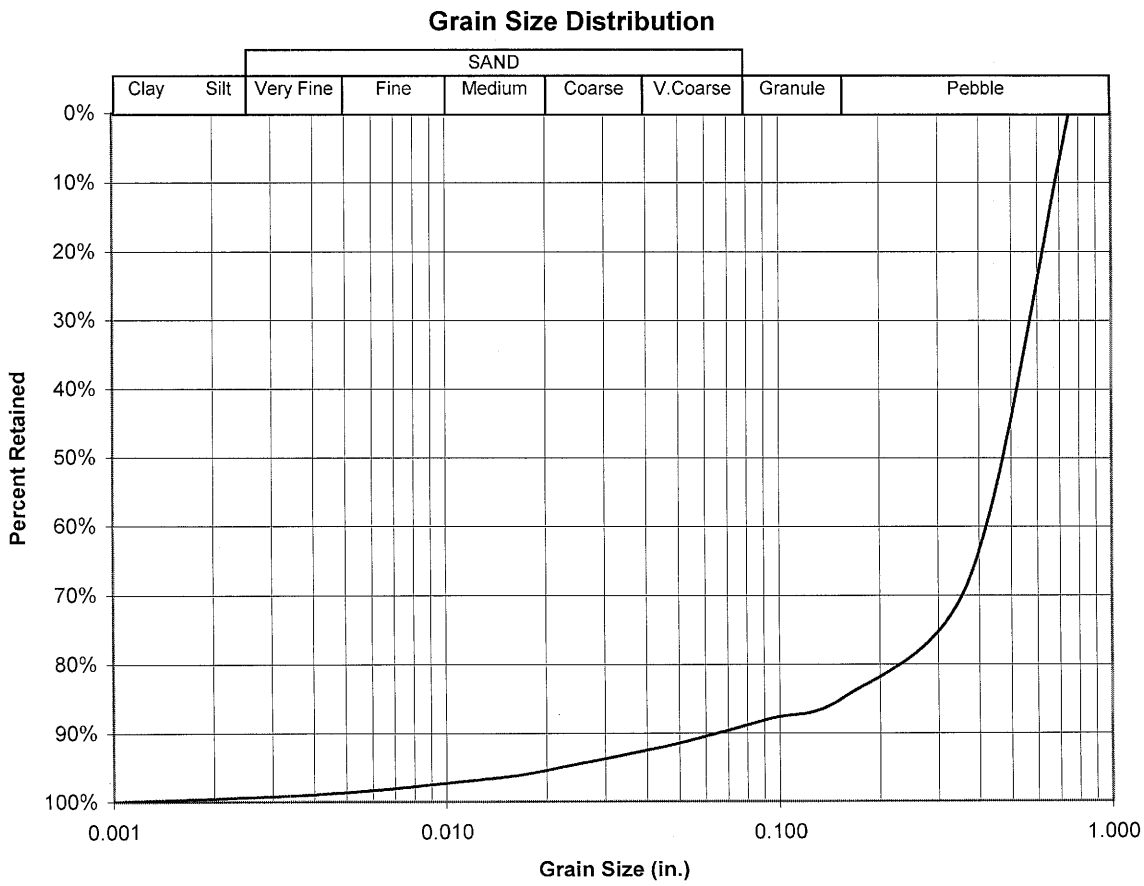
S. F. No. 7449—OS—6-61—2M.

GRAIN SIZE ANALYSES

Grain Size Calculations

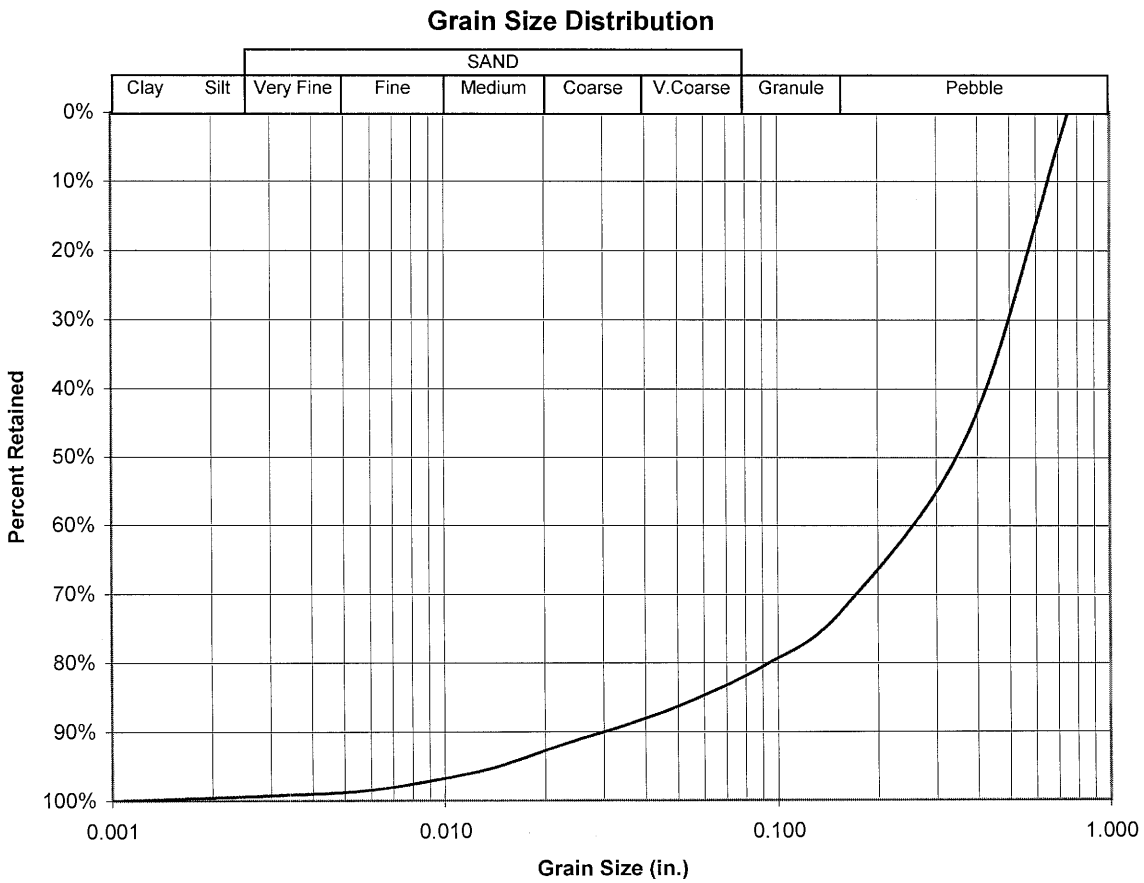
Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**76**						
				Calculations			
		Weights	**Percentage**	0.9	0.7	0.4	
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%	0	0	0.527996	
	0.375	583.3	68%	0	0.344136	0	
	0.157	731.7	85%	0	0	0	
	0.093	759.3	88%	0.068369	0	0	
	0.047	792.3	92%	0	0	0	
	0.023	818.3	95%	0	0	0	
	0.017	829.1	96%	0	0	0	
	0.012	836.3	97%	0	0	0	
	0.006	849	98%	0	0	0	
	0.003	856.6	99%	0	0	0	
	0.001	863.3	100%	0	0	0	

Depth	**D10**	**D30**	**D60**
76	0.068	0.344	0.528



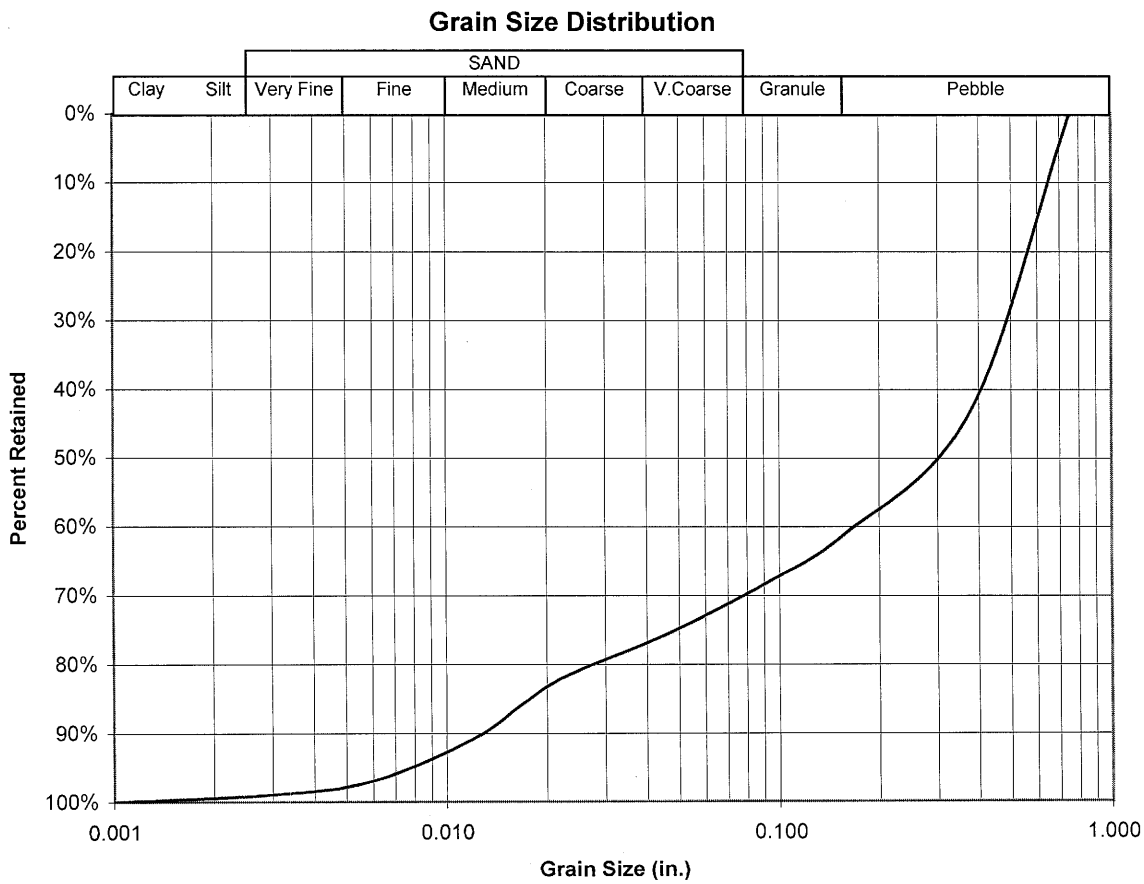
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**82**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0.427355
	0.375	574.3	46%		0	0.175976	0
	0.157	892.4	72%		0	0	0
	0.093	990.4	80%		0	0	0
	0.047	1073.2	87%		0.031598	0	0
	0.023	1133.3	92%		0	0	0
	0.017	1160	94%		0	0	0
	0.012	1185.7	96%		0	0	0
	0.006	1216.5	98%		0	0	0
	0.003	1226.1	99%		0	0	0
	0.001	1235.3	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			82	0.032	0.176	0.427	



Grain Size Calculations

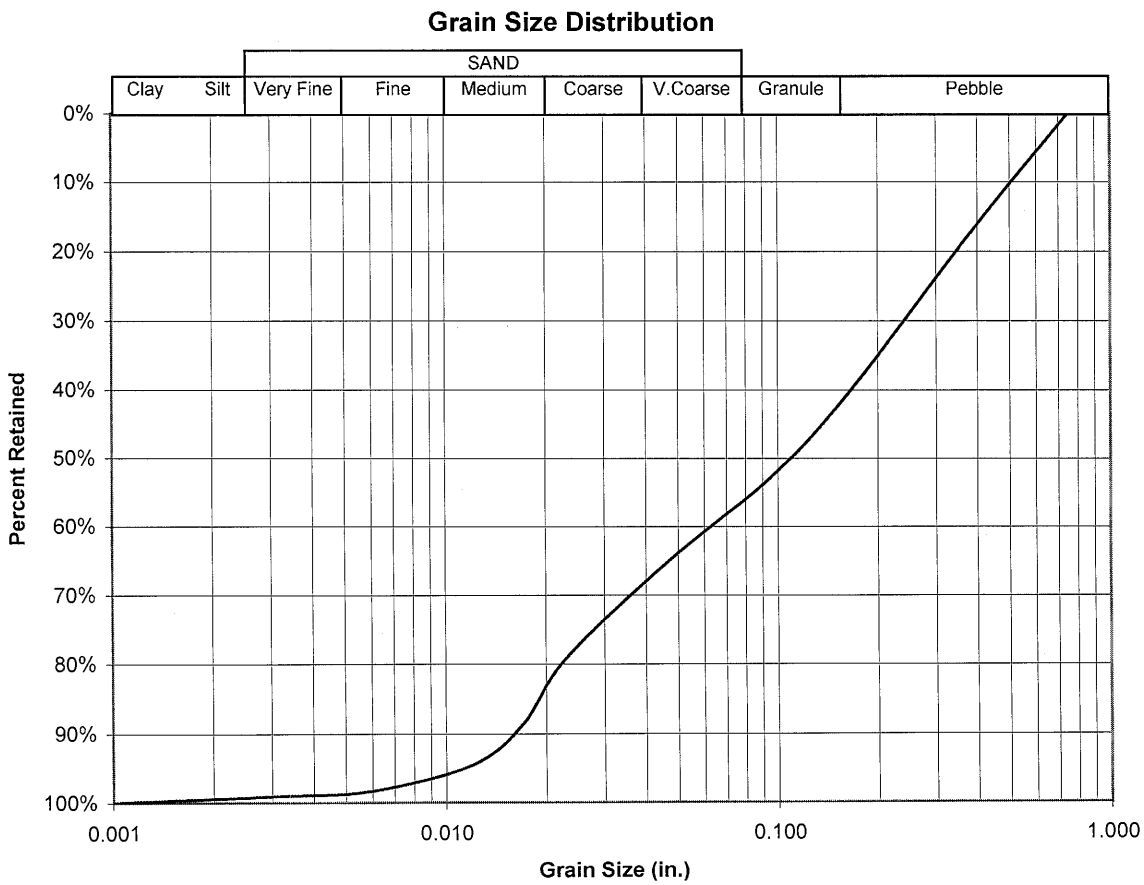
Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**88**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0.40488
	0.375	525.6	43%		0	0	0
	0.157	739.6	61%		0	0	0
	0.093	822.4	68%		0	0.080608	0
	0.047	911.9	75%		0	0	0
	0.023	987.6	82%		0	0	0
	0.017	1036	86%		0.01279	0	0
	0.012	1098.2	91%		0	0	0
	0.006	1172.4	97%		0	0	0
	0.003	1196.3	99%		0	0	0
	0.001	1209.3	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			88	0.013	0.081	0.405	



Grain Size Calculations

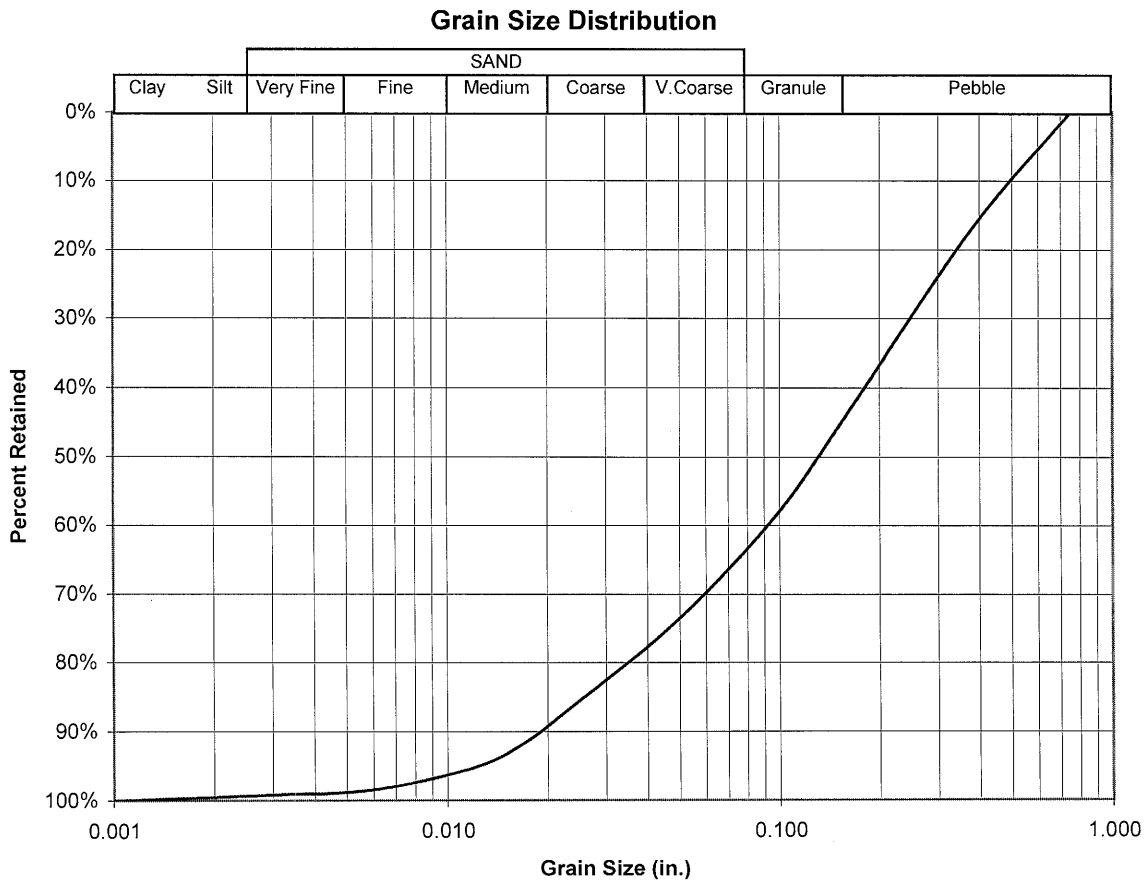
Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**94**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	243.4	18%		0	0	0.171303
	0.157	571.1	42%		0	0	0
	0.093	731.4	53%		0	0	0
	0.047	893.1	65%		0	0.03854	0
	0.023	1088	79%		0	0	0
	0.017	1218.6	89%		0.015875	0	0
	0.012	1298.6	95%		0	0	0
	0.006	1350.7	98%		0	0	0
	0.003	1361.3	99%		0	0	0
	0.001	1374	100%		0	0	0

Depth	**D10**	**D30**	**D60**
94	0.016	0.039	0.171



Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**97**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	225.6	17%		0	0	0.191801
	0.157	579.4	44%		0	0	0
	0.093	781.4	60%		0	0.061603	0
	0.047	977.3	75%		0	0	0
	0.023	1136.7	87%		0.019179	0	0
	0.017	1199.3	92%		0	0	0
	0.012	1245.6	95%		0	0	0
	0.006	1287.2	98%		0	0	0
	0.003	1296.5	99%		0	0	0
	0.001	1307.3	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			97	0.019	0.062	0.192	



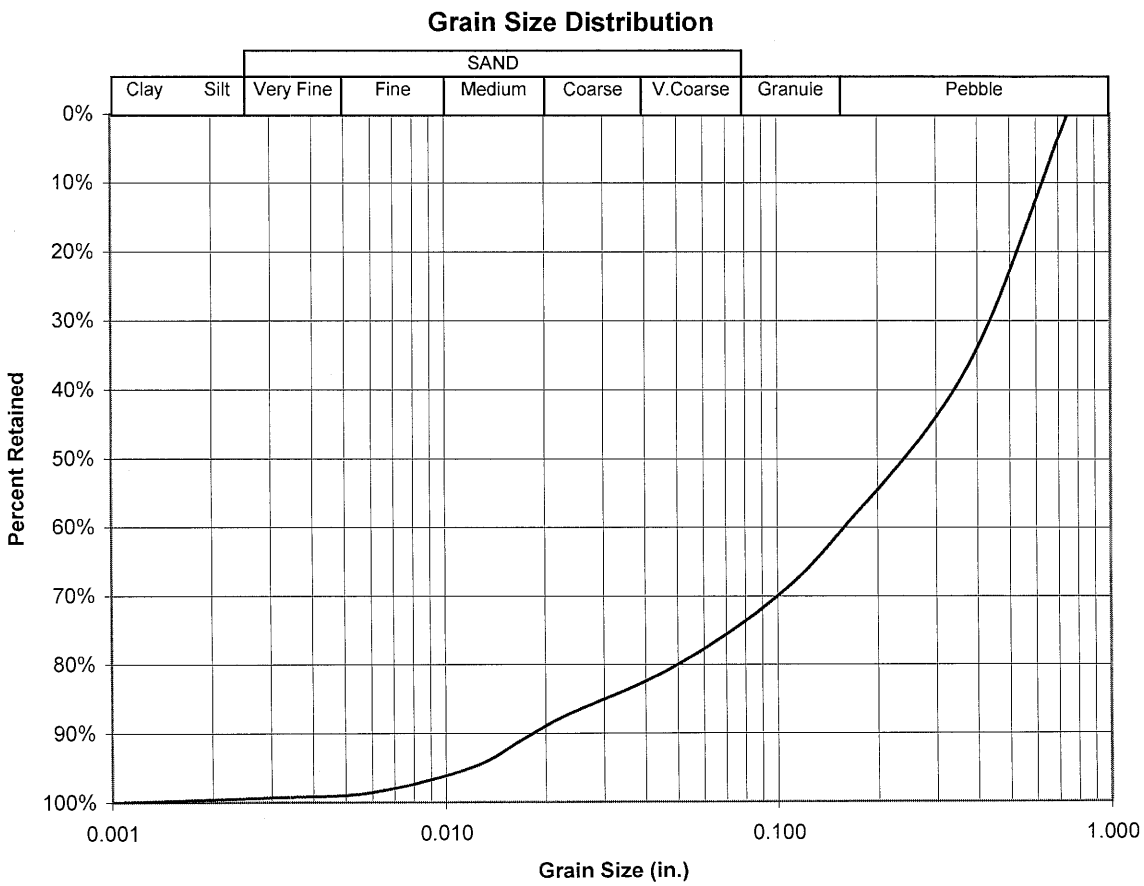
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**99**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	432.1	29%		0	0	0.295041
	0.157	859	58%		0	0	0
	0.093	1001.7	68%		0	0.084091	0
	0.047	1148.8	78%		0	0	0
	0.023	1295.7	88%		0.020399	0	0
	0.017	1362.2	93%		0	0	0
	0.012	1413.3	96%		0	0	0
	0.006	1455.2	99%		0	0	0
	0.003	1464	99%		0	0	0
	0.001	1471.7	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			99	0.020	0.084	0.295	



Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**102**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	534.1	37%		0	0	0.343461
	0.157	880.4	60%		0	0.100149	0
	0.093	1040.2	71%		0	0	0
	0.047	1179	81%		0	0	0
	0.023	1277.4	87%		0.018641	0	0
	0.017	1328.4	91%		0	0	0
	0.012	1386.6	95%		0	0	0
	0.006	1439.3	99%		0	0	0
	0.003	1449.9	99%		0	0	0
	0.001	1460.5	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			102	0.019	0.100	0.343	



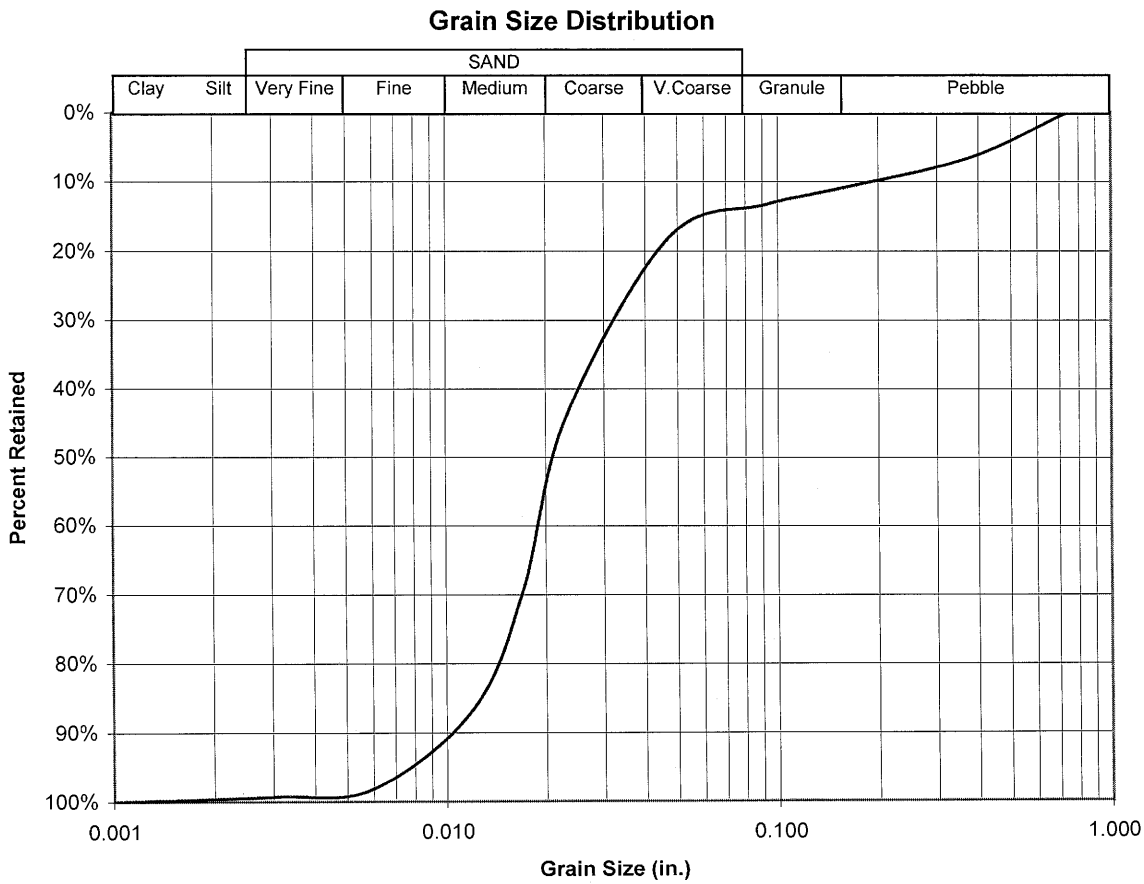
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**105**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	475.1	32%		0	0	0.32309
	0.157	962	65%		0	0.130521	0
	0.093	1136.8	77%		0	0	0
	0.047	1251.6	85%		0.029368	0	0
	0.023	1358.1	92%		0	0	0
	0.017	1414.4	96%		0	0	0
	0.012	1446.6	98%		0	0	0
	0.006	1469.9	99%		0	0	0
	0.003	1473.9	100%		0	0	0
	0.001	1477.6	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			105	0.029	0.131	0.323	



Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**108**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	83.4	7%		0	0	0
	0.157	136.3	11%		0	0	0
	0.093	166.2	13%		0	0	0
	0.047	227	18%		0	0	0.026859
	0.023	555.5	44%		0	0	0
	0.017	873.9	70%		0	0.016865	0
	0.012	1088.7	87%		0.010242	0	0
	0.006	1233.2	98%		0	0	0
	0.003	1248.1	99%		0	0	0
	0.001	1256.7	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			108	0.010	0.017	0.027	



Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**111**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	11.3	1%		0	0	0
	0.157	24.1	2%		0	0	0
	0.093	35.2	3%		0	0	0
	0.047	70.5	5%		0	0	0
	0.023	314.2	23%		0	0	0.019371
	0.017	701.2	51%		0	0.013657	0
	0.012	1087.4	79%		0.008395	0	0
	0.006	1330.6	97%		0	0	0
	0.003	1358.7	99%		0	0	0
	0.001	1370.6	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			111	0.008	0.014	0.019	



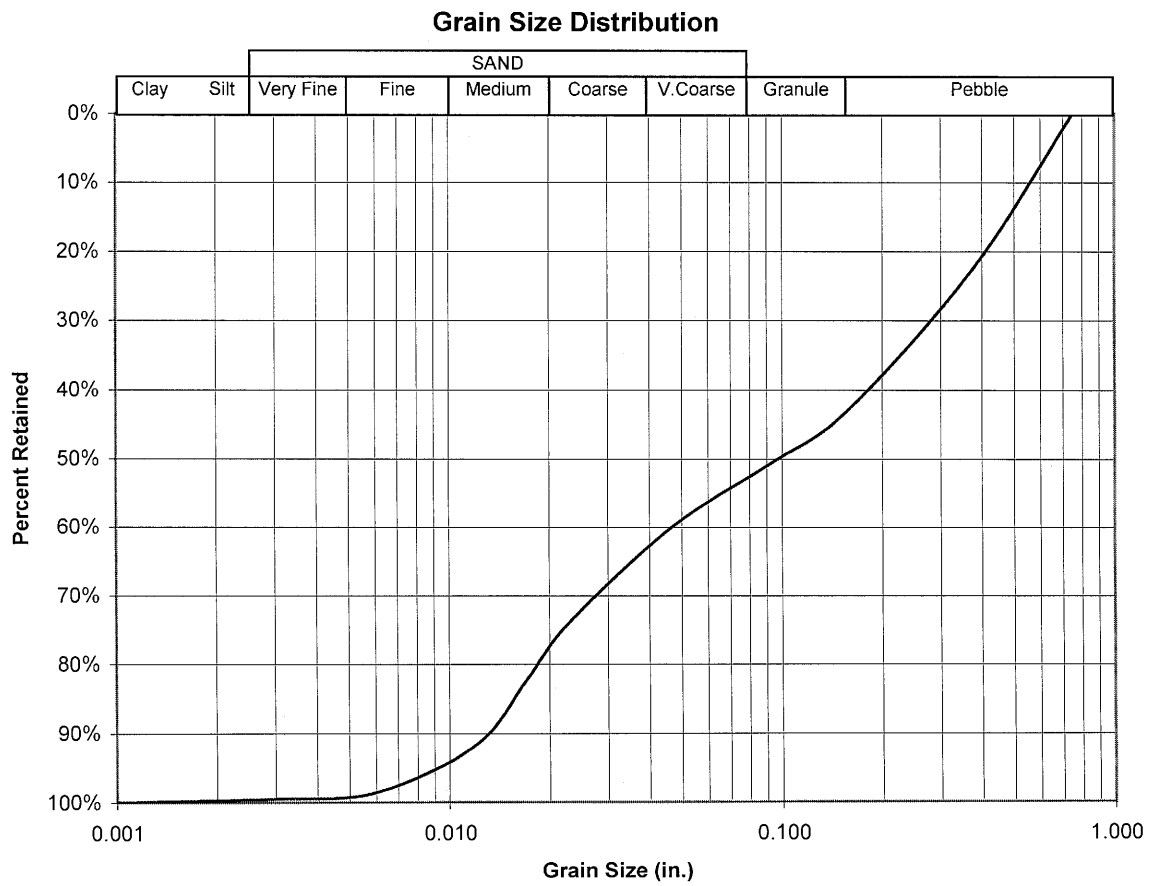
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**115**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	166.9	14%		0	0	0
	0.157	269.5	23%		0	0	0
	0.093	302.7	26%		0	0	0
	0.047	361.9	30%		0	0	0.031552
	0.023	537.3	45%		0	0	0
	0.017	691	58%		0	0.014077	0
	0.012	930.3	78%		0.00823	0	0
	0.006	1149.9	97%		0	0	0
	0.003	1173.1	99%		0	0	0
	0.001	1187	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			115	0.008	0.014	0.032	



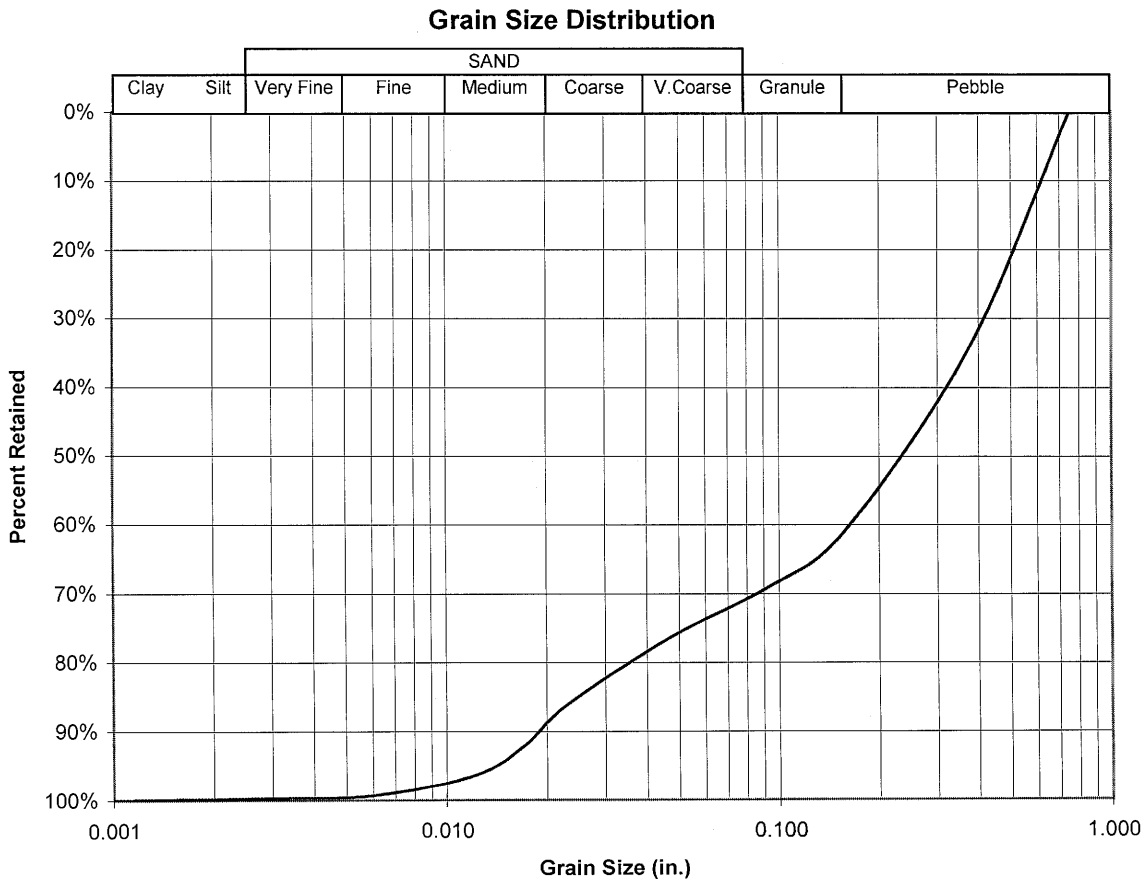
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**118**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	295.5	23%		0	0	0.189936
	0.157	563.3	43%		0	0	0
	0.093	661.6	51%		0	0	0
	0.047	782.8	60%		0	0.029704	0
	0.023	966.2	74%		0	0	0
	0.017	1077.1	82%		0.012904	0	0
	0.012	1198.3	92%		0	0	0
	0.006	1288	99%		0	0	0
	0.003	1300.3	99%		0	0	0
	0.001	1307.1	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			118	0.013	0.030	0.190	



Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**121**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	405.3	34%		0	0	0.327986
	0.157	723.3	61%		0	0	0
	0.093	818	69%		0	0.08701	0
	0.047	904.7	76%		0	0	0
	0.023	1021	86%		0.019188	0	0
	0.017	1092.2	92%		0	0	0
	0.012	1142.7	96%		0	0	0
	0.006	1175.9	99%		0	0	0
	0.003	1180.7	100%		0	0	0
	0.001	1184.7	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			121	0.019	0.087	0.328	

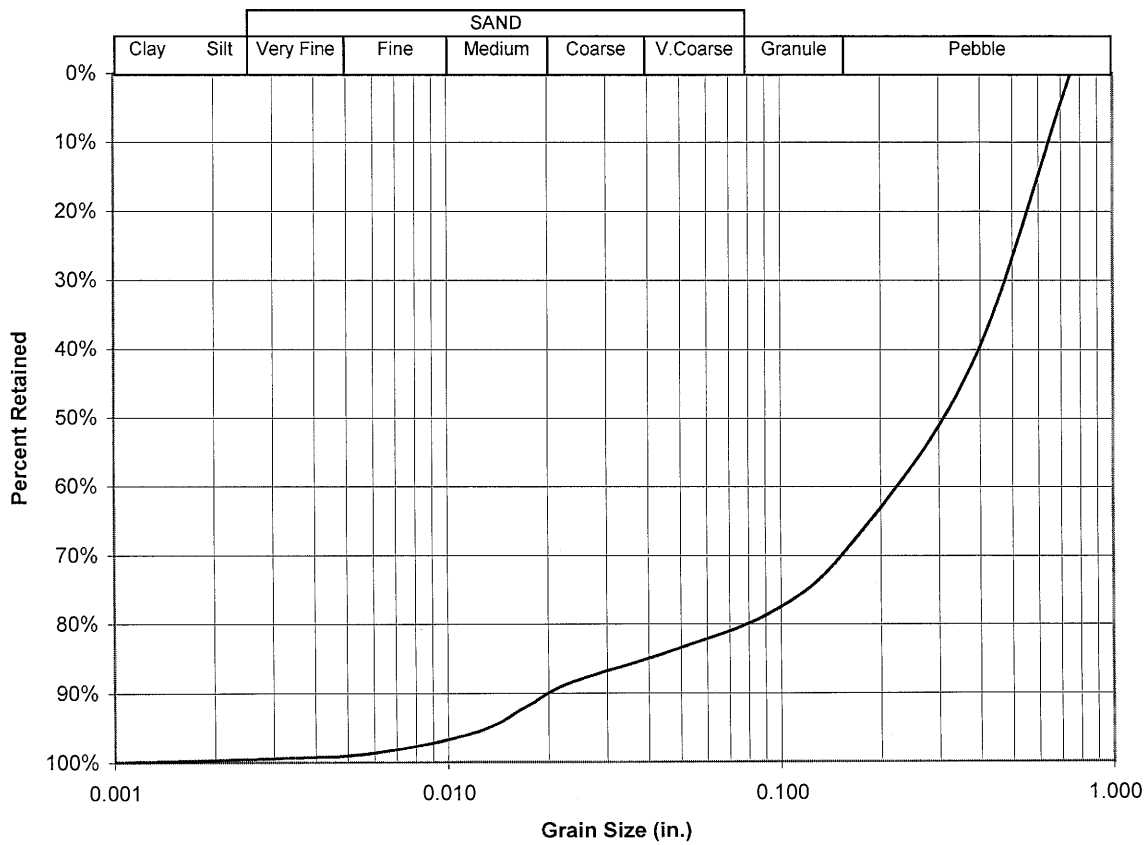


Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**124**						
				Calculations			
		Weights	**Percentage**	0.9	0.7	0.4	
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%	0	0	0.397467	
	0.375	607.9	43%	0	0	0	
	0.157	990.5	69%	0	0.15225	0	
	0.093	1119.7	78%	0	0	0	
	0.047	1198.3	84%	0	0	0	
	0.023	1266.2	89%	0.02063	0	0	
	0.017	1315.9	92%	0	0	0	
	0.012	1367.5	96%	0	0	0	
	0.006	1409.5	99%	0	0	0	
	0.003	1420	99%	0	0	0	
	0.001	1428.7	100%	0	0	0	

Depth	**D10**	**D30**	**D60**
124	0.021	0.152	0.397

Grain Size Distribution



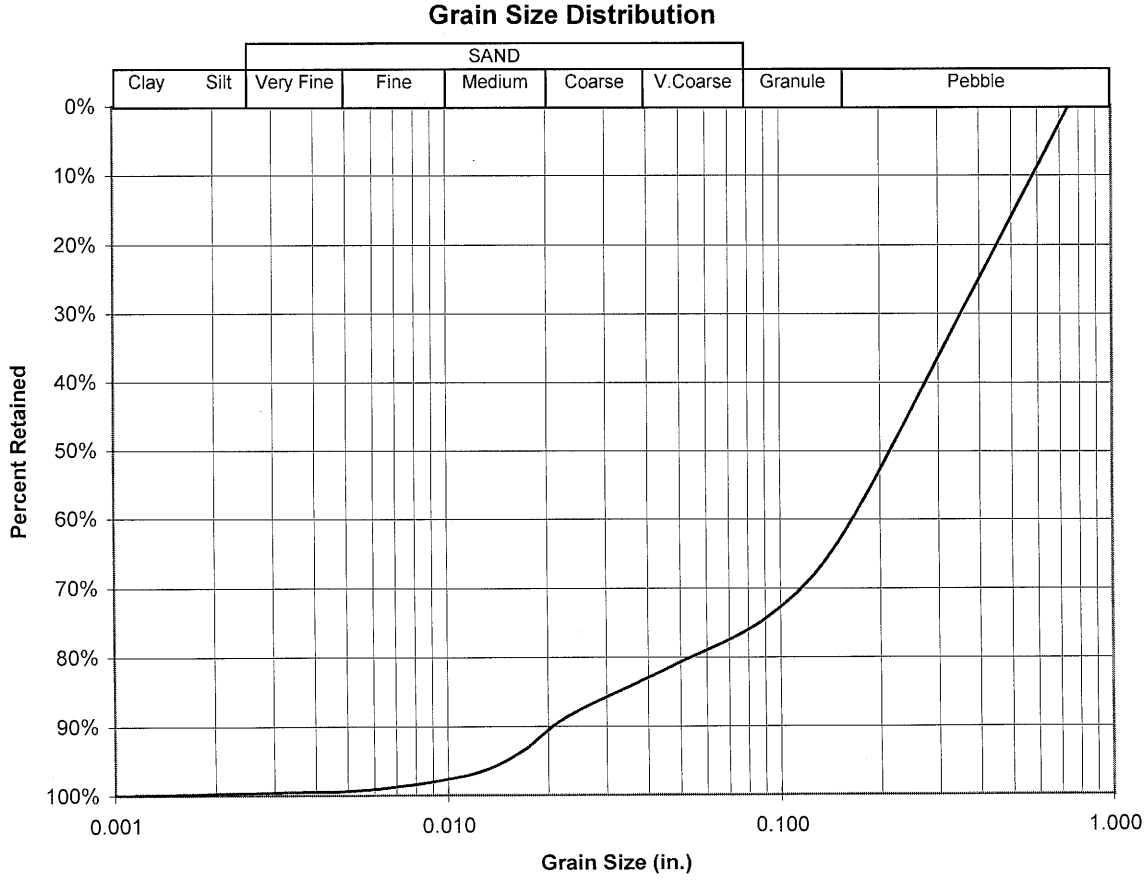
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**127**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	451.1	33%		0	0	0.313846
	0.157	796.1	58%		0	0	0
	0.093	911.5	67%		0	0.073595	0
	0.047	1023.6	75%		0	0	0
	0.023	1151.2	84%		0.017265	0	0
	0.017	1236.5	90%		0	0	0
	0.012	1307.9	95%		0	0	0
	0.006	1353.3	99%		0	0	0
	0.003	1362.5	99%		0	0	0
	0.001	1369.7	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			127	0.017	0.074	0.314	



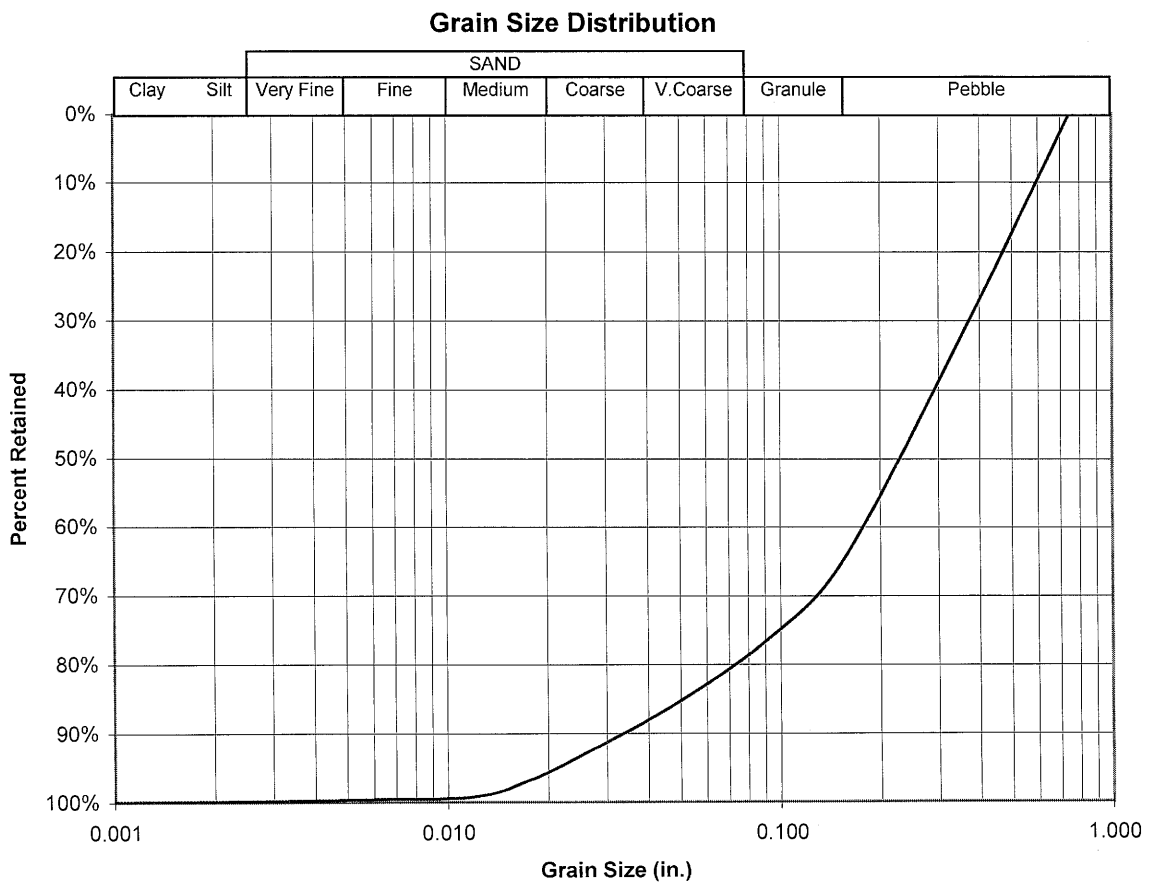
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**130**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	396.4	28%		0	0	0.296394
	0.157	889.5	62%		0	0.114426	0
	0.093	1062.9	74%		0	0	0
	0.047	1168	81%		0	0	0
	0.023	1271.4	89%		0.021218	0	0
	0.017	1340.6	93%		0	0	0
	0.012	1389.9	97%		0	0	0
	0.006	1422.8	99%		0	0	0
	0.003	1429.8	100%		0	0	0
	0.001	1435.5	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			130	0.021	0.114	0.296	



Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**132**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	396.8	30%		0	0	0.311166
	0.157	860.3	65%		0	0.127298	0
	0.093	1014.6	76%		0	0	0
	0.047	1147.2	86%		0.035621	0	0
	0.023	1254.7	94%		0	0	0
	0.017	1292.7	97%		0	0	0
	0.012	1321	99%		0	0	0
	0.006	1325.8	100%		0	0	0
	0.003	1328.8	100%		0	0	0
	0.001	1331.3	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			132	0.036	0.127	0.311	



Grain Size Calculations

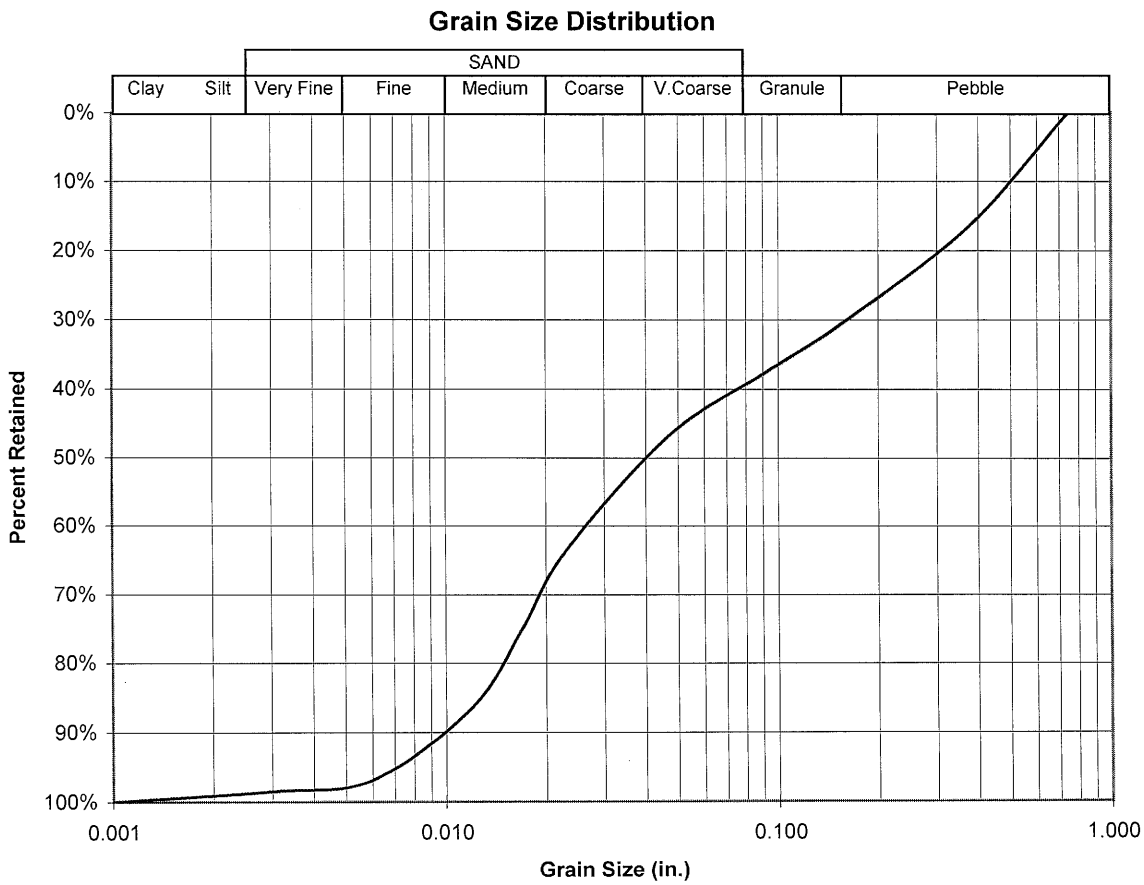
Job	**Gig Harbor Well 10**							
Job #	**1326-012A**							
Well	**10**							
Depth	**135**							
					Calculations			
		Weights	**Percentage**		0.9	0.7	0.4	
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0	
	0.375	145	12%		0	0	0	
	0.157	353.7	28%		0	0	0	
	0.093	485.4	39%		0	0	0.08929	
	0.047	658	53%		0	0.026005	0	
	0.023	904.7	72%		0	0	0	
	0.017	1060.2	85%		0.014071	0	0	
	0.012	1168.2	94%		0	0	0	
	0.006	1237.6	99%		0	0	0	
	0.003	1244.1	100%		0	0	0	
	0.001	1248.3	100%		0	0	0	
			Depth	**D10**	**D30**	**D60**		
			135	0.014	0.026	0.089		

Grain Size Distribution



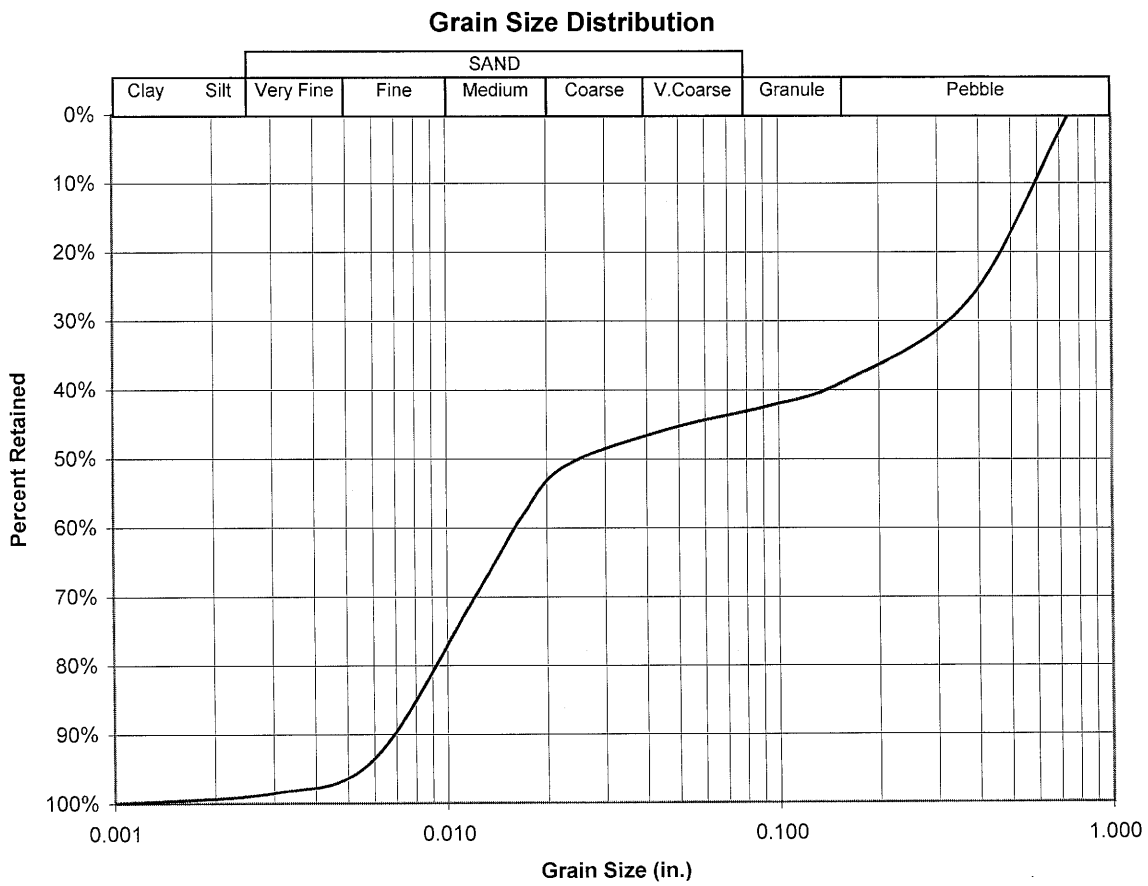
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**139**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	242.6	17%		0	0	0
	0.157	444.2	30%		0	0	0
	0.093	546.8	37%		0	0	0.080608
	0.047	683.4	47%		0	0	0
	0.023	930.9	64%		0	0.019709	0
	0.017	1095.7	75%		0	0	0
	0.012	1261.8	86%		0.009976	0	0
	0.006	1413.9	97%		0	0	0
	0.003	1437.1	98%		0	0	0
	0.001	1459	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			139	0.010	0.020	0.081	



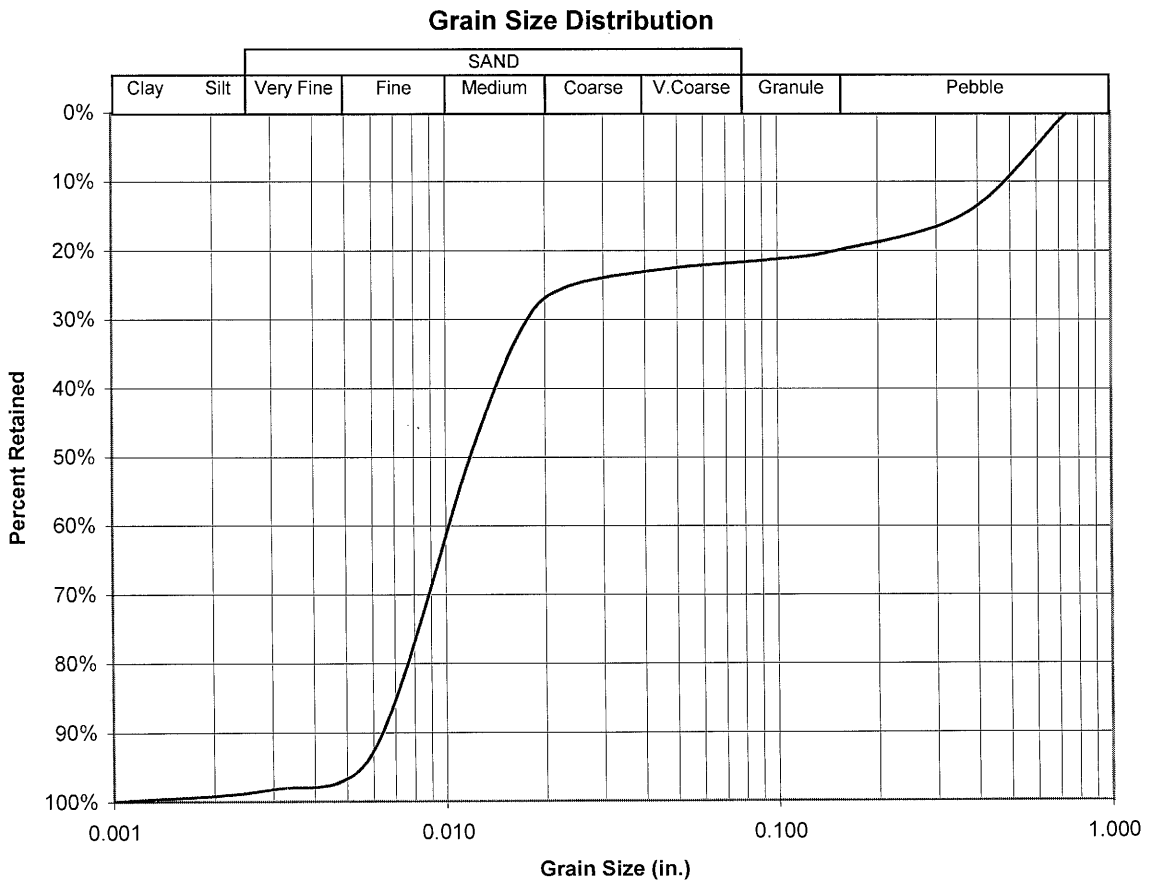
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**143**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	370.3	27%		0	0	0
	0.157	532.2	39%		0	0	0.135569
	0.093	580.1	42%		0	0	0
	0.047	625.6	46%		0	0	0
	0.023	698.7	51%		0	0	0
	0.017	798.4	58%		0	0.012236	0
	0.012	967.4	71%		0.006958	0	0
	0.006	1284.1	94%		0	0	0
	0.003	1350.5	99%		0	0	0
	0.001	1370.6	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			143	0.007	0.012	0.136	



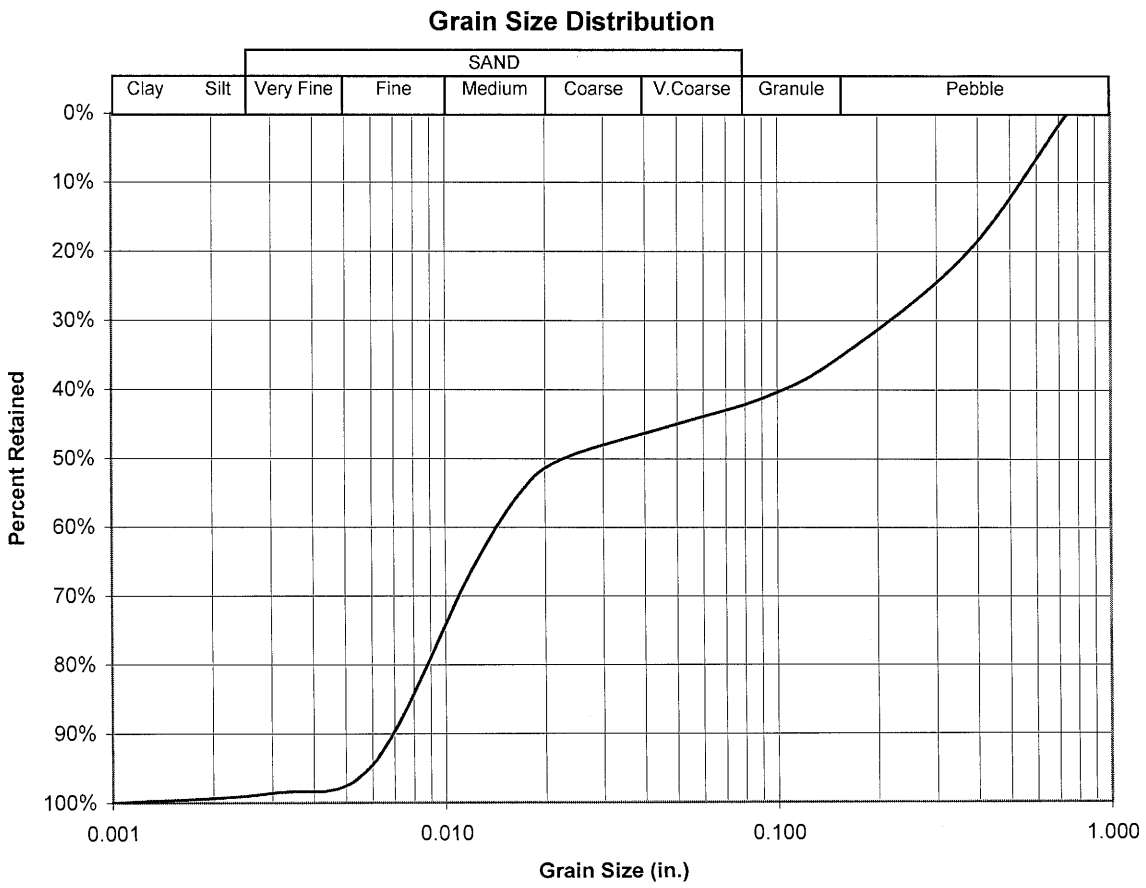
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**146**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	194.9	14%		0	0	0
	0.157	266.5	20%		0	0	0
	0.093	287	21%		0	0	0
	0.047	304.4	23%		0	0	0
	0.023	341.5	25%		0	0	0
	0.017	425.3	32%		0	0	0.014667
	0.012	666.9	50%		0.006415	0.009179	0
	0.006	1251	93%		0	0	0
	0.003	1321.4	98%		0	0	0
	0.001	1345.1	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			146	0.006	0.009	0.015	



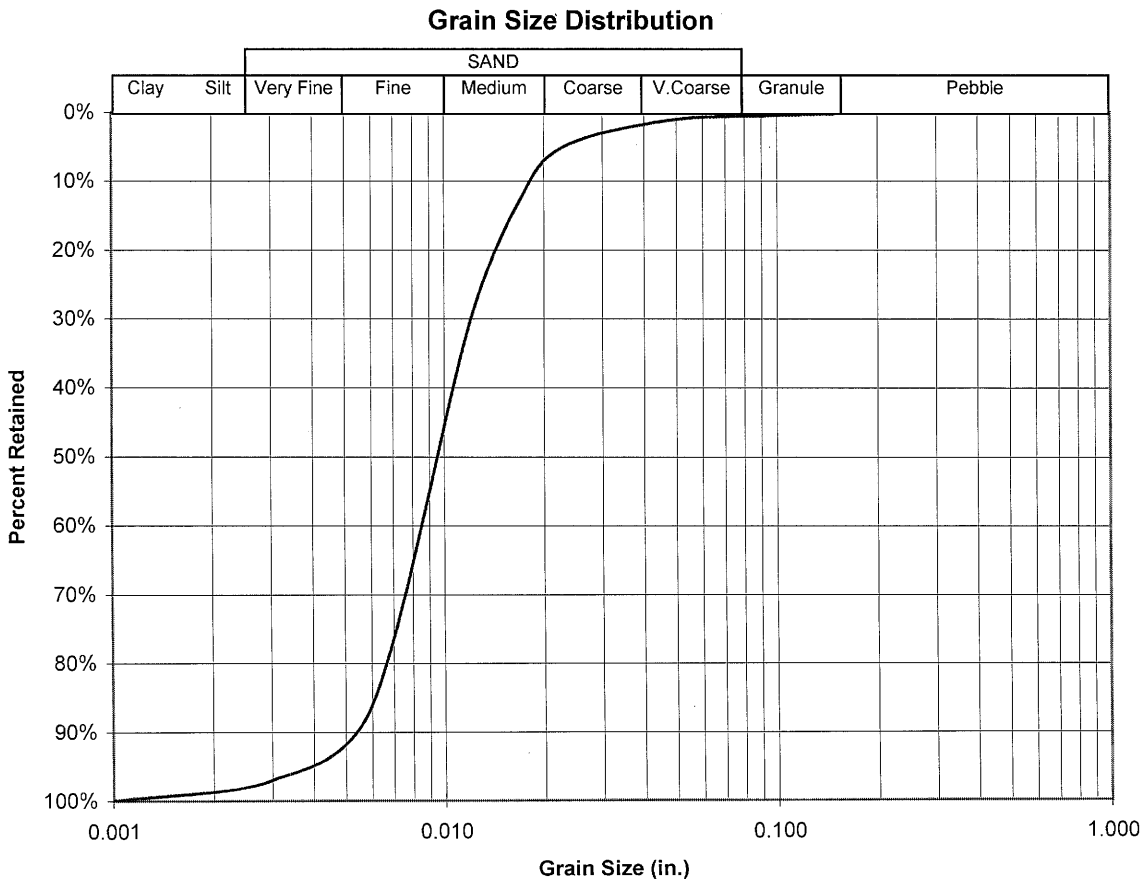
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**149**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	244.8	20%		0	0	0
	0.157	425.5	35%		0	0	0.104147
	0.093	497.5	41%		0	0	0
	0.047	550	45%		0	0	0
	0.023	605.5	50%		0	0	0
	0.017	665.2	55%		0	0	0
	0.012	806.3	67%		0.007004	0.011257	0
	0.006	1148.4	95%		0	0	0
	0.003	1195.9	99%		0	0	0
	0.001	1212.4	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			149	0.007	0.011	0.104	



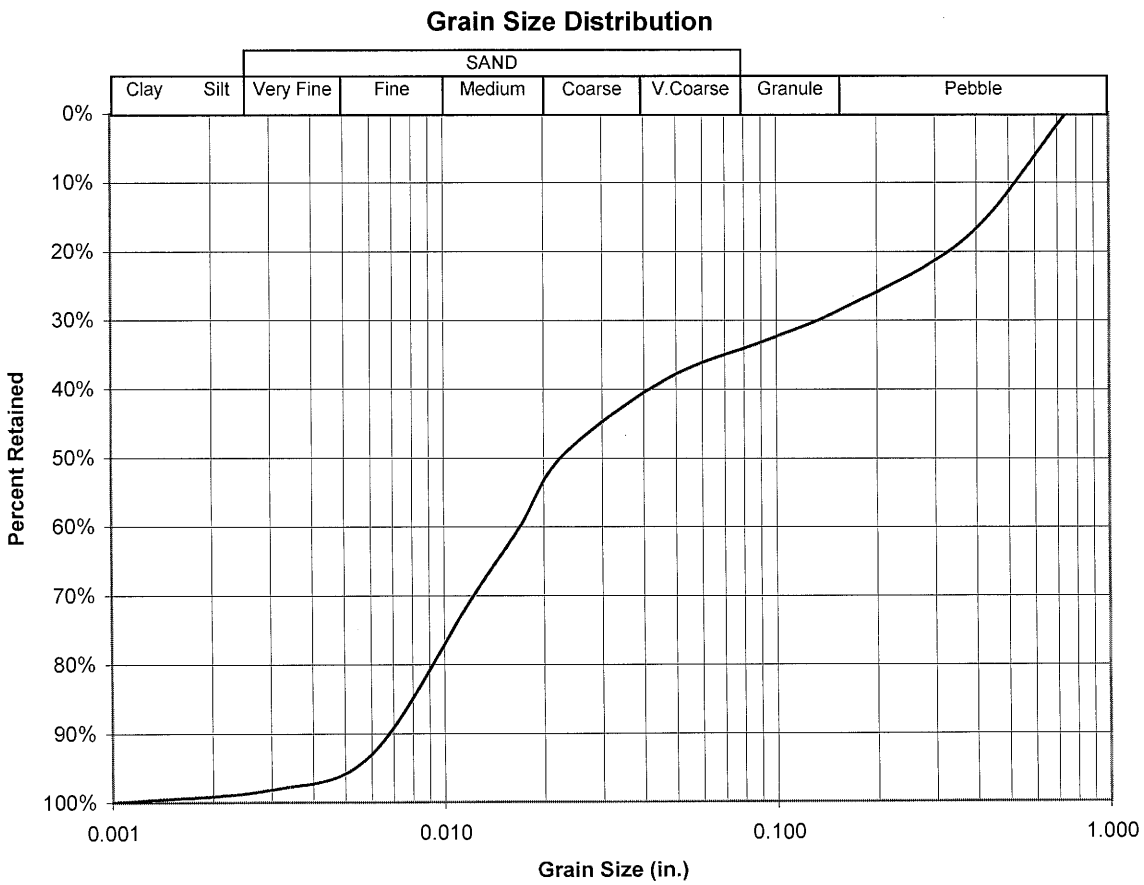
Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**153**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	0	0%		0	0	0
	0.157	2.2	0%		0	0	0
	0.093	5.1	0%		0	0	0
	0.047	13	1%		0	0	0
	0.023	54.7	5%		0	0	0
	0.017	138.9	13%		0	0	0
	0.012	333.1	30%		0	0.007746	0.010961
	0.006	948.6	86%		0.004963	0	0
	0.003	1066.3	97%		0	0	0
	0.001	1099.2	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			153	0.005	0.008	0.011	



Grain Size Calculations

Job	**Gig Harbor Well 10**						
Job #	**1326-012A**						
Well	**10**						
Depth	**155**						
					Calculations		
		Weights	**Percentage**		0.9	0.7	0.4
Sieve Sizes (Assumes Max.Size of 3/4")	0.750	0	0%		0	0	0
	0.375	276.6	18%		0	0	0
	0.157	436.5	28%		0	0	0
	0.093	506.3	33%		0	0	0
	0.047	592	39%		0	0	0.043792
	0.023	760.8	50%		0	0	0
	0.017	920.6	60%		0	0.012355	0
	0.012	1087.3	71%		0.006836	0	0
	0.006	1430.6	93%		0	0	0
	0.003	1508.5	98%		0	0	0
	0.001	1536.4	100%		0	0	0
			Depth	**D10**	**D30**	**D60**	
			155	0.007	0.012	0.044	



MANUAL WATER LEVEL MEASUREMENTS

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

PUMPING TEST DATA

Date: 4-13-04

Project: Gig Harbor - Step Test
Well: 10
Static Water Level: 15.70'
Stick Up: 25.25"
Reference Point: Toc/Sounding Tube
Measurement Device: E-tape

Project Number: 1326-012A
Weather Conditions: Partly Cloudy
Measured By: MKR
Contractor: Holocene
Pump Type: Sub
Flow Meas. Method: Oriface Plate 8x5

Time	Elapsed Time	Depth to Water	Drawdown	Flow Meas. Reading	Q (gpm)	Comments
1230	0	15.70				
	7	43.08	27.38	15"-17"	396	H_2S odor
1240	10	44.32	28.62			
1245	15	46.07	30.37			
1250	20	47.50	31.8			
	25	48.78	33.08	15"-17"	396	
1303	33	50.57	34.87			
1310	40	51.96	36.26			
1320	50	53.70	38.00			
1330	60	55.25	39.55			
	66	65.70	50.0	26"-27"	505	
1340	70	66.56	50.86			
1350	80	68.56	52.86			
1400	90	70.42	54.72			
1410	100	71.93	56.23			
1420	110	73.28	57.58			T = 50°F
1430	120	74.38	58.68			
	124	79.44	63.74	31"-32"	551	
1440	130	80.55	64.85			
	136	81.34	65.64			

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

PUMPING TEST DATA

Date: 4-13-09

Project: Gig Harbor - Step Test
Well: 10
Static Water Level: 15.70'
Stick Up: 25.25"
Reference Point: TOC / Sounding Tube
Measurement Device: E-Tape

Project Number: 1326-012A
Weather Conditions: Partly Cloudy
Measured By: MKR
Contractor: Holocene
Pump Type: Sub
Flow Meas. Method: Orifice 8×5

Time	Elapsed Time	Depth to Water	Drawdown	Flow Meas. Reading	Q (gpm)	Comments
1450	140	81.80	66.1			
14:59	1	60.09			Ø	Pump off
	2	50.92				
	3	48.00				
	4	46.23				
	5	45.02				
	6	43.49				
	7	42.86				
	8	42.25				
	9	41.80				
15:08	10	41.30				
	11	40.88				
	12	40.43				
	13	4000				
	14	39.65				
1513	15	39.20				

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

PUMPING TEST DATA

Date: 4-14-09

Project: Gig Harbor - 24hr Test
Well: 10
Static Water Level: 15.82'
Stick Up: 25.25"
Reference Point: Toc/ Sounding Tube
Measurement Device: E-tape

Project Number: 1326-012A
Weather Conditions: Partly Cloudy
Measured By: MKR
Contractor: Holocene
Pump Type: Sub
Flow Meas. Method: Orifice Plate 8x5

Time	Elapsed Time	Depth to Water	Drawdown	Flow Meas. Reading	Q (gpm)	Comments
9:15	0	15.84				Adjusting Q
	1					
	2					
	3					
	4					
	5	49.34	31.40	26" - 27"	475-505	
	6	49.99	32.05			
	7	50.82	32.88			
	8	51.53	33.59			
	9	52.19	34.25			
9:25	10	52.76	34.82			
	12	53.62	35.68			
	14	54.73	36.79			
	15	55.05	37.11			
	17	55.76	37.82			
	19	56.54	38.60			
9:35	20	56.79	38.85			
	22	57.52	39.58			
	24	58.23	41.29			
	25	58.55	40.61			

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

PUMPING TEST DATA

Date: 4-14-09

Project: Gig Harbor - 24hr Test
Project Number: 1326 - 012A
Well: 10
Weather Conditions: Partly Cloudy
Static Water Level: 15.82'
Measured By: MKR
Stick Up: 25.25"
Contractor: Holocene
Reference Point: Toc/Sounding Tube
Pump Type: Sub
Measurement Device: E-Tape
Flow Meas. Method: Orifice Plate 8x5

Time	Elapsed Time	Depth to Water	Drawdown	Flow Meas. Reading	Q (gpm)	Comments
	27	59.05	41.11			
	29	59.84	41.90			
9:45	30	60.36	42.42	26"-27"	505	Had to ↑ Q to
	35	62.22	44.28			Maintain 505gpm
9:55	40	63.70	45.76			
	45	64.80	46.86			
10:05	50	65.72	47.78			
	55	66.85	48.91			
10:15	60	67.71	49.77			
	90	72.19	54.25			
11:15	120	75.49	57.55		505	Increased Q
12:15	180					to maintain 505gpm
	225	76.64	58.70		400	Decreased Q to
13:15	240	76.11	56.17			400 due to excessive
14:15	300	75.65	57.71			drawdown
15:15	360	75.98	58.04			
16:15	420	76.46	56.52			
17:15	480	76.95	59.01			
18:15	540	77.50	59.56			
19:15	600	77.73	59.79			

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

PUMPING TEST DATA

Date: 4-14/15-09

Project: Gig Harbor - 24hr Test
Well: 10
Static Water Level: 15.82'
Stick Up: 25.25"
Reference Point: TOC / Sounding tube
Measurement Device: E-tape

Project Number: 13260-012A
Weather Conditions: Partly Cloudy
Measured By: MKR / Contractor
Contractor: Holocene
Pump Type: SUB
Flow Meas. Method: Orifice Plate 8x5

Time	Elapsed Time	Depth to Water	Drawdown	Flow Meas. Reading	Q (gpm)	Comments
20:15	660	77.95	60.01		400	
21:15	720	78.10	60.16			
22:15	780	78.38	60.44			
23:15	840	78.64	60.70			
00:15	900	78.86	60.92			
1:15	960	79.00	61.06			
2:15	1020	79.31	61.37			
3:15	1080	79.39	61.45			
4:15	1140	79.68	61.74			
5:15	1200	79.68	61.74			
6:15	1260	79.73	61.79			
7:15	1320	80.00	62.06			
8:15	1380	80.23	62.29			
9:15	1440	80.34	62.40			
10:15	1500	80.51	62.57			
11:15	1560	80.70	62.76			
11:16	1	62.80			Ø	Pump off
11:17	2	57.77				
11:18	3	55.33				

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

PUMPING TEST DATA

Date:

Project: Gig Harbor - 24hr Test
Well: 10
Static Water Level: 15.82'
Stick Up: 25.25"
Reference Point: TOC/ Sounding Tube
Measurement Device: E-Tape

Project Number: 1326-012A
Weather Conditions: Partly Cloudy
Measured By: MKR
Contractor: Holocene
Pump Type: Sub
Flow Meas. Method: Orifice Plate 8x5

Time	Elapsed Time	Depth to Water	Drawdown	Flow Meas. Reading	Q ( )	Comments
11:19	4	54.16			Ø	
	5	53.05				
	6	52.46				
	7	51.85				
	8	51.23				
	9	50.45				
11:25	10	50.13				
	12	49.32				
	14	48.62				
	15	48.19				
	17	47.48				
	19	46.86				
11:35	20	46.50				
	22	46.01				
	24	45.30				
	25	45.15				
	27	44.64				
	29	44.08				
11:45	30	43.82				
	35	42.79				

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

PUMPING TEST DATA

Date: 4-15/16-09

Project: Gig Harbor - 24hr Test
Well: 10
Static Water Level: 15.82'
Stick Up: 25.25"
Reference Point: TOC/Sampling Tube
Measurement Device: E-Tape

Project Number: 13206-012A
Weather Conditions: Partly Cloudy
Measured By: MKR
Contractor: Hisiere
Pump Type: Sub
Flow Meas. Method: Orifice Plate 8x5

Time	Elapsed Time	Depth to Water	Drawdown	Flow Meas. Reading	Q ( )	Comments
11:55	40	41.75			∅	
	45	40.75				
12:05	50	40.09				
	55	39.31				
12:15	60	38.61				
16:15	420	27.27				
	435	26.97				
	450	26.68				
	465	26.42				
17:15	480	26.15				
9:15	1380	19.01				4-16-09
13:28	1620	18.56				4-16-09

Robinson & Noble, Inc.
3011 South Huson Street, Suite A
Tacoma, WA 98409
253-475-7711

OBSERVATION WELL DATA

Date: 4-14-09

Project: Gig Harbor
Well No.: 2 Piezo No.: N/A
Owner: Gig Harbor
Location: 200' SW of Well 10
Measuring Point: Electronic Read out Stickup: N/A
Static Water Level: 87.84
Other Information: Box reads out feet of water above probe, probe set @ 90' below measuring point

Date	Time	Elapsed Time	DTW	Drawdown	Remarks
4-14-09	9:00		2.16		
	9:15	0	2.16		
	9:16	1	2.8	0.64	
	9:17	2	3.35	1.19	
	9:18	3	3.85	1.69	
	9:19	4	4.45	2.29	
	9:20	5	5.02	2.86	
	9:21	6	5.56	3.4	
	9:22	7	6.09	3.93	
	9:23	8	6.57	4.41	
	9:24	9	7.04	4.88	
	9:25	10	7.51	5.35	
	9:27	12	8.35	6.19	
	9:30	15	9.54	7.38	
	9:35	20	11.33	9.17	
	9:40	25	12.93	10.77	
	9:46	26	16.03	13.87	
	9:57	42	18.64	16.48	
	10:15	60	21.21	19.05	
	10:21	66	22.16	20.0	
	11:15	120	29.36	27.2	
	12:30	195	35.67	33.51	

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Tacoma, WA 98409
253-475-7711

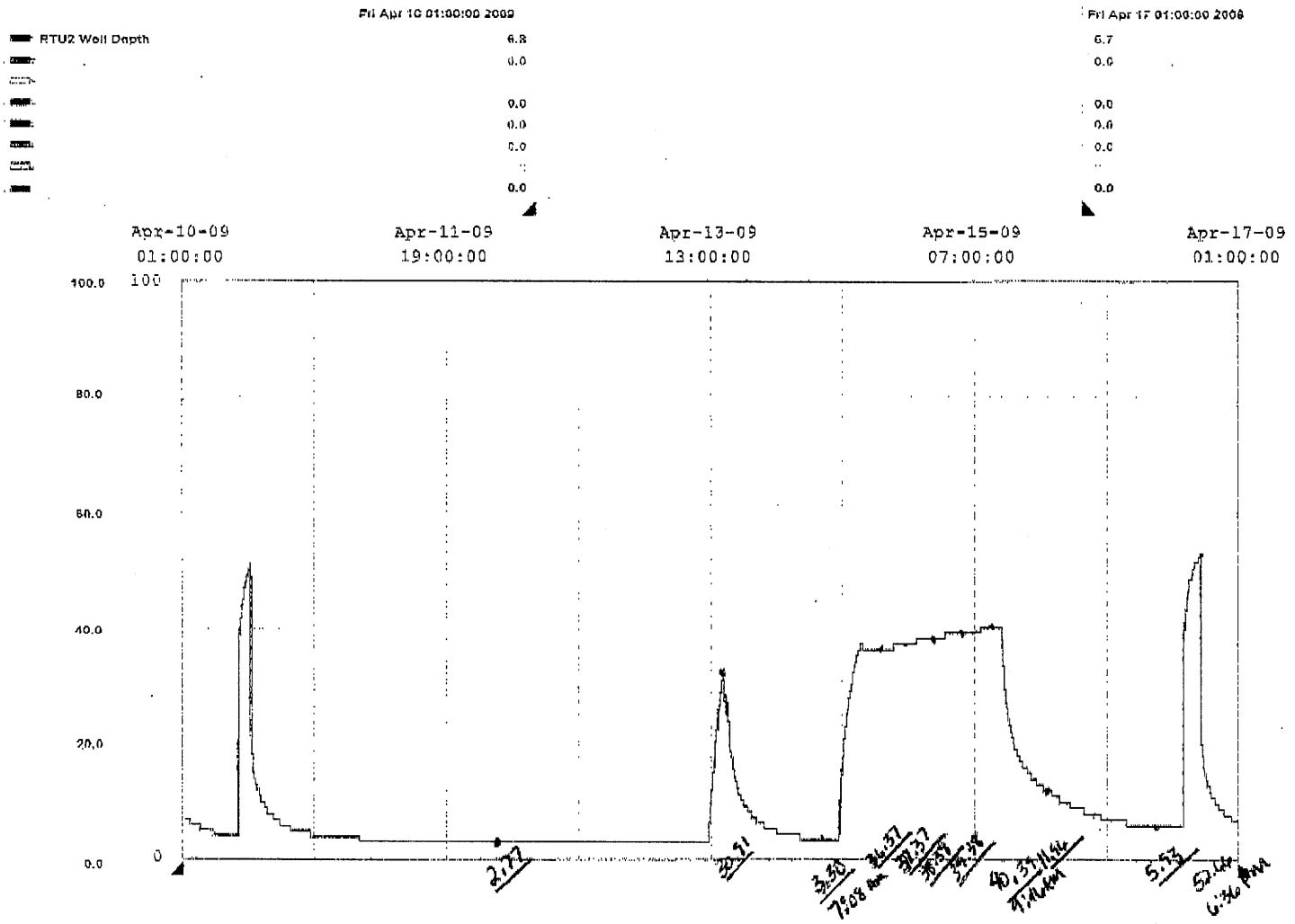
OBSERVATION WELL DATA

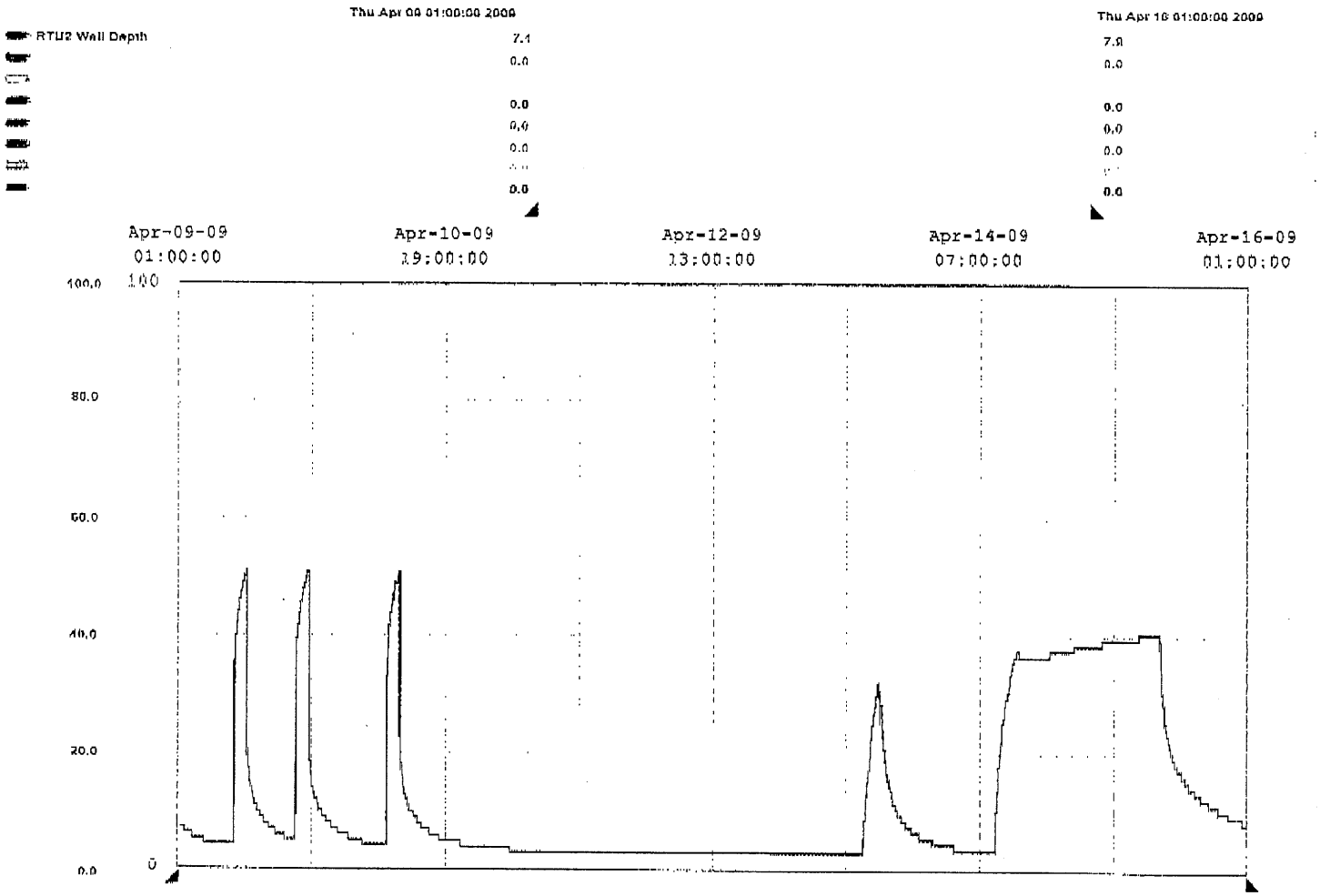
Page: 2 of 2
Date: 4-14/15-09

Project: Gig Harbor
Well No.: 2 Piezo No.: N/A
Owner: Gig Harbor
Location: 200' SW of Well 10
Measuring Point: Electronic box needs cut Stickup: N/A
Static Water Level: 2.16'
Other Information: Box needs cut feet of water above probe, probe set @ 90' below measuring point

Date	Time	Elapsed Time	DTW	Drawdown	Remarks
4-14-09	13:15	240	35.03	32.87	
4-15-09	9:04	1431	39.34	37.18	
	10:15	1500	39.49	37.33	

WELL 2 WATER LEVEL GRAPHICS


Fri Apr 10 01:00:00 2009
Fri Apr 17 01:00:00 2008
RTU2 Well Depth
6.8
0.0
0.0
0.0
0.0
0.0
6.7
0.0
0.0
0.0
0.0
0.0
Apr-10-09
01:00:00
Apr-11-09
19:00:00
Apr-13-09
13:00:00
Apr-15-09
07:00:00
Apr-17-09
01:00:00
100.0
80.0
60.0
40.0
20.0
0.0
100
0
2.77
20.91
3.30
7:08 AM
34.37
39.37
40.37
11:46 AM
5.53
6:36 PM


Thu Apr 09 01:00:00 2009
Thu Apr 16 01:00:00 2009
RTU2 Wall Depth
7.1
0.0
0.0
0.0
0.0
0.0
0.0
0.0
Apr-09-09
01:00:00
Apr-10-09
19:00:00
Apr-12-09
13:00:00
Apr-14-09
07:00:00
Apr-16-09
01:00:00
100.0
80.0
60.0
40.0
20.0
0.0
100
0

LABORATORY WATER QUALITY RESULTS

WATER MANAGEMENT LABORATORIES INC.

1515 80th St. E.
Tacoma, WA 98404
(253) 531-3121

VOLATILE ORGANIC CHEMICALS (VOC's) ANALYSIS REPORT
EPA TEST METHOD - 524.2

System ID No.: 276009	System Name: Gig Harbor Water Department		
Lab/Sample No.: 08977679	Date Collected: 04/15/2009		DOH Source No.: N/A
Multiple Source Nos.: N/A		Sample Type: B	Sample Purpose: B
Date Received: 04/16/2009	Date Analyzed: 04/20/2009		Analyst: LHL
	Date Reported: 04/21/2009		Supervisor: LMA
County: Pierce		Group: A	
Sample Location: Wellhead at Well 10, Crescent Creek Park, Gig Harbor			
Send To: Robinson, Noble & Saltbush 3011 South Huson Street, Suite A Tacoma, WA 98409			Remarks: NEW WELL

DOH #	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEEDS	
	EPA REGULATED						Trigger?	MCL?
45	Vinyl Chloride	ND	ug/L	0.5	0.5	2	NO	NO
46	1,1 - Dichloroethylene	ND	ug/L	0.5	0.5	7	NO	NO
47	1,1,1 - Trichloroethane	ND	ug/L	0.5	0.5	200	NO	NO
48	Carbon Tetrachloride	ND	ug/L	0.5	0.5	5	NO	NO
49	Benzene	ND	ug/L	0.5	0.5	5	NO	NO
50	1,2 - Dichloroethane	ND	ug/L	0.5	0.5	5	NO	NO
51	Trichloroethylene	ND	ug/L	0.5	0.5	5	NO	NO
52	1,4 - Dichlorobenzene	ND	ug/L	0.5	0.5	75	NO	NO
56	Dichloromethane	ND	ug/L	0.5	0.5	5	NO	NO
57	trans-1,2 - Dichloroethylene	ND	ug/L	0.5	0.5	100	NO	NO
60	cis-1,2 - Dichloroethylene	ND	ug/L	0.5	0.5	70	NO	NO
63	1,2 - Dichloropropane	ND	ug/L	0.5	0.5	5	NO	NO
66	Toluene	ND	ug/L	0.5	0.5	1000	NO	NO
67	1,1,2 - Trichloroethane	ND	ug/L	0.5	0.5	5	NO	NO
68	Tetrachloroethylene	ND	ug/L	0.5	0.5	5	NO	NO
71	Chlorobenzene	ND	ug/L	0.5	0.5	100	NO	NO
73	Ethylbenzene	ND	ug/L	0.5	0.5	700	NO	NO
76	Styrene	ND	ug/L	0.5	0.5	100	NO	NO
84	1,2 - Dichlorobenzene	ND	ug/L	0.5	0.5	600	NO	NO
95	1,2,4 - Trichlorobenzene	ND	ug/L	0.5	0.5	70	NO	NO
160	Total Xylenes	ND	ug/L	0.5	0.5	10000	NO	NO
74	m/p Xylenes (MCL for Total)	ND	ug/L	0.5	0.5		NO	
75	o - Xylene (MCL for Total)	ND	ug/L	0.5	0.5		NO	
	EPA UNREGULATED							
27	Chloroform	ND	ug/L	0.5	0.5		NO	
28	Bromodichloromethane	ND	ug/L	0.5	0.5		NO	
29	Chlorodibromomethane	ND	ug/L	0.5	0.5		NO	
30	Bromoform	ND	ug/L	0.5	0.5		NO	
53	Chloromethane	ND	ug/L	0.5	0.5		NO	
54	Bromomethane	ND	ug/L	0.5	0.5		NO	
55	Chloroethane	ND	ug/L	0.5	0.5		NO	

Water Management Laboratories, Inc.
1515 80th St. E.
Tacoma, WA 98404
(253) 531-3121

DOH #	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEEDS	
EPA UNREGULATED (Continued)							Trigger?	MCL?
58	1,1 - Dichloroethane	ND	ug/L	0.5	0.5		NO	
59	2,2 - Dichloropropane	ND	ug/L	0.5	0.5		NO	
62	1,1 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
64	Dibromomethane	ND	ug/L	0.5	0.5		NO	
70	1,3 - Dichloropropane	ND	ug/L	0.5	0.5		NO	
72	1,1,1,2 - Tetrachlroroethane	ND	ug/L	0.5	0.5		NO	
78	Bromobenzene	ND	ug/L	0.5	0.5		NO	
79	1,2,3 - Trichloropropane	ND	ug/L	0.5	0.5		NO	
80	1,1,2,2 - Tetrachloroethane	ND	ug/L	0.5	0.5		NO	
81	o - Chlorotoluene	ND	ug/L	0.5	0.5		NO	
82	p - Chlorotoluene	ND	ug/L	0.5	0.5		NO	
83	m - Dichlorobenzene	ND	ug/L	0.5	0.5		NO	
154	1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
STATE UNREGULATED								
65	cis-1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
69	trans-1,3 - Dichloropropene	ND	ug/L	0.5	0.5		NO	
85	Fluorotrichloromethane	ND	ug/L	0.5	0.5		NO	
86	Bromochloromethane	ND	ug/L	0.5	0.5		NO	
87	Isopropylbenzene	ND	ug/L	0.5	0.5		NO	
88	n - Propylbenzene	ND	ug/L	0.5	0.5		NO	
89	1,3,5 - Trimethylbenzene	ND	ug/L	0.5	0.5		NO	
90	t - Butylbenzene	ND	ug/L	0.5	0.5		NO	
91	1,2,4 - Trimethylbenzene	ND	ug/L	0.5	0.5		NO	
92	s - Butylbenzene	ND	ug/L	0.5	0.5		NO	
93	p - Isopropyltoluene	ND	ug/L	0.5	0.5		NO	
94	n - Butylbenzene	ND	ug/L	0.5	0.5		NO	
96	Napthalene	ND	ug/L	0.5	0.5		NO	
97	Hexachlorobutadiene	ND	ug/L	0.5	0.5		NO	
98	1,2,3 - Trichlorobenzene	ND	ug/L	0.5	0.5		NO	
102	EDB (Confirm by 504.1)	ND	ug/L	0.5	0.5		NO	
103	DBCP (Confirm by 504.1)	ND	ug/L	0.5	0.5		NO	
162	Dichlorodifluoromethane	ND	ug/L	0.5	0.5		NO	
N/A	MTBE	ND	ug/L	0.5	0.5		NO	

NOTES:

SRL (State Reporting Level): Indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may need to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): In the RESULTS column indicates this compound was not included in the current analysis.

ND (Not Detected): In the RESULTS column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

< : Indicates less than.

Comments:

A maximum contaminant level of 80 ug/L total Trihalomethanes (Compounds 27-30) is allowed.

Method 524.2: VOC's

1515 80TH STREET E
TACOMA, WA 98404
(253) 531-3121

WATER BACTERIOLOGICAL ANALYSIS

SAMPLE COLLECTION: READ INSTRUCTIONS ON BACK OF GOLDENROD COPY
If instructions are not followed, sample will be rejected.

DATE COLLECTED MONTH / DAY / YEAR	TIME COLLECTED	COUNTY NAME
4 / 16 / 09	9 : 15 ☑ AM ☐ PM	Pierce

TYPE OF SYSTEM
☑ PUBLIC
☐ INDIVIDUAL (serves only 1 residence)

IF PUBLIC SYSTEM, COMPLETE:
I.D. No. 2 7 6 5 0

CIRCLE GROUP: (A) B

NAME OF SYSTEM:
Gig Harbor ~~Water Dept~~ Well 10

SPECIFIC LOCATION WHERE SAMPLE COLLECTED (ie; kitchen tap @ school, fire station, fountain)
well Head, Crescent Creek Park, Well 10

TELEPHONE NO:
DAY (253) 475-7911
EVENING ( )

SAMPLE COLLECTED BY: (Name)
Matt Rakow

SYSTEM OWNER / MGR.: (Name)
~~Jeff Olsen~~ Gig Harbor

SOURCE TYPE ☐ GROUND WATER UNDER SURFACE INFLUENCE
☐ SURFACE ☑ WELL or WELL FIELD ☐ SPRING ☐ PURCHASED or INTERTIE ☐ COMBINATION or OTHER

SEND REPORT TO: (Print Full Name, Address and Zip Code)
Robinson, Noble & Saltbush
3011 S. Huson St, Suite A
Tacoma WASHINGTON 98409

TYPE OF SAMPLE (check only one in this column)
☐ ROUTINE DRINKING WATER check treatment →
☐ Chlorinated (Residual: Total / Free)
☐ Filtered
☐ Untreated or Other
☐ REPEAT SAMPLE
Previous coliform presence? Lab #:
Previous coliform presence? Date: / /
☐ RAW SOURCE WATER Source # S - - -
☐ NEW CONSTRUCTION or REPAIRS
☐ Total Coliform
☐ Fecal Coliform
☑ OTHER (Specify) Well Head (Well 10)

REMARKS

LABORATORY RESULTS (FOR LAB USE ONLY)

METHOD USED

MF 2410	MPN 2600	PA 2610	MMO 2720	CPRG 2730

TOTAL COLIFORM 0 /100 ml
FECAL COLIFORM /100 ml
E. COLI /100 mL
HETEROTROPHIC /per ml
1340

ANOTHER SAMPLE REQUIRED

SAMPLE NOT TESTED BECAUSE
☐ Sample too old
☐ Wrong container
☐ Incomplete form
☐

TEST UNSUITABLE BECAUSE
☐ Confluent growth
☐ TNTC
☐ Turbid colours
☐ Excess debris

DRINKING WATER SAMPLE RESULTS

☐ UNSATISFACTORY, Coliforms present

REPEAT SAMPLES REQUIRED
☐ E. Coli present ☐ E. Coli absent
☐ Fecal present ☐ Fecal absent

☐ SATISFACTORY, Coliforms absent

SEE REVERSE SIDE OF GREEN COPY FOR EXPLANATION OF RESULTS

LAB NO	DATE, TIME RECEIVED	RECEIVED BY
089 01179	4-16-09 10 AM	
DATE REPORTED	ROUTE	ACCT #
4-20-09		

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WATER MANAGEMENT LABORATORIES INC.
1515 80th St. E.
Tacoma, WA 98404
(253) 531-3121

SEE BACK FOR INSTRUCTIONS

*1,2,3

INORGANIC CHEMICALS (IOCS) REPORT

System ID No: 2760009	System Name: Gig Harbor Water Department		
Lab/Sample No: 08926993	Date Collected: 04-15-09	DOH Source No: N/A	
Multiple Source Nos: N/A	Sample Type: B	Sample Purpose: B	
Date Received: 04-16-09	Date Reported: 04-21-09	Supervisor: DMB	
County: Pierce	Date Digested: NA	Group: (A) B Other	
Sample Location: Well #10 wellhead - Crescent Creek Park (24 hour)			
Send Results & Bill To: Robinson, Noble + Saltbush 3011 S Huson St, Ste A Tacoma, WA 98409		Remarks: AR1875	

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEEDS Trigger?	EXCEEDS MCL?	Method / Analyst	
	EPA REGULATED									
4	Arsenic	<0.002	mg/L	0.002	0.01	0.01	NO	NO	200.8	JMB
5	Barium	<0.1	mg/L	0.1	2	2			200.8	JMB
6	Cadmium	<0.002	mg/L	0.002	0.005	0.005			200.8	JMB
7	Chromium	<0.01	mg/L	0.01	0.1	0.1			200.8	JMB
11	Mercury	<0.0005	mg/L	0.0005	0.002	0.002			200.8	JMB
12	Selenium	<0.005	mg/L	0.005	0.05	0.05			200.8	JMB
110	Beryllium	<0.003	mg/L	0.003	0.004	0.004			200.8	JMB
111	Nickel	<0.04	mg/L	0.04	0.1	0.1			200.8	JMB
112	Antimony	<0.005	mg/L	0.005	0.006	0.006			200.8	JMB
113	Thallium	<0.002	mg/L	0.002	0.002	0.002			200.9	JMB
116	Cyanide	<0.05	mg/L	0.05	0.2	0.2			4500-CNF	RL
19	Fluoride	<0.2	mg/L	0.2	2	4			300.0	MMA
114	Nitrite - N	<0.2	mg/L	0.5	0.5	1			300.0	MMA
20	Nitrate - N	<0.2	mg/L	0.5	5	10			300.0	MMA
161	Total Nitrate/Nitrite	<0.5	mg/L	0.5	5	10	↓	↓	300.0	MMA
	EPA REGULATED (Secondary)									
8	Iron	0.73	mg/L	0.1	0.3	0.3	YES	YES	3111B	JMB
10	Manganese	0.11	mg/L	0.01	0.05	0.05	↓	↓	200.8	JMB
13	Silver	<0.01	mg/L	0.01	0.1	0.1	NO	NO	200.8	JMB
21	Chloride	6	mg/L	20	250	250			300.0	MMA
22	Sulfate	8	mg/L	10	250	250			300.0	MMA
24	Zinc	<0.2	mg/L	0.2	5	5	↓	↓	200.8	DMB
	STATE REGULATED									
14	Sodium	7	mg/L	5					200.8	JMB
15	Hardness	83	mg/L	10					2340C	MD
16	Conductivity	159	umhos/cm	10	700	700	NO	NO	2510B	MD
17	Turbidity	2.8	NTU	0.1	1		YES		2130B	MD
18	Color	<5.0	color units	5	15	15	NO	NO	2120B	MD
26	Total Dissolved Solids	124	mg/L	150	500	500	↓	↓	2540C	MD
	STATE UNREGULATED									
9	Lead	<0.002	mg/L	0.002					200.8	JMB
23	Copper	<0.02	mg/L	0.02					200.8	JMB

COMMENTS: R+N Special

NEW WELL

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1515 80th St. E.
Tacoma, WA 98404
(253) 531-3121

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INORGANIC CHEMICALS (IOCS) REPORT

System ID No: 276009	System Name: Gig Harbor ~~Well 10~~		
Lab/Sample No: 08926992	Date Collected: 04-14-09	DOH Source No: N/A	
Multiple Source Nos: N/A	Sample Type: B	Sample Purpose: B	
Date Received: 04-16-09	Date Reported: 04.18.09	Supervisor: DMB	
County: Pierce	Date Digested: NA	Group: (A) B Other	
Sample Location: Well #10 Wellhead - Crescent Creek Park (12 hour)			
Send Results & Bill To: Robinson, Noble + Saltbush		Remarks:	
3011 S Huson St, Ste A		AR1875	
Tacoma, WA 98409			

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEEDS		Method / Analyst	
	EPA REGULATED						Trigger?	MCL?		
4	Arsenic	NA	mg/L	0.002	0.05	0.05			200.8	
5	Barium		mg/L	0.1	2	2			200.8	
6	Cadmium		mg/L	0.002	0.005	0.005			200.8	
7	Chromium		mg/L	0.01	0.1	0.1			200.8	
11	Mercury		mg/L	0.0005	0.002	0.002			200.8	
12	Selenium		mg/L	0.005	0.05	0.05			200.8	
110	Beryllium		mg/L	0.003	0.004	0.004			200.8	
111	Nickel		mg/L	0.04	0.1	0.1			200.8	
112	Antimony		mg/L	0.005	0.006	0.006			200.8	
113	Thallium		mg/L	0.002	0.002	0.002			200.9	
116	Cyanide		mg/L	0.05	0.2	0.2			4500-CNF	
19	Fluoride		mg/L	0.2	2	4			300.0	
114	Nitrite - N		mg/L	0.5	0.5	1			300.0	
20	Nitrate - N		mg/L	0.5	5	10			300.0	
161	Total Nitrate/Nitrite	↓	mg/L	0.5	5	10			300.0	
	EPA REGULATED (Secondary)									
8	Iron	NA	mg/L	0.1	0.3	0.3			3111B	
10	Manganese	↓	mg/L	0.01	0.05	0.05			200.8	
13	Silver	↓	mg/L	0.01	0.1	0.1			200.8	
21	Chloride	7	mg/L	20	250	250	No	No	300.0	DMB
22	Sulfate	NA	mg/L	10	250	250			300.0	
24	Zinc	↓	mg/L	0.2	5	5			200.8	
	STATE REGULATED									
14	Sodium	NA	mg/L	5					200.8	
15	Hardness	↓	mg/L	10					2340C	
16	Conductivity	158	umhos/cm	10	700	700	No	No	2510B	mb
17	Turbidity	NA	NTU	0.1	1				2130B	
18	Color	↓	color units	5	15	15			2120B	
26	Total Dissolved Solids	↓	mg/L	150	500	500			2540C	
	STATE UNREGULATED									
9	Lead	NA	mg/L	0.002					200.8	
23	Copper	↓	mg/L	0.02					200.8	

COMMENTS: Chloride, Conductivity

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FOR INSTRUCTIONS

INORGANIC CHEMICALS (IOCS) REPORT

System ID No: 2760009	System Name: Gig Harbor ~~Well 10~~		
Lab/Sample No: 08926991	Date Collected: 04-14-09	DOH Source No: N/A	
Multiple Source Nos: N/A	Sample Type: B	Sample Purpose: B	
Date Received: 04-16-09	Date Reported: 04.18.09	Supervisor: DMB	
County: Pierce	Date Digested: NA	Group: (A) B Other	
Sample Location: Well #10 wellhead - Crescent Creek Park (1-hour)			
Send Results & Bill To: Robinson, Noble & Saltbush 3011 S Huson St, Ste A Tacoma, WA 98409		Remarks: AR187S	

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEEDS		Method / Analyst	
	EPA REGULATED						Trigger?	MCL?		
4	Arsenic	NA	mg/L	0.002	0.05	0.05			200.8	
5	Barium	↓	mg/L	0.1	2	2			200.8	
6	Cadmium		mg/L	0.002	0.005	0.005			200.8	
7	Chromium		mg/L	0.01	0.1	0.1			200.8	
11	Mercury		mg/L	0.0005	0.002	0.002			200.8	
12	Selenium		mg/L	0.005	0.05	0.05			200.8	
110	Beryllium		mg/L	0.003	0.004	0.004			200.8	
111	Nickel		mg/L	0.04	0.1	0.1			200.8	
112	Antimony		mg/L	0.005	0.006	0.006			200.8	
113	Thallium		mg/L	0.002	0.002	0.002			200.9	
116	Cyanide		mg/L	0.05	0.2	0.2			4500-CNF	
19	Fluoride		mg/L	0.2	2	4			300.0	
114	Nitrite - N		mg/L	0.5	0.5	1			300.0	
20	Nitrate - N		mg/L	0.5	5	10			300.0	
161	Total Nitrate/Nitrite	↓	mg/L	0.5	5	10			300.0	
	EPA REGULATED (Secondary)									
8	Iron	NA	mg/L	0.1	0.3	0.3			3111B	
10	Manganese	↓	mg/L	0.01	0.05	0.05			200.8	
13	Silver	↓	mg/L	0.01	0.1	0.1			200.8	
21	Chloride	7	mg/L	20	250	250	No	No	300.0	WMA
22	Sulfate	NA	mg/L	10	250	250			300.0	
24	Zinc	↓	mg/L	0.2	5	5			200.8	
	STATE REGULATED									
14	Sodium	NA	mg/L	5					200.8	
15	Hardness	↓	mg/L	10					2340C	
16	Conductivity	157	umhos/cm	10	700	700	No	No	2510B	
17	Turbidity	NA	NTU	0.1	1				2130B	
18	Color	↓	color units	5	15	15			2120B	
26	Total Dissolved Solids	↓	mg/L	150	500	500			2540C	
	STATE UNREGULATED									
9	Lead	NA	mg/L	0.002					200.8	
23	Copper	↓	mg/L	0.02					200.8	

COMMENTS: Chloride, Conductivity

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Appendix K-3

WELL LOGS

WELL 1

30°

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Appli. 1015
Cert. 590-A

Date Nov. 30, 1951

Record by Pete Sylte

Source Driller's Record

Location: State of WASHINGTON

County Pierce

Area

Map

DIAGRAM OF SECTION

Lots 19 & 20 Adams Add. to Town of Gig Harbor. NE¼ NW¼ sec. 8 T. 21 N., R. 2E W.M.

Drilling Co. Pete Sylte

Address Tacoma, Wash.

Method of Drilling Date - 19

Owner Town of Gig Harbor

Address Gig Harbor, Wash.

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Top soil	3	3
	Sand	2½	5½
	Gravel	1 3/4	6'3"
	Gray Clay	3"	6½
	Compacted sand & gravel	4'3"	10'9"
	Clay	3"	11
	Gravel	3"	11'3"
	Compacted sand & gravel	3'6"	14'9"
	Gray clay	3"	15'
	Large stones compacted with sand & gravel	2	17'
	Compacted sand & gravel	2	19'
	Yellow clay	2	21'
	Compacted sand	7	28
	Gravel	6"	28'6"
	Compacted sand	9½	38
	Blue clay	4	42

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up (over

Sheet of sheets

WELL LOG.—Continued No._____/_____-_____

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Depth forward	———	
	Compacted sand & gravel	1	43
	Dirty redish clay	4	47
	Compacted sand & gravel	2	49
	Hardpan	9	58
	Gravel & clay	4	62
	Hardpan	11	73
	Gravel & sand - water	2	75
	Hardpan	7	82
	Gravel	1	83
	Hardpan	9	92
	Mud & sand	9	101
	Hardpan	17	118
	Muddy sand & gravel	10	128
	Coarse sand	1	129
	Muddy sand & gravel	19	148
	Sand, gravel & muddy clay	13	161
	Packed sand with small amt. clay	11	172
	Hard silt	22	194
	Hardpan	19	213
	Hard silt	17	230
	Hardpan	30	260
	Cemented gravel	3	263
	Gravel	2	265
	Clay	15	280
	Hardpan coarse sand	5	285
	Fine sand with small amt.	3	288
	Hardpan	33	321
	Fine sand	1	322
	Hard silt, sand, some gravel	24	346
	Fine sand	12	358
	Hard packed sand	10	368
	Cemented gravel	7	375
	Pump Test:		
	Dim: 375' x 18" Elev. 60' Tend: 50"		
	SWL: DD: 31' (Perf. 260-265') 3-2/61		
	Yield: 340 g.p.m.		
	Casing: 18" casing drilled to 83'. 10" inner casing set to 265'. 18" casing withdrawn to 73'. After gravel packing 10" casing perforated 73' to 83'		

S.F. 7449-48 REMINGTON RRC-20 30 749-34

WELL 2
AAF 346

Information

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

WELL LOG No. A-6570

Date 1-29-63, 19

Record by

Source

Location: State of WASHINGTON

County Pierce

Area

Map

SE ¼ SW ¼ sec. 32 T. 22N., R. 2 E.

Diagram of Section

Drilling Co. Harbor Pump and Drilling Co., Inc.

Address Route 4, Box 4117, Gig Harbor, Wash.

Method of Drilling cable Date Sept. 10, 19 62

Owner Town of Gig Harbor

Address P. O. Box 145, Gig Harbor, Washington

Land surface, datum ft above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Sand and gravel, hardpan	0	18
	Blue clay	18	30
	Sand, gravel and water	30	48
	Blue clay with layers of sand	48	73
	Medium sand to coarse gravel - water-bearing	73	84
	Mixed sand and gravel	84	90
	Hardpacked sand and gravel with water	90	99
	Large loose gravel & water	99	109
	Brown peat, clay & vegetation	109	111
	Water-bearing coarse sand & pea gravel	111	115
	Coarse sand & pea gravel with larger gravel - water-bearing	115	121

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up (over) Sheet ____ of ____ sheets

The Department of Ecology does NOT Warrant the Data and/or the Information on this Well Repo

The Department of Ecology does NOT Warrant the Data and/or the Information on this Well Repo

WELL LOG.—Continued No...../.....

CORRELATION	MATERIAL	THICKNESS (feet)	DE (fee
	Depth forward		
	New well - test well - municipal		
	Casing: welded		
	10 in diam from 0 to 116 ft 7 in. - gage 280		
	Screens: Johnson Everdur		
	8 in diam, slot size 90, set from 116 to 121 ft		
	Water levels: Flowing - water controlled by cap with valve.		
	Well tests: Yield 425 gpm with 76 ft drawdown after 46 hrs.		
	Artesian flow 20 gpm - Date Sept., 1962		
	Temp. 50°		
	Diam. of well 10 in. - Depth drilled 121 ft		
	Depth of completed well 121 ft		

S. F. No. 7449—OS—6-61—2M.

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. G7-25078
Permit No.

(1) OWNER: Name Gig Harbor, Town of Address P.O. Box 145 Gig Harbor, WA

(2) LOCATION OF WELL: County Pierce SE¼ NW¼ Sec. 17 T. 21 N., R. 2E W.M.
Bearing and distance from section or subdivision corner 1240'N & 690'W from cent. of Sec. 17

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) #3
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 16 inches.
Drilled 907 ft. Depth of completed well 901 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 16" Diam. from 0 ft. to 902 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐ SEE ATTACHED DRWG
Manufacturer's Name Johnson
Type Stainless Steel Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 330 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom?
Yield: 708 gal/min. with 28 ft. drawdown after 72 hrs.
SEE ATTACHED GRAPH
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

SEE ATTACHED GRAPH
Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 49.5 Was a chemical analysis made? Yes ☒ No ☐

OK KHS

FCY 050-1-70 3-30-79

(10) WELL LOG:
Formation. Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Brown Hardpan	0	30
Brown Sand & Gravel	30	73
Brown Silty Sand	73	137
Brown Sand & Gravel	137	155
Brown Sand	155	169
Brown Sand & Gravel	169	171
Gravel/Trace Brn. Sand	171	174
Brown Sand	174	205
Brown Sand w/Gray Clay mix	205	210
Brown Sand	210	229
Brown Sand & Gravel	229	239
Brown Gravely Hardpan	239	246
Gray Gravely Clay	246	256
Brown Sandy Clay	256	307
Brown Sand, small gravel-H20	307	312
Muddy Brown Sand-No Water	312	322
Brn. Fine Sand/w Gravel-H20	322	419
Blue Silt	419	450
Gray Silty Clay	450	627
Blue Silty Clay w/some Sand	627	682
Sand & Silt	682	705
Medium Sand & Some Gravel	705	726
Clay & Sand Mixture	726	729
Gravel w/some Sand	729	734
Sand & Gravel	734	736
Sand w/some Gravel	736	754
Clay Layer w/Sand & Gravel	754	754.5
Sand & Gravel	754.5	790
Gray Clay	790	806
Gravel w/Sand	806	901
Brown Clay	901	909

Work started 2-6 19 28 Completed 9-22 19 28

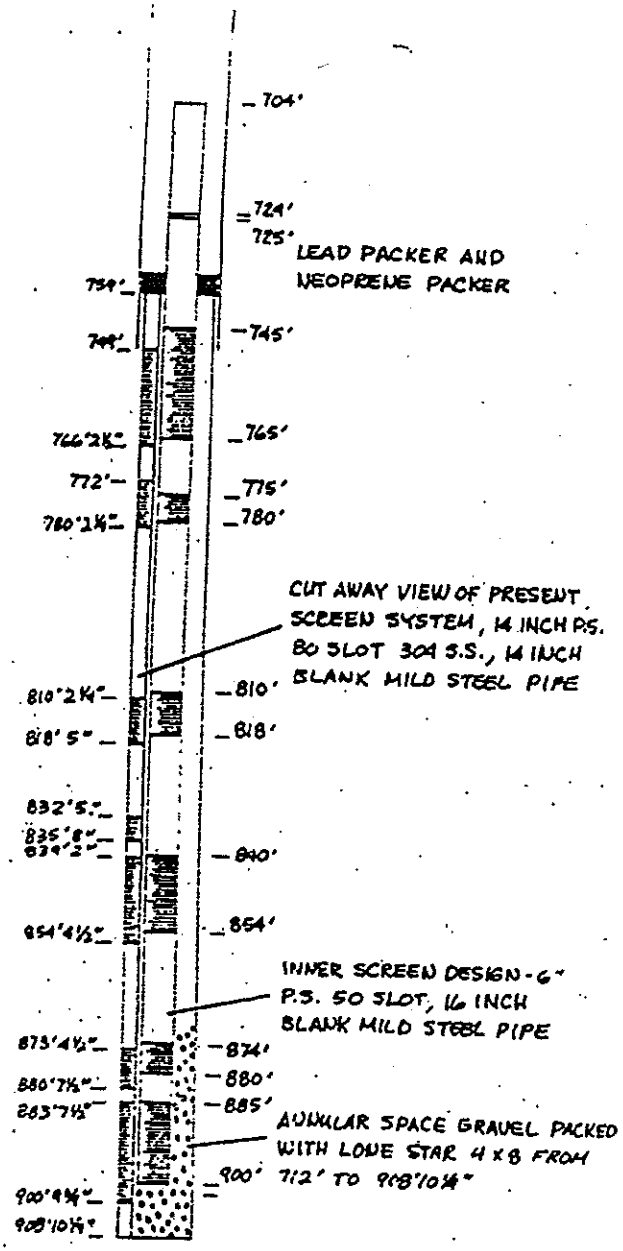
WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

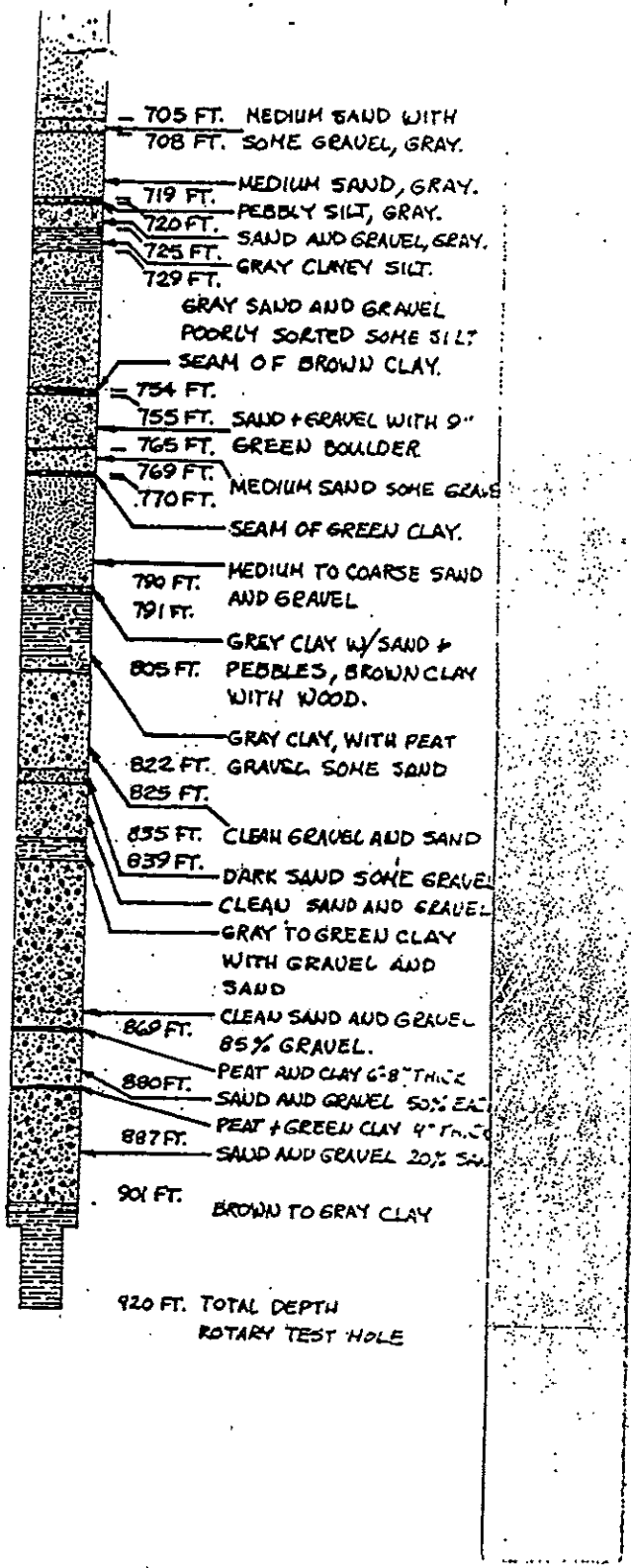
NAME Burt Well Drilling, Inc.
(Person, firm, or corporation) (Type or print)
Address Rt. 1, Box 282 Poulsbo, WA 98370

[Signed] George O. Burt
(Well Driller)

License No. 0018 Date Oct. 10, 19 28

(USE ADDITIONAL SHEETS IF NECESSARY)


704'
724'
725'
LEAD PACKER AND NEOPRENE PACKER
734'
745'
749'
765'
766'2½"
772'
775'
780'2½"
780'
CUT AWAY VIEW OF PRESENT SCREEN SYSTEM, 14 INCH P.S. 80 SLOT 304 S.S., 14 INCH BLANK MILD STEEL PIPE
810'2¼"
810'
818'5"
818'
832'5"
835'8"
839'2"
840'
854'4½"
854'
INNER SCREEN DESIGN - 6" P.S. 50 SLOT, 16 INCH BLANK MILD STEEL PIPE
874'4½"
874'
880'7½"
880'
885'7½"
885'
ANNULAR SPACE GRAVEL PACKED WITH LONE STAR 4 x 8 FROM 712' TO 908'10¼"
900'9¾"
900'
908'10¼"


705 FT. MEDIUM SAND WITH
708 FT. SOME GRAVEL, GRAY.
MEDIUM SAND, GRAY.
719 FT. PEBBLY SILT, GRAY.
720 FT. SAND AND GRAVEL, GRAY.
725 FT. GRAY CLAYEY SILT.
729 FT.
GRAY SAND AND GRAVEL POORLY SORTED SOME SILT
SEAM OF BROWN CLAY.
754 FT.
755 FT. SAND + GRAVEL WITH 9"
765 FT. GREEN BOULDER
769 FT. MEDIUM SAND SOME GRAVEL
770 FT.
SEAM OF GREEN CLAY.
790 FT. MEDIUM TO COARSE SAND AND GRAVEL
791 FT.
GREY CLAY W/SAND + PEBBLES, BROWN CLAY WITH WOOD.
805 FT.
GRAY CLAY, WITH PEAT
822 FT. GRAVEL SOME SAND
825 FT.
835 FT. CLEAN GRAVEL AND SAND
839 FT. DARK SAND SOME GRAVEL
CLEAN SAND AND GRAVEL
GRAY TO GREEN CLAY WITH GRAVEL AND SAND
CLEAN SAND AND GRAVEL
869 FT. 85% GRAVEL.
PEAT AND CLAY 6"-8" THICK
880 FT. SAND AND GRAVEL 50% EA
PEAT + GREEN CLAY 4" TH.
887 FT. SAND AND GRAVEL 20% SA
901 FT. BROWN TO GRAY CLAY
920 FT. TOTAL DEPTH ROTARY TEST HOLE

d First Copy with
of Ecology
y — Owner's Copy
— Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

Name City of Gig Harbor Address P.O. Box 145, Gig Harbor, WA 98335

ATION OF WELL: County Pierce NE ¼ SW ¼ Sec. 8 T. 21 N., R. 2E W.M.

tance from section or subdivision corner

POSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

OF WORK: Owner's number of well (if more than one) 4
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

ENSIONS: Diameter of well 12 inches.
446 ft. Depth of completed well 443 ft.

STRUCTION DETAILS:

g installed: 12 " Diam. from +1.7 ft. to 403.3 ft.
aded ☐ ..... " Diam. from ..... ft. to ..... ft.
lded ☒ ..... " Diam. from ..... ft. to ..... ft.

rations: Yes ☐ No ☒
e of perforator used .....
E of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

ens: Yes ☒ No ☐
nufacturer's Name Johnson
Stainless W.W. Model No. 304
6"PS Slot size .030 from 399 ft. to 404 ft.
Diam 6"PS Slot size .030 from 409 ft. to 438 ft.

packed: Yes ☒ No ☐ Size of gravel CSS 8-12
avel placed from 380 ft. to 443 ft.

ce seal: Yes ☒ No ☐ To what depth? 21 ft.
terial used in seal Cement/Bentonite
d any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
thod of sealing strata off .....

: Manufacturer's Name .....
Type: ..... H.P. .....

R LEVELS: Land-surface elevation above mean sea level .... 296 ft.
262.85 ft. below top of well Date 6/9/88
ressure ..... lbs. per square inch Date .....
rtesian water is controlled by ..... (Cap, valve, etc.)

L TESTS: Drawdown is amount water level is lowered below static level
test made? Yes ☒ No ☐ If yes, by whom? Carr/Assoc
gal./min. with 83 ft. drawdown after 24 hrs.
" " "
" " "

n (time taken as zero when pump turned off) (water level from well top to water level) Time in Minutes

ater Level	Time	Water Level	Time	Water Level
302.48	60	287.99	420	272.22
98.23	100	284.44	1629	264.95
92.32	240	277.37	9032	262.85

est .....
gal./min. with ..... ft. drawdown after ..... hrs.
..... g.p.m. Date .....
of wate 11.5° Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
SAND, brown	0	8
SAND, some gravel, brown	8	29
SAND, silty, brown	29	35
SAND & PEA GRAVEL, brown	35	40
SAND, silty, brown	40	53
SAND & GRAVEL, brown	53	77
SAND, silty, brown	77	109
SAND, some gravel, brown	109	155
SND & GRVL, silt-binder, gray	155	156
SILT, SAND, GRAVEL, layered	156	188
SAND, silty	188	194
SILT, SAND, GRAVEL	194	202
SAND, silty	202	208
SAND & GRAVEL, silty	208	213
SAND, silty	213	229
SND & GRVL, slt-binder, hard	229	237
SAND, silty, some gravel	237	248
CLAY with pebbles silty, gray	248	296
SAND, silty, organics, gray	296	330
SAND, fine-med, water bearing	330	340
SILT, gray	340	347
SAND, medium, gray	347	350
SAND & GRAVEL, gray	350	351
SILT, gray, hard	351	365
SAND & GRAVEL, silty, wtr brg	365	378
SAND & GRAVEL, silt-bndr hard	378	384
CLAY, marine shells, hard	384	387
SILT, gray, colored SAND	387	394
GRVL, silty/sndy, lyrs slt/cly	394	401
SAND & GRAVEL, louse, wtr brg	401	407
GRVL, SND, CLAY, tight, gray	407	411
SAND, m-f, GRVL, gry, wtr brg	411	418
SND, m-f, tr slt/grvl wtr brg	418	440
SAND, m-f, gray, tight	440	444
SILT, gry, pyrite cement grvl	444	446

Work started 4/4 19 88 Completed 6/3 19 88

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

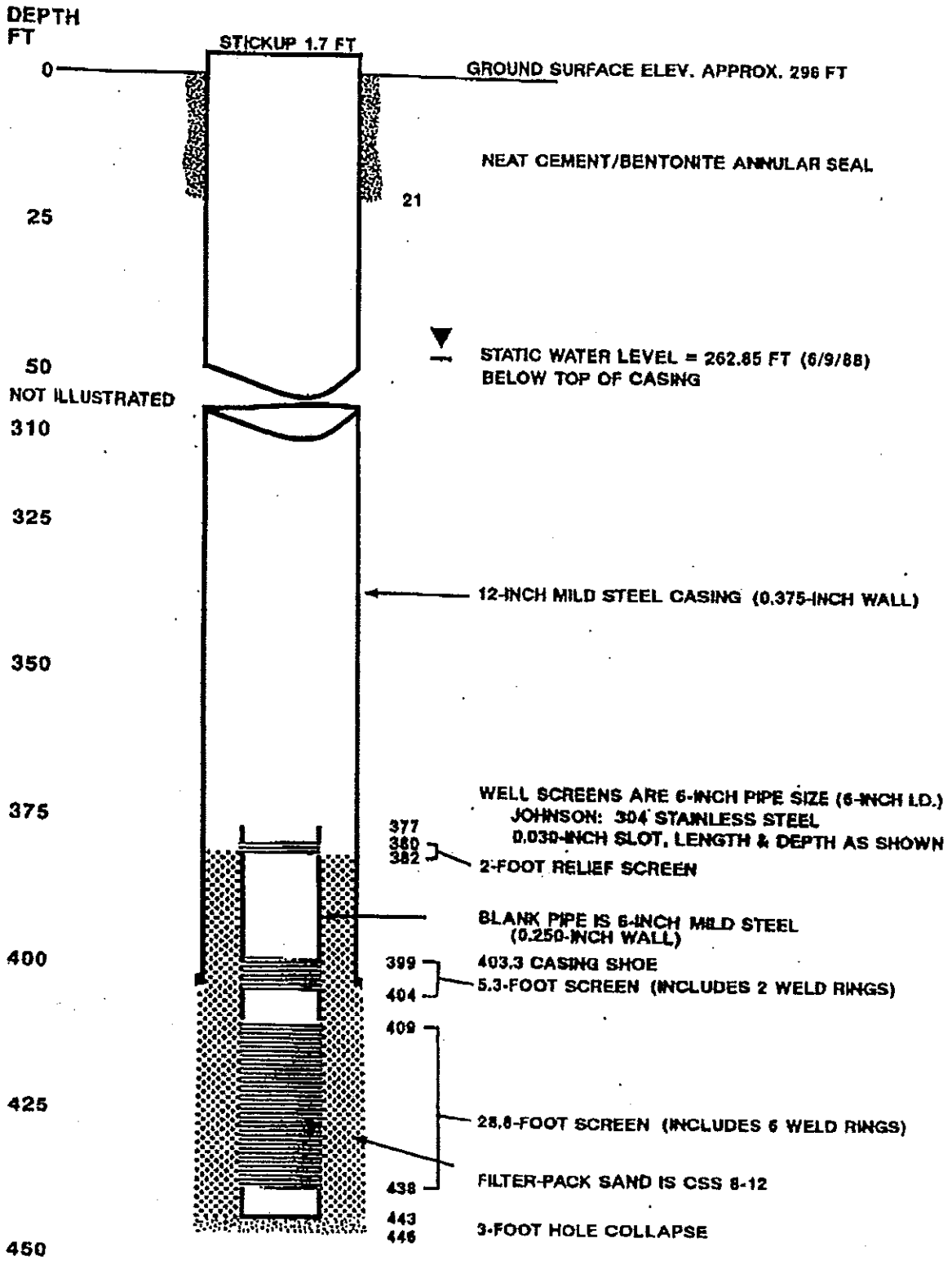
NAME Holt Well Drilling
(Person, firm, or corporation) (Type or print)
Address 10621 Todd Road East Puyallup, WA 98372

[Signed] .....
(Well Driller)

License No. ..... Date ..... 19 .....

FIGURE 2

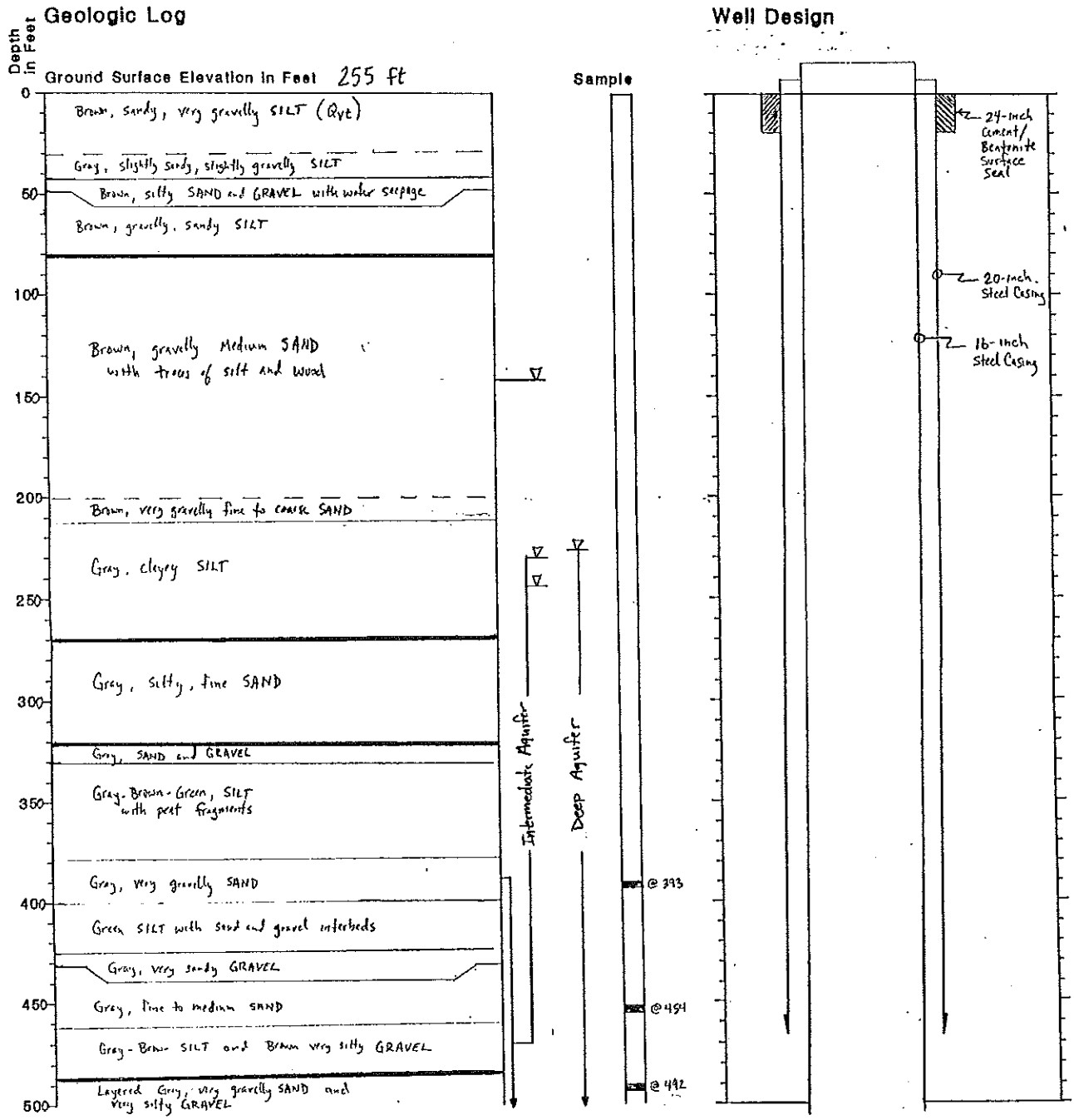
GIG HARBOR WELL 4
CONSTRUCTION DETAILS



Carr/Associates

Boring Log and Construction Data for Well

Gig Harbor Production Well No. 5



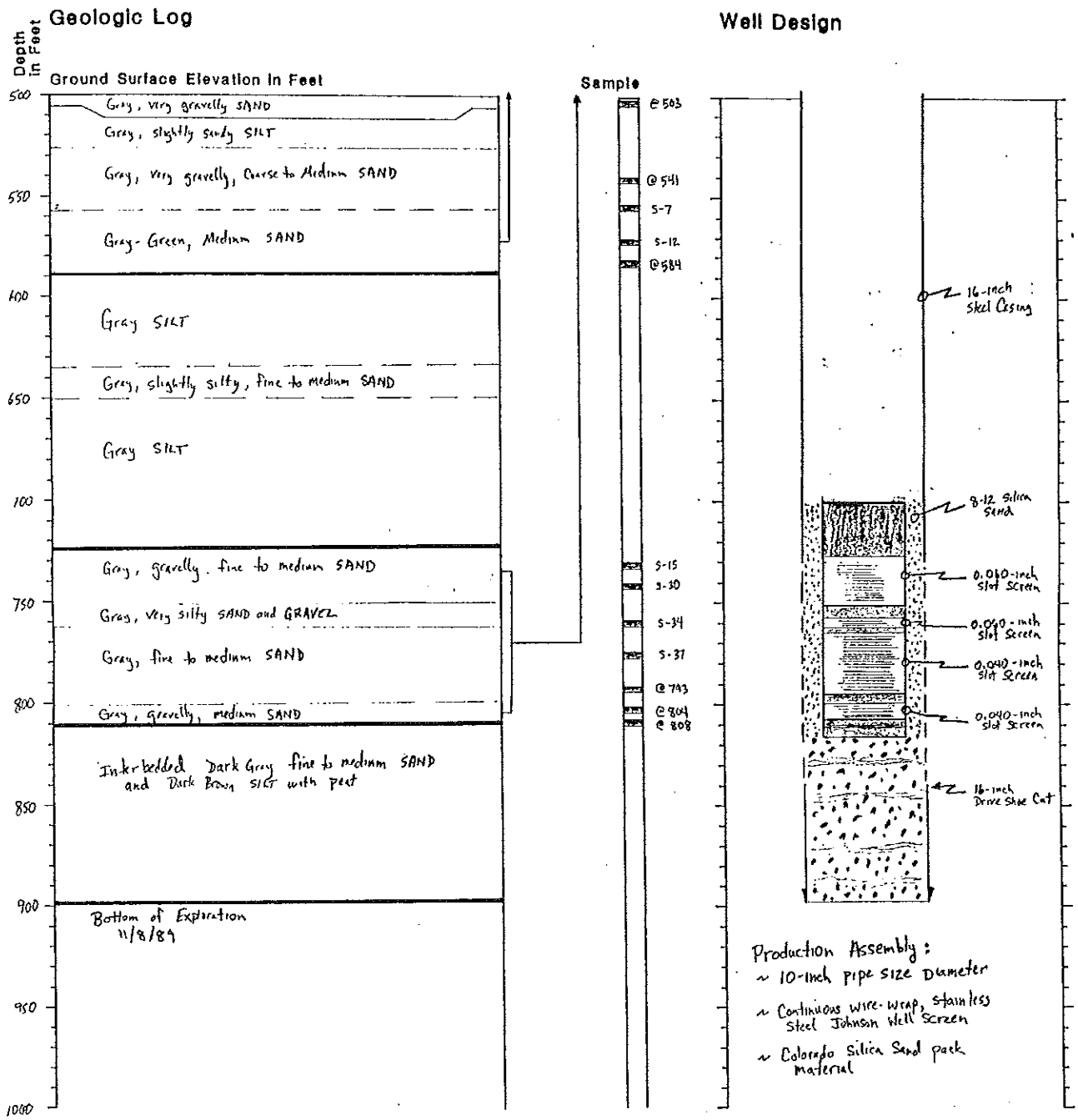
HARTCROWSER

J-2481 5/90

Figure A-2 1/2

Boring Log and Construction Data for Well

Gig Harbor Production Well No. 5



HARTCROWSER

J-2481 5/90

Figure A-2 2/2

Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Well #6

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 065763

Water Right Permit No. G2-28102

(1) OWNER: Name City of Gig Harbor Address 3105 Judson St., P.O. Box 145, Gig Harbor, WA 98

LOCATION OF WELL: County Pierce SE ¼ NW ¼ Sec. 7 T. 21 N., R. 2E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Intersection of 74th St. NW & 47th Ave.ct., NW GH98

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☒ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) Well 6

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☒ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 16 inches. Drilled 597 feet. Depth of completed well 566 ft.

(6) CONSTRUCTION DETAILS:

Casing Installed: 16 " Diam. from +1.5 ft. to 495 ft. Welded ☒ Liner installed ☐ Threaded ☐

_____ " Diam. from _____ ft. to _____ ft.

_____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒

Type of perforator used _____

SIZE of perforations _____ in. by _____ in.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☒ No ☐

Manufacturer's Name Cook

Type 304 Stainless Model No. Pipe Size

Diam. 14 Slot size 0.050 from 496 ft. to 508.5 ft.

Diam. 14 Slot size 0.090 from 532.5 ft. to 561 ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____

Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 67 ft.

Material used in seal Cement/bentonite

Did any strata contain unusable water? Yes ☐ No ☒

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level 255 ft.

Static level 226.43 ft. below top of well Date 12/11/91

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (Cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? Yes ☒ No ☐ If yes, by whom Carr/Assoc.

Yield: 800 gal./min. with 28.52 ft. drawdown after 24 hrs.

" " " " " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
0	254.95	5	239.13	60	234.87
1	240.20	10	238.07	415	231.46
2	240.10	16	237.27	1350	229.31

Date of test 12/11 to 12/12/91

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water 49 1/2 F Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Sand, silty, big rock at 12ft	0	12
Sand, silty and Gravel	12	29
Silt, gray with Sand & Gravel	29	40
Sand, silty, gry, seepage	40	48
Sand, silty & Gravel, brn.	48	67
Sand, silty & Gravel	67	75
Sand & Gravel, loose	75	80
Sand & Gravel	80	95
Sand, occ. Gravel, brn.	95	120
Sand, occ. Gravel, dry, brn.	120	152
Sand & Gravel, with Silt layers, red-brn., wood, W.B.	152	185
Sand, Silt layers, brn., heave	185	203
Sand, gry, heave	203	220
Cly, gry.	220	234
Clay & Silt, gry.	234	266
Sand, fine, & Silt	266	282
Sand, fine to medium, heave	282	322
Sand, medium, with Gravel, some Silt	322	331
Silt, green-brn. & gry. with peat & wood	331	348
Silt, green-brn. & gry	348	361
Silt, Sand, & Gravel, Tight	361	378
Silt, Sand, & Gravel	378	383
Sand & Gravel, loose	383	395
Sand, medium-coarse, & Gravel	395	404
Sand & Silt, occ. Gravel	404	419
Sand, medium-coarse, & Gravel	419	433
Sand, medium, heave	433	461
Silt, green, brown, gray	461	471
Sand, silty & Sand	471	480
Gravel, & fine Sand	480	491
Gravel, Silty, & Sand, tight	491	495

Work started 8/30 19. Completed 12/24 19. 91

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 10621 Todd Road East, Puyallup, WA

(Signed) _____ (WELL DRILLER) License No. _____

Contractor's Registration No. _____ Date _____ 19____

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Well #6

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 065783

Water Right Permit No. G2-28102

(1) OWNER: Name City of Gig Harbor Address 3105 Judson St., PO Box 145, GH 983

(2) LOCATION OF WELL: County Pierce SE ¼ NW ¼ Sec 7 T. 21 N., R. 2E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Intersection of 74th St NW & 47th Ave Ct NW GH 983

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) Well 6

Abandoned ☐ New well ☐ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well _____ inches. Drilled _____ feet. Depth of completed well _____ ft.

(6) CONSTRUCTION DETAILS:

Casing installed: _____" Diam. from _____ ft. to _____ ft.
Welded ☐ Liner installed ☐ Threaded ☐
_____" Diam. from _____ ft. to _____ ft.
_____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☐
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☐ No ☐ To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Sand, coarse, & Gravel	495	508
Silt, gray	508	530
Sand & Gravel, medium to coarse, W.B.	530	563
Sand, medium, green	563	592

Work started 8/30 19. Completed 12/24 19 91

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 10621 Todd Road East Puyallup, WA

(Signed) _____ (WELL DRILLER) License No. _____

Contractor's Registration No. _____ Date _____, 19__

(USE ADDITIONAL SHEETS IF NECESSARY)

The Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 7773
Permit No. 7303

(1) OWNER: Name Peninsula Water Development Co. Inc. Address Gig Harbor, Wn.

(2) LOCATION OF WELL: County Pierce 1250'W. & 1250'S. from E. ¼ Cor. NE ¼ SE ¼ Sec. 17 T. 21 N., R. 2E W.M.
Bearing and distance from section or subdivision corner A

(3) PROPOSED USE: Domestic X Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
New well X Method: Dug ☐ Bored ☐
Deepened ☐ Cable X Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10" inches.
Drilled 555 ft. Depth of completed well 242 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from 0 ft. to 349 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded X 10" Diam. from 10 ft. to 349 ft.

Perforations: Yes X No ☐
Type of perforator used 8 holes every Ft.
SIZE of perforations in. by in.
perforations from 338 ft. to 348 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes X No ☐
Manufacturer's Name Johnson's
Type Stainless Steel Model No.
Diam. 8" Slot size 22 from 227 ft. to 222 ft.
Diam. 8" Slot size 30 from 217 ft. to 222 ft.

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 207 ft. below top of well Date 9/1765
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes X No ☐ If yes, by whom? Driller
30 gal./min. with 15 ft. drawdown after 40 hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Water Level	Time	Water Level	Time	Water Level

Date of test 9/30/65
Bailer test 20 gal./min. with 7 ft. drawdown after 5 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No X

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Augered hole	0	13
Brown gravel - hard pan	13	52
Hard dry brown sand	52	125
Blue clay	125	135
Dry gray sand	135	164
Coarse gravel hardpan	164	166
Dry, coarse sand & gravel	166	177
Clean, dry sand	177	193
Clean, dry gravel	193	198
Muddy sand & gravel	198	215
Conglomorated sand & seepage	215	220
Clean water sand - Med.	220	227
Blue clay	227	259
Blue clay - hardpan	259	285
Blue clay silt	285	300
Solid blue clay	300	312
Blue clay silt	312	320
Blue clay, solid	320	338
Water - sand & gravel	338	344
Hardpacked gravel	344	349
Loose sand & gravel to big rocks		
W/layers of clay hard pan	349	355
Loose coarse Sand & small grav	355	358
Hardpacked gravel W/hard pan seams	358	361
Loose gray sand	361	363
Gray sand laminated with dry sand & clay seams	363	403
Blue clay	403	404
Fine silty gray sand	404	450
Hard silty clay W/silt layers	450	555
Reduced casing to 8" @ 349' and went to 555'		
Pulled out all 8", 10" Casing Filled with crushed gravel #240' to 350' Cut 10" off at 232' 6" and 231' Installed Screens		

Work started August 23, 1965 Completed October 14, 1965

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME HARBOR PUMP & DRILLING CO., INC.
(Person, firm, or corporation) (Type or print)
Address Rt. 5 Box 5110 Gig Harbor, Wash.

[Signed] JIM MILLER Jr. (Well Driller)

License No. D149036-68 Date March 26, 1968

WDOE 9189—(Rev. 5-80)—8-82—500. 4812. (USE ADDITIONAL SHEETS IF NECESSARY)

Appendix L

WELLHEAD PROTECTION PROGRAM

PACIFIC groundwater GROUP

CITY OF GIG HARBOR
DRAFT WELLHEAD PROTECTION
CONTAMINANT SOURCE INVENTORY REPORT

April, 2018

CITY OF GIG HARBOR
DRAFT WELLHEAD PROTECTION
CONTAMINANT SOURCE INVENTORY REPORT

Prepared for:

City of Gig Harbor
3510 Grandview St
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206.329.0141
www.pgwg.com

April, 2018
JB1706
CSI_GigHarbor Draft (April 2018)

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FIGURES

Figure 1: Potential Contaminant Sources of Concern and Land Use by Parcel

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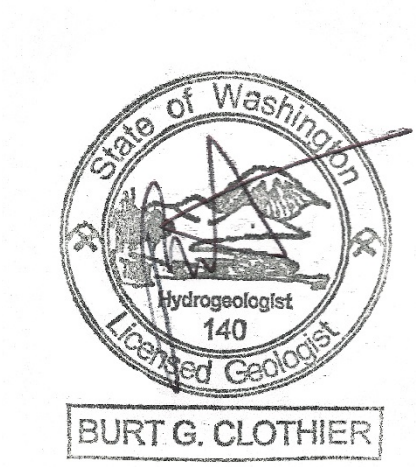
Appendix A: Environmental Sites Information
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LIST OF ACRONYMS

CEC	Contaminant of Emerging Concern
CSI	Contaminant Source Inventory
EPA	Environmental Protection Agency
FSID	Facility Site Identification
GIS	Geographic Information System
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
UST	Underground Storage Tank
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WHPA	Wellhead Protection Area

SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.



Burt Clothier
Senior Hydrogeologist
Washington State Hydrogeologist No. 140

David Wampler
Staff Geologist

1.0 INTRODUCTION

This report summarizes contaminant risks to groundwater supplies for the City of Gig Harbor ("the City"). Information presented in this report supports an update of the City's Water System Plan ("WSP") currently being prepared for the City by Carollo Engineers. The purpose of this report is to help the City understand the contaminant risks posed by these sources. Elements of this report were developed following the Washington State Department of Health guidelines for Wellhead Protection Programs (WSDOH, 2010).

The study area for this inventory is shown on Figure 1.

This report primarily contains documentation and results corresponding to the CSI update performed, includes a table of recommended sites visited during a "windshield survey" as well as adjustments made during the windshield survey, includes a protocol for updating the CSI in the future, and includes example letters to be sent to businesses and property owners within the City's WHPAs.

This work was performed, and this report prepared, in accordance with generally accepted hydrogeologic practices at this time and in this area for the exclusive use of the City of Gig Harbor for specific application to the study area. No other warranty, expressed or implied, is made.

2.0 HYDROGEOLOGIC SETTING

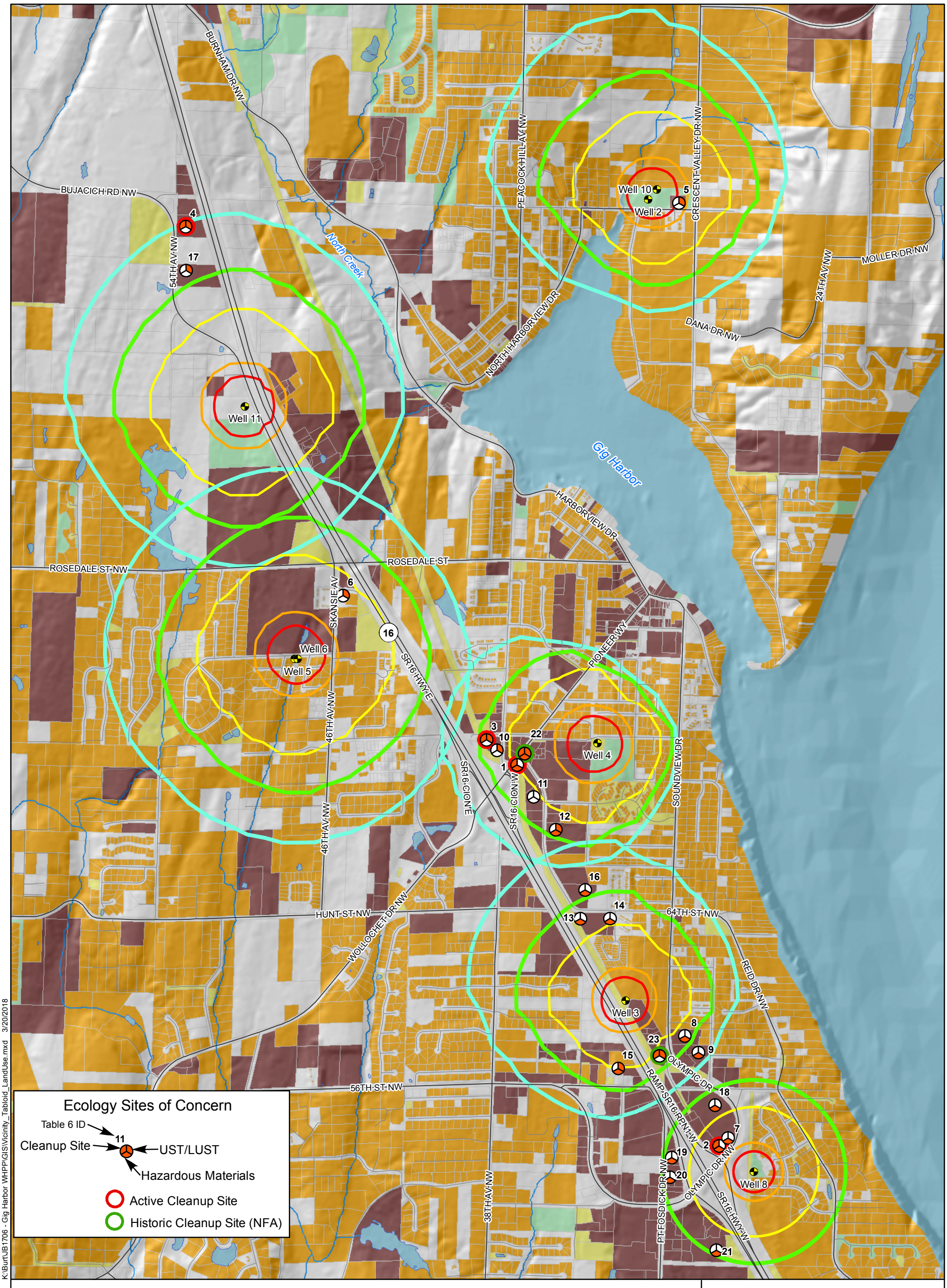
Gig Harbor is located within the Kitsap Peninsula, alongside Puget Sound, several miles northwest of Tacoma. Gig Harbor precipitation is estimated to average 44 inches of rain annually largely between October and March, as well as a few inches of snow. The area of WHPP concern resides roughly along a four mile stretch from SSE to NNW, starting just southeast of the intersection between Washington State Highway 16 (WA-16) and Olympic Drive Northwest.

Surface elevations throughout most of the area vary from close to sea level at the coast to close to 300 feet. Topographic relief is low to moderate in much of the area, with slopes between zero and 10 degrees, sloping downward toward the coastline to the east and inland to the west of WA-16. In some locations, especially along coastlines, elevation change can be substantial over relatively short distances.

The WHPAs contain large percentages of both pervious and impervious surfaces. Impervious surfaces are composed of roofs, parking lots, and roads. Impervious surfaces in the WHPAs tend to be forested areas, grass lawns and fields, and parks.

The area subsurface in the Kitsap Peninsula is composed of approximately a dozen broadly-categorized geologic units. These units also serve as layers in the hydraulic model used to estimate water travel time to production wells. Geologic Units are summarized as:

- Vashon Recessional Aquifer (Qvr) – Model Layer 1. Recessional outwash. Sand and gravel. Where present, this layer is the most susceptible to contamination


BURNHAM DR NW
BUJACICH RD NW
54TH AV NW
North Creek
PEACOCK HILL AV NW
CRESCENT VALLEY DR NW
NORTH HARBORVIEW DR
DANA DR NW
24TH AV NW
MOLLER DR NW
Gig Harbor
HARBORVIEW DR
ROSEDALE ST NW
ROSEDALE ST
SKANSIE AV
SR16 HWY E
46TH AV NW
SR16 CION E
SR16 CION W
PIONEER WY
SOUNDVIEW DR
HUNT ST NW
WOLLOCHET DR NW
64TH ST NW
REID DR NW
56TH ST NW
RAMP SR16 RPNT W
OLYMPIC DR
OLYMPIC DR NW
PT FOSDICK DR NW
38TH AV NW
SR16 HWY W
Well 10
Well 2
Well 11
Well 6
Well 5
Well 4
Well 3
Well 8
4
17
5
6
16
3
10
22
1
11
12
16
14
13
8
23
9
15
18
7
2
19
20
21
Ecology Sites of Concern
Table 6 ID
Cleanup Site
11
UST/LUST
Hazardous Materials
Active Cleanup Site
Historic Cleanup Site (NFA)
City of Gig Harbor Wells
Wellhead Protection Area
6-Month
1-Year
5-Year
10-Year
20-Year
Current Land Use Type
Manufacturing/Trade/Services/Resource Production and Extraction
Residential
Transportation, Communication, and Utilities
Cultural, Entertainment, and Recreational
Vacant/Undeveloped Land and Water Areas
N
0
Feet
2,000
See section XX for WHPA definitions
Figure 1
Potential Contaminant Sources of Concern and Land Use by Parcel
JB1706
City of Gig Harbor
PgG
K:\Burt\JB1706 - Gig Harbor WHPP\GIS\Vicinity_Tabloid_LandUse.mxd 3/20/2018

from surface releases but is typically thin (<30 feet) or absent within the study area.

- Vashon Till Confining Unit (Qvt) – Model Layer 2. The Vashon Till Confining Unit typically separates Qvr from the underlying advance outwash sand and gravel. Composed of variably compact sand and gravel in a matrix of silt and clay, compacted from the overburden pressure of the Vashon glacier. Has low permeability in most areas and is typically less than 70 feet thick or absent within the study area.

- Vashon Advance Aquifer (Qva) – Model Layer 3. Occurs below Qvr and Qvt, when present. Consists of sand and gravel that was deposited from meltwaters along the perimeter of the Vashon ice sheet. Typically, less than 70 feet thick or absent within the study area.

- Upper Confining Unit (QC1) – Model Layers 4 & 6. A low-permeability unit consisting mostly of early Vashon glaciolacustrine silt and clay and underlying interglacial deposits of silt, sand, and gravel with numerous lenses of silt and clay or silty peat. Less than 100 feet thick or absent within the study area.

- Sea Level Aquifer (QA1) – Model Layer 7. Consists primarily of glacial sand and gravel, with silt interbeds. Present throughout most of study area at thicknesses of 191 feet or less.

- Middle Confining Unit (QC2) – Model Layer 8. Low-permeability unit consisting of interglacial sandy silty clay and glacial sand and gravel, with significant amounts of silt and clay layers. Present throughout study area, typically at thicknesses of 175 feet or less.

- Glaciomarine Aquifer (QA2) – Model Layer 9. Ranges in composition from sand and gravel to silt. Generally lower permeability compared to Qva and QA1. Present throughout study area, typically at thicknesses of 160 feet or less.

- Lower Confining Unit (QC3) – Model Layer 10. Unit composed of clay and silt, with some gravel. Present throughout study area, typically at thicknesses of 410 feet or less.

- Deep Aquifer (QA3) – Model Layer 11. Confined unit consisting mostly of sand and gravel with silt interbeds. Present throughout study area, typically at thicknesses of 210 feet or less.

- Basal Confining Unit (QC4) - Model Layer 12. Low-permeability unit composed of clay and silt with some gravel. Present throughout study area, typically at estimated thicknesses of 1,000 feet or less.

- Bedrock (BR) – Model Layer 13 & 14. Present throughout study area. Composed of marine and non-marine sedimentary rocks and volcanic rocks. Typically, present starting between 1,241 and 2,170 feet below ground surface.

These geologic unit summaries are based on regional descriptions and WHPA-specific unit thicknesses and are not necessarily definitive for every location within Gig Harbor. In most circumstances these will constitute reliable estimates of subsurface conditions.

3.0 WHPA DELINEATIONS

New Wellhead Protection Areas (WHPAs) for the City's eight selected water supply wells were delineated for this project. The WHPAs for seven of the eight Gig Harbor water supply wells (2, 3, 4, 5, 6, 10, and 11) were delineated using the USGS Kitsap Peninsula groundwater flow model (Frans and Olsen, 2016). The Kitsap model was used to estimate the 6-month, 1-year, 5-year, 10-year, and 20-year "capture zones" for these wells operating each well's permitted maximum instantaneous flow (Qi).

The 6-month, 1-year, 5-year, and 10-year capture zones are WHPAs required by DOH guidance. The 20-year capture zone is added as a "buffer zone" WHPA to account for hazards outside of the 10-year WHPA.

The WHPAs were delineated based on the maximum installed pump capacity for each well. Wells 2 and 10 are located close enough to each other that they share modeled travel times from vicinity sources. The same is true for Wells 5 and 6. In some locations wellfield protection areas for multiple wells overlap; therefore, potential contamination sources are ranked based on the shortest travel time to any water supply well. Gig Harbor Well 8 is the shallowest city water supply well and could not be simulated with the USGS model due to limitations of the model to simulate the shallow aquifers.

A well's capture zone is the area within the aquifer that supplies groundwater recharge to a pumping well (i.e. the zone of contribution). A time-related capture zone is the area that supplies groundwater recharge to a pumping well within a specified time period. Time-related capture zones provide a basis for developing monitoring plans, land-use inventories, and data collection plans, as well as assessing the vulnerability of source aquifers to contamination from the identified sites of known or potential risk.

The following sections describes the Kitsap ground water flow model and the capture zone analysis in more detail.

3.1 KITSAP MODEL

The Kitsap Model was constructed by the USGS to simulate the groundwater flow system within the unconsolidated glacial and interglacial deposits beneath the Kitsap Peninsula. The model uses the MODFLOW-NWT finite difference code and consists of 14 layers representing the different aquifers and aquitards with a uniform model grid spacing of 500 by 500 feet (Frans and Olsen, 2016). The model simulates recharge water entering the groundwater system from precipitation, groundwater flow within the different aquifers and aquitards, and groundwater discharge to pumping wells, streams, lakes, springs, and the Puget Sound.

The model was calibrated to transient (time varying) conditions between 1985 and 2012 using targets from 18,835 observed groundwater levels and 43 locations of stream

baseflows. Model calibration involved adjusting the assigned values of aquifer parameters within realistic ranges until a reasonable fit to the observed targets was achieved (Frans and Olsen, 2016).

Various scenarios were developed with the calibrated Kitsap model to evaluate future water resource conditions (e.g changes in pumping and/or recharge). One of the scenarios simulated was a steady-state simulation using average 2005-2012 pumping rates and the 30-year annual average recharge. A steady-state simulation allows the modeled groundwater flow system to come into equilibrium under a single set of assigned stresses (i.e. pumping and recharge). The average steady-state version of the calibrated Kitsap model was used to simulate the capture zones of the Gig Harbor wells (see below).

3.2 SIMULATED CAPTURE AREAS OF GIG HARBOR WELLS

The estimated capture areas for the City wells were generated using the USGS average steady-state version of the Kitsap groundwater model (Frans and Olsen, 2016).

City Wells 2, 3, 4, 5, 6, and 8 were already represented in the USGS model, using average pumping rates, and assigned to the model layer corresponding to its interpreted target aquifer (Table 1). Wells 2, 4, and 6 were interpreted by the USGS as completed in the Glaciomarine aquifer (layer 9), Wells 3 and 5 as completed in the Deep aquifer (layer 11), and Well 8 in the Sea Level aquifer (layer 7). As mentioned above, the capture area for well 8 could not be adequately simulated with the USGS model due to limitations of the model to simulate the shallow aquifers.

Wells 10 and 11 were added to the USGS model for the capture zone analysis. Based on the anticipated target well depths, we interpret well 10 as completed in the Deep aquifer (layer 11) and well 10 in the Glaciomarine aquifer (layer 9).

Because Wells 2 and 10 are located in close proximity to each other, occurring the same model cell and same model layer, the two wells were simulated in the model as one well pumping well with the combine Qi for both wells (Table 1). Wells 5 and 6 are also located in the same model cell but in different layers; layer 11 and 9 respectively. The two wells were simulated independently in the model, but because of their close proximity, a single capture area was delineated for the combined wells. The delineation used the largest simulated capture area of the two wells.

The pumping rates assigned to the City wells for the capture zone analysis used their maximum instantaneous rates (Qi) allowed by the water rights, which provides a fairly conservative assessment of the capture zone extent. A single steady-state model simulation was performed for each well operating at its Qi rate while the other City wells were left at the average rate assigned by the USGS.

The estimated capture zones were delineated using the particle tracking code MODPATH, a post-processing program designed to work with MODFLOW for tracing out the simulated groundwater flow field within the finite difference grid. Particles were placed at the location of the pumping well and traced backwards in time to delineate the 6-month, 1-year, 5-year, 10-year, and 20-year capture path for each well. Final capture zones are shown in Figure 1. All the capture zones are fairly circular in shape, indicating

a fairly low natural groundwater gradient. In areas with higher natural groundwater gradients, the capture zones tend to be fairly elongated in shape, extending towards the area of recharge. The capture area for Well 8 is based on the fixed radius method originally used in the 2008 effort and as such it's shape is a perfect circle.

Table 1: Gig Harbor wells simulated with the USGS groundwater model

Well	USGS Model Layer	Assigned Pumping Rate for Capture Zone Simulation, Qi (gpm)	Average Pumping Rate Assigned by USGS in Steady-State Model (gpm)
2 and 10	9 (both wells)	330 (combined)	75 (well 2)
3	11	625	186
4	9	230	41
5	11	500	131
6	9	1000	139
11	11	1000	Not Simulated
8	7	Not Simulated	7.5

4.0 CONTAMINANT SOURCE INVENTORY RISK ASSESSMENT

The following sections present an inventory of confirmed and potential sources of contamination located within the WHPA and an evaluation of risks associated with these sources.

4.1 DATA SOURCES

Potential contaminant risks that lie within the vicinity of the City's WHPAs were investigated and mapped using data from three sources. The first two sources are parcel databases that contain information on land use and zoning, one created by Pierce County and one by the City. The second contains data from the Washington State Department of Ecology's Facility / Site database, including state cleanup sites, federal superfund sites, hazardous waste generators, solid waste facilities and underground storage tanks. The information from these sources were classified and plotted on GIS coverages to assess whether existing and potential contaminant sources were located within the vicinity of Gig Harbor's production wells and WHPA delineations[1].

4.2 CURRENT LAND USE

Pierce County's database contains a description of the land use within each parcel in the study area. A GIS analysis and database query were used to identify land uses present in the City WHPAs, with the following land-use categories mapped (Figure 1):

[1] Some locations from Ecology's Facility database were adjusted in Figure 1 based on facility address, parcel information, and Google Earth imagery.

- Manufacturing/Trade/Services/Resource Production and Extraction (Commercial & Industrial)
- Residential
- Transportation, Communication, and Utilities
- Cultural, Entertainment, and Recreational
- Undeveloped Land and Water Areas

The most common land use within the City's WHPAs is residential. The WHPAs for Well 3 and for Well 4 contain a greater total number of commercial & industrial land-use parcels, wat four to five dozen. The WHPAs for Well 3, Well 4, and Wells 5 & 6 contain the greatest number of parcels with residential land use, followed by the WHPA for Wells 2 and 10.

This analysis provides a method to broadly assess which water-supply wells may be impacted by the proximate uses on City land. As a general rule, land use associated with commercial and industrial operations pose the greatest risk to groundwater supplies, followed by residential (largely due to the cumulative impact of many residences in a single area). However, any land use carries the potential to source a contaminant release, and land use today may not match historical land use.

Figure 1 shows the distribution of land use throughout the study area. A summary of the distribution of parcels is presented in the table below (Table 2).

Table 2: Land use within WHPAs

	Number of Parcels by Land Use within each WHPA					
Travel Time (years)	Wells 2 and 10	Well 11	Wells 5 and 6	Well 4	Well 3	Well 8
Manufacturing, Trade, Services, & Resource Production and Extraction	4	25	17	51	66	10
Residential	335	26	542	413	483	138
Transportation, Communication, & Utilities	4	7	22	14	17	4
Cultural, Entertainment, & Recreational	4	2	0	1	0	0
Vacant, Unknown, & Undeveloped	71	54	145	43	65	27

Parcels associated with Manufacturing, Trade, Services, Resource Production and Extraction, and Residential land use that fall within the various capture zones should be considered as possible contaminant sources. Parcels with shorter time of travel should be considered more pressing to evaluate for risk management. However, given that some land use categories are quite broad, many of these parcels are likely not of significant hazard,

and without additional information these parcels should be considered lower risk than the potential contaminant sources identified in Section 2.3 where hazardous materials have been confirmed present on site or historically located on site.

4.3 CONTAMINANT SOURCES

Table 3 summarizes known environmental sites of potential concern to water supply within the City's WHPAs. Initially, 23 contaminant sources of potential concern were identified. These sites were identified using the Department of Ecology's Facility Site Identification (FSID) database. FSID entries for the Gig Harbor area were then sorted based on their FSID interaction type, which represents the importance of the site to Ecology. Sites with interaction types representing contaminant releases or contaminant handling were flagged and mapped. The mapped site locations were then verified (and in some cases updated) using a Google Maps address search and a field survey. Upon completion of the windshield survey, five sites were removed from this list and five sites were added.

Figure 1 displays the location of each of hazard site with a site marker. Each site marker has three pie slices which indicate the type of activities associated with the site as follows:


Underground Storage Tank (UST) or Leaky Underground Storage Tank (LUST)


Cleanup Site (State Cleanup or Voluntary Cleanup)


Hazardous Material Generator or Handler

Any combination of the three indicators is possible. Sites where these activities previously occurred have low levels of risk associated with them, but still may remain a risk to groundwater quality because undocumented leaks or spills may have occurred and if not properly addressed, could cause future contamination issues.

Sites with cleanup actions for soil, groundwater, or surface water contamination, active USTs or LUSTs, and active hazardous material generation or handling facilities have red circles highlighting their pie slices to emphasize the risk associated with these facilities. Sites that have historically had cleanup actions but have since received an NFA from Ecology are highlighted with green circles.

Site markers without any pie slices filled in indicate the facility is tracked in Ecology's facilities database, and the facility type is considered to have risk to groundwater, but the facility is not a cleanup site, a hazardous materials handler, nor does it have registered underground storage tanks.

4.3.1 Contaminant Sources with Known Releases

Table 3 indicates six confirmed sites with known contaminant releases within in the Gig Harbor WHPAs. Two of these sites had historical releases that have since been remediated or contained as documented by NFA letters, while four of these sites have ongoing contamination issues.

Table 3. Summary of Environmental Sites of Potential Concern within Wellhead Protection Capture Zones

Map ID (See Fig. 1)	Facility Name	Facility ID	WHPA	Release	Underground Storage Tank	Underground Storage Tank Release (LUST)	Total "Current" Operational Tank Volume (gallons)	Hazardous Materials	Cleanup Site	Cleanup Status[1]	Nature of Contaminants at Cleanup Sites[2]								
											Halogenated Organics	Other Non-Halogenated Organics	Halogenated Solvents	Lead	PCB	Petroleum - Other	Petroleum - Gasoline	Petroleum-Diesel	Benzene
1	T & Y Management Inc	72694822	5	Y				Yes	Yes				S(gw), C(s)						
2	Olympic Tire & Auto Svc Center Inc	91344771	5	Y				Yes	Yes		C(s)								
3	U HAUL GIG HARBOR	84651569	10	Y	Yes	Yes	Two removed (111 - 1100)		Yes							C(s)			
4	PAPE & SONS CONSTRUCTION INC	9566131	20	Y	Yes	Yes	One removed (111-1100), one removed (5000-9999), one exempt (111 - 1100)		Yes							C(gw), C(s)			
5	Pentecostals of Gig Harbor (Masonic Lodge)	n/a	1		Yes		Unknown, not in Ecology UST database												
6	Baby Beau & Belle Inc	18680	5		Yes		One removed (111 - 1100)												
7	Sun Dry Cleaners	n/a	5					Yes											
8	Pacific Endometriosis and Pelvic Surgery	n/a	10					Yes											
9	DPI Printing	n/a	20					Yes											
10	MARITIME MART CHEVRON	15598147	10		Yes		Three operational (10000 - 19999)												
11	Microlynx	1056975	10																
12	Pierce Cnty Fire Dist 5	63282214	10		Yes		Two removed (111 - 1100), two removed (1101 - 2000)	Yes											
13	WILCO WINFIELD GIG HARBOR	11279	10					Yes											
14	United Rentals Northwest Inc Gig Harbor	8281744	10					Yes											
15	SE 15 GIG HARBOR	7014163	10		Yes		One removed (111 - 1100)	Yes											
16	Franciscan Medical Clinic	n/a	20					Yes											
17	EYRISH HEMLEY LAND COMPANY	35923829	20		Yes		Three removed (unknown)												
18	Bartells 39	63449638	20					Yes											
19	Walts Radiator & Muffler Gig Harbor	76926774	20					Yes											
20	JIFFY LUBE STORE 2058	4013037	20					Yes											
21	Safeway Store 2949	10976	20					Yes											
22	Shell Station 121515	92722628	5	Y	Yes	Yes	Three removed (unknown), two removed (111 - 1100), one removed (10000 - 19999), four operational (10000 - 19999)	Yes	Yes	NFA		B(gw), B(s)		B(gw), B(s)	B(s)	B(gw), RB(s)	B(s)	B(s)	B(gw), B(s)
23	GIG HARBOR VETERINARY HOSPITAL INC	69461234	10	Y	Yes	Yes	One removed (111 - 1100)		Yes	NFA		B(s)		B(s)			RB(s)		B(s)

1. NFA = No Further Action
2. Nature of Contaminants and Impacted Media at Cleanup Sites (as provided on Ecology's online Site Summary Report).

B	Below Cleanup Level	R	Remediated	(gw)	Groundwater
C	Confirmed Above Cleanup Level	RA	Remediated-Above Cleanup Level	(sw)	Surface Water
S	Suspected	RB	Remediated-Below Cleanup Level	(s)	Soil

A brief discussion of each site with ongoing contamination issues and its current status follows, with additional information provided in Appendix B for all sites tracked by Ecology with historical or current cleanup actions occurring.

4.3.1.1 T & Y Management Inc (FSID 72694822, Map ID=1)

T & Y Management Incorporated is located at 6978 Kimball Drive, located east of WA-16 along Pioneer Way, and is within the 5-year travel time boundary of Well 4. This site had confirmed soil contamination and suspected groundwater contamination of halogenated solvents. As of the close of 2017, soil and groundwater at this site is noted as below cleanup levels and remediated in the FS database. A NFA has not yet been issued for this site.

4.3.1.2 Olympic Tire & Auto Svc Center Inc (FSID 91344771, Map ID=2)

Olympic Tire and Auto Service Center Incorporated is located at 5500 Olympic Drive Northwest, just east of WA-16, and within the 5-year travel time boundary for Well 8. This site has soil contamination from halogenated organics. At least three dry cleaner businesses operated on this site between 1968 and 1990, within the same unit in the shopping mall. Tetrachloroethylene has been detected above cleanup levels between 0 and 20 feet below ground surface. Exceedances have not been detected at deeper depths, although Ecology comments that additional sampling was required as of 2011. Perched groundwater at this site occurs between 10 and 15 feet below ground surface, and perched groundwater samples taken in 2010 revealed exceedances of cleanup levels. Ecology has issued comments that the contamination at this site does not appear to extend laterally beyond the site property, but does extend vertically to an unknown depth (Ecology, 2011).

4.3.1.3 U-Haul Gig Harbor (FSID 84651569, Map ID=3)

U-Haul Gig Harbor is located at 3818 Grandview Street[2], just east of WA-16 and located within the 10-year travel time boundary for Well 4. This site is listed as an active LUST site. Two USTs between 111 and 1100 gallons have been removed from this site; no remaining USTs are listed. The site is identified as having active petroleum contamination in soil.

4.3.1.4 Pape & Sons Construction Inc. (FSID 9566131, Map ID=4)

Pape & Sons Construction Inc. in an excavation contractor with a property located at 9401 54th Ave NW. Ecology records a LUST at another property which appears to now be undeveloped land located at coordinates 47.33926, 122.60541 and address 9512 State Highway 16 Northwest, within the 5-year travel time boundary for Well 11. This LUST site is listed as active in the Ecology Facility Site Database with petroleum above cleanup levels in both soil and groundwater. The site contained two USTs, installed in 1973, one between 111 and 1100 gallons and one between 5000 and 9999 gallons Both of these tanks have been removed. A third UST, between 111 and 1100 gallons, is noted as exempt as of at least 1996 in the UST database.

[2] Ecology's Facility Site database incorrectly lists this address as Grandview Avenue.

4.3.2 Potential Sources

This section discusses potential sources of contamination within the wellhead protection capture zones based on Ecology's Facility database, Ecology's underground-injection-control database, and the combined Pierce County and City of Gig Harbor parcel database. The following potential contamination sources have been identified within capture zones for the Gig Harbor wells:

- Hazardous materials
- Underground storage tanks

Other potential contaminant sources not specifically addressed in this CSI include:

- On-site septic systems
- Home heating oil tanks
- Stormwater
- Agriculture, golf courses, and parks
- Unused and improperly constructed wells
- Transportation corridors

Although parcels and sites with these unaddressed potential sources are not identified, and are generally lower sources of risk, the City should remain aware that these represent persistent potential sources of contamination within the region.

4.3.2.1 Hazardous Materials

The commercial use of chemicals poses a major threat to groundwater quality, since chemicals can accidentally spill or be disposed of improperly. The likelihood of such releases from spills can be reduced by proper methods of handling, spill prevention measures, and emergency response strategies. Risk reduction strategies should target on-site waste management practices. Improper disposal is likely the most common pathway for chemicals to be released into the environment. The following facility activity classifications (Table 4) were used to identify sites with hazardous material for this assessment:

Table 4: Ecology-Defined Activities Associated with Potential Contaminant Releases Within WHPAs

Activity Code	Definition
HWG	Facilities that generate any quantity of a dangerous waste. They may be classified as small, medium or large quantity generators (SQG, MQG, or LQG) depending on hazardous waste generated for a given month.
HWP	Under Chapter 173-307 WAC, facilities that report under Section 313 of the Emergency Planning/Community Right-To-Know Act (EPCRA), or that generate more than 2,640 pounds of hazardous waste per year, must prepare Pollution Prevention Plans.

HWOTHER	Facilities that are required to have a RCRA Site ID# but who do not generate and/or manage hazardous waste (XQG generator status). This includes transporters, used oil recycler's, and dangerous waste fuel marketers and burners.
TIER2	Businesses that store 10,000 pounds or more of a hazardous chemical or 500 pounds or less, depending on the chemical, of an extremely hazardous chemical on site at any one time must report annually. Reports are sent to the State Emergency Response Commission [represented by Ecology], Local Emergency Planning Committees, and local fire departments for emergency planning. [product, not waste]
UST	Any one or combination of tanks (including connecting underground pipes) that is used to contain regulated substances and has a tank volume of ten percent or more beneath the surface of the ground. This term does not include any of the exempt UST systems specified in WAC 173-360-110(2) or any piping connected thereto. See WAC 173-360
LUST	A leaking underground tank cleanup site being cleaned up with Ecology oversight or review.
ENFORFNL	An Enforcement action (i.e. Penalty, Order, Notice) was finalized, issued to the respective party, indicating the enforcement action was taken.

The most significant threats to groundwater are related to the use and storage of solvents. Solvents are persistent, both soluble and insoluble in water, and highly mobile. A large plume of contamination can be created with a small quantity of solvent.

The FSID database indicates that there are 23 sites within the Gig Harbor WHPAs that fall into one of the above hazardous waste classifications. Of those only 6 have had cleanup actions, and of those, only four are active cleanup sites. Inactive status indicates that the sites do not have current permitting, and therefore, are not actively overseen by Ecology. The FSID database does not indicate whether sites listed are large or small hazardous waste generators.

4.3.2.2 Underground Storage Tanks

Contamination in soil and groundwater caused by leaking USTs ("LUSTs") is a major environmental, legal, and regulatory issue. Common causes of leaks are structural failure, corrosion, improper fittings, improper installation, and natural phenomena. Although USTs usually contain flammable motor fuels or heating oils, they may contain other compounds used by industry, government, or business.

Leakage from USTs and associated piping can often occur without detection. Even relatively small amounts of certain compounds can adversely impact groundwater quality. Once released from an UST, some VOCs and petroleum products can rapidly migrate to groundwater, a problem that is especially serious in areas with permeable soils or that directly overlie a water supply aquifer.

Of the many materials stored in USTs, solvents are considered the most toxic. However, petroleum products may pose a greater total risk because of the prevalence of tanks containing petroleum products. In addition, petroleum products contain many potential contaminants, including three EPA priority pollutants: benzene, toluene, and ethylbenzene. Benzene is a known human carcinogen.

Figure 1 shows the locations facilities identified with current or historical USTs in the WHPAs. These sites were identified from the Ecology's UST site data, and most exist in areas zoned industrial and commercial. There are 10 sites within the WHPAs that have or historically had USTs, nine of which are identified from the Ecology UST database. The tenth site, Map ID 6, was identified as having a UST during the windshield survey but is not listed in the Ecology database. Of these, three sites have active USTs, six sites have only inactive, closed, or removed USTs, and one site has USTs with unknown status (Table 3). Of the three active UST sites, there is one large facility (>15,000 gallons total volume) in operation. The tanks at this large facility were upgraded in 1998 to include additional standard protections such as corrosion-resistant double-walled tanks and leak detection systems.

Four sites with LUSTs were identified in Ecology's database and EPA documents as located within the WHPAs. Three LUSTs are listed as inactive, which indicates cleanup has occurred, although only two sites have received a full NFA. One site is listed as an active LUST site. The windshield survey may clarify the status of this one site.

4.3.2.3 On-Site Septic Systems

On-site septic systems pose a risk to groundwater where they are relatively high in density and/or where hazardous wastes are discharged to them. Potential contaminants from septic systems include pathogenic organisms (bacteria and parasites), toxic substances, and nitrogen compounds.

The extent to which pathogens are transported in the subsurface away from a septic drain field depends on the type of pathogen and the chemical and physical conditions in the subsurface. In general, if a septic system is properly sited, constructed, and maintained, the transport of microorganisms will be limited. Household hazardous chemicals such as cleaners, polishes, waxes, and paints can be transported to groundwater via a septic system. Some products contain toxic and persistent chemicals that can cause low-level contamination when coupled with a high density of septic systems. Homeowners may improperly apply or dispose of chemicals because they do not understand the threat they pose to groundwater quality. In some areas, business and commercial facilities use on-site septic systems for sewage disposal. Business, commercial, and industrial operations that utilize on-site systems need to take special precautions to avoid contamination of their wastewater.

Septic systems can also be sources of contaminants of emerging concern (CECs), which generally are not hazardous chemicals, but can present in wastewater at low concentrations. CECs include pharmaceuticals, personal care products, food additives, cooking products, flame retardants, and various commercially and industrially used compounds. These compounds are not always removed by wastewater treatment plants or septic tanks, and therefore are often detectable in groundwater and surface water. Current research into CECs and their potential impact to humans and the environment is ongoing.

Ammonia and nitrate are highly soluble in water and can be expected in detectable quantities wherever portions of an aquifer are affected by septic system discharges. Nitrate is regulated, since ingestion can result in methemoglobinemia, or "blue baby" syndrome. Other sources of nitrate include fertilizers, feedlots, and natural mineral deposits. Background concentrations of nitrate in groundwater are typically less than 1 milligram of nitrogen per liter (mg-N/L). Shallow wells typically are more susceptible to nitrate contamination since they are closer to surficial sources and less aquifer dilution occurs near the water table. The maximum contaminant level (MCL) for nitrate is 10 mg-N/L.

4.3.2.4 Storm Water

Storm water (i.e., urban runoff) is produced when rainfall or other precipitation accumulates faster than it can evaporate, be used by plants, or infiltrate to the subsurface. Urban areas produce more runoff than rural areas because they have more impermeable surfaces, such as rooftops, driveways, streets, and highways. These surfaces not only promote runoff but they also reduce the infiltration that recharges groundwater. Even grass lawns can produce more runoff than forests and pasture.

Storm water typically contains pollutants, such as sediment, nutrients, bacteria, oils and grease, metals, and other toxics. Many of these contaminants come from air pollution, motor vehicles, application of pesticides and fertilizers, soil erosion, and animal feces. Roofing materials have also been identified as a diffuse source of metals in runoff, particularly zinc (Good, 1993). In general, contaminant concentrations in urban storm water are similar for all land uses, though slightly higher nitrate concentrations occur in residential areas and higher heavy metals concentrations occur in commercial areas. Concentrated sources of storm water contamination may also occur if undiluted pollutants (e.g., fertilizer, gasoline) are accidentally spilled or intentionally released and enter storm drains.

Storm water contamination has primarily been a concern for surface water pollution because most urban runoff is directed to streams, lakes, and other water bodies with fish and other aquatic life that are highly sensitive to common storm water contaminants. However, where storm water is discharged to infiltration areas, the potential for groundwater contamination exists.

Concern over potential groundwater contamination from storm water has been recognized by several governmental agencies in western Washington. Storm water-related impacts to water quality are of particular concern in industrial, commercial, and high-density residential development areas, where runoff volumes can be large. Consequently, storm water runoff from highways and roads can introduce contaminants such as EPA priority pollutants (heavy metals and numerous organic compounds), pesticides/herbicides, and coliform bacteria into the groundwater system. Storm water runoff from lawns and agricultural areas may also introduce nitrate, herbicides, pesticides, and bacterial contaminants.

4.3.2.5 Agriculture, Golf Courses, Parks, and Lawns

Fertilizers, pesticides, and herbicides are applied to residential lawns, commercial landscaping, agricultural lands, and landscaped areas adjacent to roads. If optimally applied, these chemicals pose little threat to groundwater, however, applications are commonly made incorrectly and groundwater contamination can result if fertilizers are applied in exceedance of the agronomic uptake rate. Excess nitrate from fertilizer will be recharged

to the underlying groundwater system. Landscaping activities can also be the source of pesticides and herbicides.

Residential lawns and other landscaping occur throughout the Gig Harbor WHPAs. These are potential sources of nitrogen, pesticides and herbicides to the groundwater. The risk of groundwater contamination by these contaminants is moderate because much of the City's water supply aquifer is overlain by glacial till.

Public parks, schools, and a cemetery were all identified within Gig Harbor WHPAs, and the application of fertilizers and pesticides/herbicides at these sites can negatively impact groundwater quality. Some of these areas are within wellfield 6-month time of travel zones (such as the City Park at Crescent Creek and Haven of Rest Funeral Home), and therefore the City should coordinate with the parks department on the use of chemicals at facilities in close proximity to wellfields. Unique risks to groundwater posed by cemeteries include the release of fluids (such as formaldehyde) or heavy metals from the decay of embalmed bodies.

4.3.2.6 Unused, and Improperly Constructed Wells

Well casings can provide a conduit between the ground surface and underlying aquifers. Improperly constructed or abandoned wells pose several potential problems. In wells with no surface seal, contaminants introduced near the wellhead can move downward outside the casing to underlying aquifers. Many older wells that were constructed before the implementation of the State's minimum well standards in WAC 173-160 (pre-1971) have no surface seal. Unused wells that have not been properly abandoned are left uncapped in many cases, posing a special risk because contaminants can be introduced directly into the aquifer. Unused wells also pose a risk when they are damaged during site redevelopment. Any of these situations can provide a conduit for contaminant movement.

4.3.2.7 Transportation Spills

Vehicles transporting hazardous material can be a source of groundwater contamination through accidents and resultant chemical spills. Hazardous materials are transported through Gig Harbor on a daily basis. The major transportation routes in the City Gig Harbor include:

- WA-16
- Pioneer Way & Wollochet Drive Northwest
- Rosedale Street Northwest
- Olympic Drive Northwest
- Soundview Drive
- Peacock Hill Avenue Northwest

All of these transportation corridors go through at least one of these WHPAs, with WA-16 (the most heavily used route) present in six of the WHPAs. A major spill along any of these routes could adversely impact groundwater pumped from given water supply wells.

4.4 RECOMMENDED SITES FOR VISITATION

A primary purpose of this Draft Contaminant Source Inventory is to provide a list of sites that are recommended for review and visitation by the City to verify site locations and the existence of potential hazards. **Table 5** lists sites investigated during the windshield survey performed by the City, and includes the following general types of sites:

- Sites with historical and/or ongoing contaminant cleanups;
- Sites with active contaminant sources;
- Sites handling large quantities of hazardous materials (TIER 2 sites as categorized in the FSID database);
- Sites identified through database searches, but with limited or questionable information; and
- Site identified as potential contaminant sources during the City's windshield survey.

Five sites were identified during the windshield survey as additional potential contaminant sources. These are identified by map markers 5, 7, 8, 9, and 16. Five other sites listed initially as potential contaminant source were removed as a result of the windshield survey. These sites are listed at the bottom of Table A-1.

4.5 WHPA NOTIFICATION LETTERS

In an effort to protect and coordinate spill response planning within the City's WHPA, notification letters should be sent to the following entities:

- Owners of Environmental Sites of Potential Concern within WHPA (Table A1)
- Local Fire and Police Department
- Washington Department of Ecology

Copies of potential notification letters are provided in Appendix B.

5.0 REFERENCES

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Frans, L. and Olsen, T., USGS, 2016. Numerical Simulation of the Groundwater-Flow System of the Kitsap Peninsula, West-Central Washington. Scientific Investigations Report 2016-5052, Version 1.1, October 2016.

Good, J. C., 1993. Roof Runoff as a Diffuse Source of Metals and Aquatic Toxicity in Storm Water. Water Science Technology, 28(305):317-321.

LOTT Clean Water Alliance, 2017. Reclaimed Water Infiltration Study Task 1 Summary Residual Chemicals in Reclaimed Water, Groundwater, and Surface Water. May 17, 2017.

Washington State Department of Health (WSDOH), 2010. Washington State Wellhead Protection Program Guidance Document. June 2010. DOH 331-018 (Revised)

Welch, W., Frans, L., and Olsen, T., USGS, 2014. Hydrogeologic Framework, Groundwater Movement, and Water Budget of the Kitsap Peninsula, West-Central Washington. Scientific Investigations Report 2014-5106.

Table 5. Windshield Survey Sites

Map ID	Facility Name	Facility ID	Address	WHPA	Underground Storage Tank	Leaking Underground Storage Tank	Total "Current" Operational Tank Volume (gallons)*	Hazardous Materials	Cleanup Site	Reason for Visit/Comments
1	**T & Y Management Inc**	**72694822**	**6978 KIMBALL DR**	**Well 4; 5 year**				**I**	**A**	**Active cleanup site**
2	**Olympic Tire & Auto Svc Center Inc**	**91344771**	**5500 OLYMPIC DR NW STE I 101**	**Well 8; 5 year**				**I**	**A**	**Potential contaminant source in 5-year travel zone. Should confirm whether this is an active VCP site.**
3	**U HAUL GIG HARBOR**	**84651569**	**3818 GRANDVIEW AVE**	**Well 4; 10 year**	**I**	**I**	**Two removed (111 - 1100)**		**A**	**Active cleanup site**
4	**PAPE & SONS CONSTRUCTION INC**	**9566131**	**Current business: 9401 54th Ave NW # 1A Coordinates in Ecology: 47.33926, -122.60541 : located behind 8809 W-16**	**Well 11; 20 year**	**A**	**A**	**One removed (111-1100), one removed (5000-9999), one exempt (111 - 1100)**		**A**	**Active cleanup site. Should verify status of LUST; listed as active LUST in FS database, but may be out of date. Should verify address of contaminated site. Appears to be either within 20-year WHPA or 5-year WHPA for Well 11.**
5	Pentecostals of Gig Harbor (Masonic Lodge)	n/a	3025 96th St NW	Well 2/10; 1 year	Y		Unknown; not in Ecology UST database			Added by Windshield Survey
6	Baby Beau & Belle Inc	18680	7817 SKANSIE AVE	Well 5/6; 5 year	I		One removed (111 - 1100)			Potential contaminant source in 5-year travel zone
7	Sun Dry Cleaners	n/a	5500 Olympic Dr NW # I105	Well 8; 5 year			Unknown; not in Ecology UST database	Yes		Added by Windshield Survey
8	Pacific Endometriosis and Pelvic Surgery	n/a	5801 SOUNDVIEW DR	Well 3; 10 year			Unknown; not in Ecology UST database	Yes		Added by Windshield Survey
9	DPI Printing	n/a	5775 SOUNDVIEW DR	Well 3; 20 year			Unknown; not in Ecology UST database	Yes		Added by Windshield Survey
10	MARITIME MART CHEVRON	15598147	7102 Stinson Ave	Well 4; 10 year	A		Three operational (10000 - 19999)			Potential contaminant source in 10-year travel zone
11	Microlynx	1056975	6820 Kimball Dr	Well 4; 10 year						Active enforcement actions taken against party in 2009. No other information.
12	Pierce Cnty Fire Dist 5	63282214	6711 KIMBALL DR	Well 4; 10 year	I		Two removed (111 - 1100), two removed (1101 - 2000)	I		Potential contaminant source in 10-year travel zone
13	WILCO WINFIELD GIG HARBOR	11279	3408 Hunt St NW	Well 3; 10 year				A		Active large-scale handler of hazardous materials (TIER 2)
14	United Rentals Northwest Inc Gig Harbor	8281744	3302 Hunt St NW,	Well 3; 10 year				I		Inactive cleanup site (end date 2011), but large-scale handler of hazardous materials (TIER 2)
15	SE 15 GIG HARBOR	7014163	3213 56TH ST NW	Well 3; 10 year	I		One removed (111 - 1100)	Yes		Active large-scale handler of hazardous materials (TIER 2)
16	Franciscan Medical Clinic	n/a	6401 KIMBALL DR	Well 3; 20 year			Unknown; not in Ecology UST database	Yes		Added by Windshield Survey
17	EYRISH HEMLEY LAND COMPANY	35923829	9303 54TH AVE NW	Well 11; 20 year	I		Three removed (unknown)			Potential contaminant source in 20-year travel zone
18	Bartells 39	63449638	5500 Olympic Dr NW	Well 8; 20 year				I		Potential contaminant source in 20-year travel zone
19	Walts Radiator & Muffler Gig Harbor	76926774	5309 Point Fosdick Dr NW	Well 8; 20 year				I		Potential contaminant source in 20-year travel zone
20	JIFFY LUBE STORE 2058	4013037	5121 Point Fosdick Dr NW	Well 8; 20 year				A		Active large-scale handler of hazardous materials (TIER 2)
21	Safeway Store 2949	10976	4831 Point Fosdick Dr NW	Well 8; 20 year				A		Potential contaminant source in 20-year travel zone
22	Shell Station 121515	92722628	7101 PIONEER WAY	Well 4; 5 year	A	I	Three removed (unknown), two removed (111 - 1100), one removed (10000 - 19999), four operational (10000 - 19999)	I	I	Inactive cleanup site (NFA 2012), but large-scale handler of hazardous materials (TIER 2)
23	GIG HARBOR VETERINARY HOSPITAL INC	69461234	5606 Soundview Dr	Well 3; 10 year	I	I	One removed (111 - 1100)		I	One UST listed as removed in the UST database, one UST listed as active in the FS database. Should confirm whether USTs are present. NFA received 2012.

Notes:
A = Active; I = Inactive; A; NFA = No Further Action; **Bold** Text = Active Cleanup Site; Red Text = added by Windshield Survey

APPENDIX A
ENVIRONMENTAL SITES INFORMATION

Table A-1. Address Information for Sites of Potential Concern (Table 3)

Map ID (See Fig. 1)	Facility Name	Facility ID	Address Facility Site	Address Google Maps	Site Address	WHPA
1	T & Y Management Inc	72694822	6978 KIMBALL DR		6978 KIMBALL DR	5
2	Olympic Tire & Auto Svc Center Inc	91344771	5500 OLYMPIC DR NW STE I 101		5500 OLYMPIC DR NW STE I 101	5
3	U HAUL GIG HARBOR	84651569	3818 GRANDVIEW AVE		3818 GRANDVIEW AVE	10
4	PAPE & SONS CONSTRUCTION INC	9566131	9512 STATE HWY 16 NW	9401 54th Ave NW # 1A	Unclear. Current business: 9401 54th Ave NW # 1A Address in Ecology: 9512 STATE HWY 16 NW Coordinates in Ecology: 47.33926, -122.60541 : located behind 8809 W-16	20
5	Pentecostals of Gig Harbor (Masonic Lodge)	n/a		3025 96th St NW	3025 96th St NW	1
6	Baby Beau & Belle Inc	18680	7817 SKANSIE AVE	4706 97th St NW #200	7817 SKANSIE AVE	5
7	Sun Dry Cleaners	n/a		5500 Olympic Dr NW # I105	5500 Olympic Dr NW # I105	10
8	Pacific Endometriosis and Pelvic Surgery	n/a		5801 SOUNDVIEW DR	5801 SOUNDVIEW DR	20
9	DPI Printing	n/a		5775 SOUNDVIEW DR	5775 SOUNDVIEW DR	5
10	MARITIME MART CHEVRON	15598147	7102 STINSON	7102 Stinson Ave	7102 Stinson Ave	10
11	Microlynx	1056975	6820 KIMBALL DR	6820 Kimball Dr	6820 Kimball Dr	10
12	Pierce Cnty Fire Dist 5	63282214	6711 KIMBALL DR		6711 KIMBALL DR	10
13	WILCO WINFIELD GIG HARBOR	11279	3408 HUNT ST NW	3408 Hunt St NW	3408 Hunt St NW	10
14	United Rentals Northwest Inc Gig Harbor	8281744	3302 HUNT ST	3302 Hunt St NW,	3302 Hunt St NW,	10
15	SE 15 GIG HARBOR	7014163	3213 56TH ST NW		3213 56TH ST NW	10
16	Franciscan Medical Clinic	n/a		6401 KIMBALL DR	6401 KIMBALL DR	20
17	EYRISH HEMLEY LAND COMPANY	35923829	9303 54TH AVE NW		9303 54TH AVE NW	20
18	Bartells 39	63449638	5500 OLYMPIC DR NW BLD C	5500 Olympic Dr NW	5500 Olympic Dr NW	20
19	Walts Radiator & Muffler Gig Harbor	76926774	5309 PT FOSDICK DR NW	5309 Point Fosdick Dr NW	5309 Point Fosdick Dr NW	20
20	JIFFY LUBE STORE 2058	4013037	5121 POINT FOSDICK DR NW	5121 Point Fosdick Dr NW	5121 Point Fosdick Dr NW	20
21	Safeway Store 2949	10976	4831 Point Fosdick Dr NW	4831 Point Fosdick Dr NW	4831 Point Fosdick Dr NW	20
22	Shell Station 121515	92722628	7101 PIONEER WAY		7101 PIONEER WAY	5
23	GIG HARBOR VETERINARY HOSPITAL INC	69461234	5606 SOUNDVIEW DR NW	5606 Soundview Dr	5606 Soundview Dr	10
R*	KNIGHT HARPER SEATHER RANDAL	35968471	46TH AVE NW & ROSEDALE ST		46TH AVE NW & ROSEDALE ST	5
R*	JACKSON ROOFING	45385422	7901 46TH AVE NW		7901 46TH AVE NW	5
R*	Photo Pro	41677617	6876 KIMBALL DR		6876 KIMBALL DR	10
R*	AIRTOUCH STONE ROAD	89123376	5800 SOUNDVIEW DR		5800 SOUNDVIEW DR	5
R*	Ritz Camera 1121	36219824	5500 OLYMPIC DR NW STE A 107		5500 OLYMPIC DR NW STE A 107	5

R* = Site removed from potential hazard list after windshield survey

APPENDIX B
NOTIFICATION LETTERS

DATE

Address of local business or cleanup site (see Table 4 and Table A-1)

Re: City of Gig Harbor Wellhead Protection Plan

To Whom It May Concern:

The City of Gig Harbor has developed an updated Wellhead Protection Plan to help maintain drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPAs). The Plan also requires an inventory of potential sources of groundwater contamination within these WHPAs.

The primary purpose of this letter is to notify you that your facility is located within our WHPA. Since your business or the activities conducted at your facility may involve the use of chemicals (e.g., gasoline, underground storage tanks, hazardous waste, etc.), and the potential exists that a chemical spill from your facility may adversely impact the city drinking water supply, please notify the City of Gig Harbor immediately if a chemical spill occurs at your facility. All spills should be reported by dialing 911 and requesting that the City of Gig Harbor Fire and Medic One and the Tacoma-Pierce County Public Health Department be contacted.

Thank you for assisting us in protecting our water supply and groundwater resources. If you have any questions, please contact me at (253) 853-7637.

Sincerely,

Trent Ward, P.E.
Senior Engineer
City of Gig Harbor

DATE

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775

Re: City of Gig Harbor Wellhead Protection Plan

Dear Department of Ecology:

The City of Gig Harbor has developed a Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

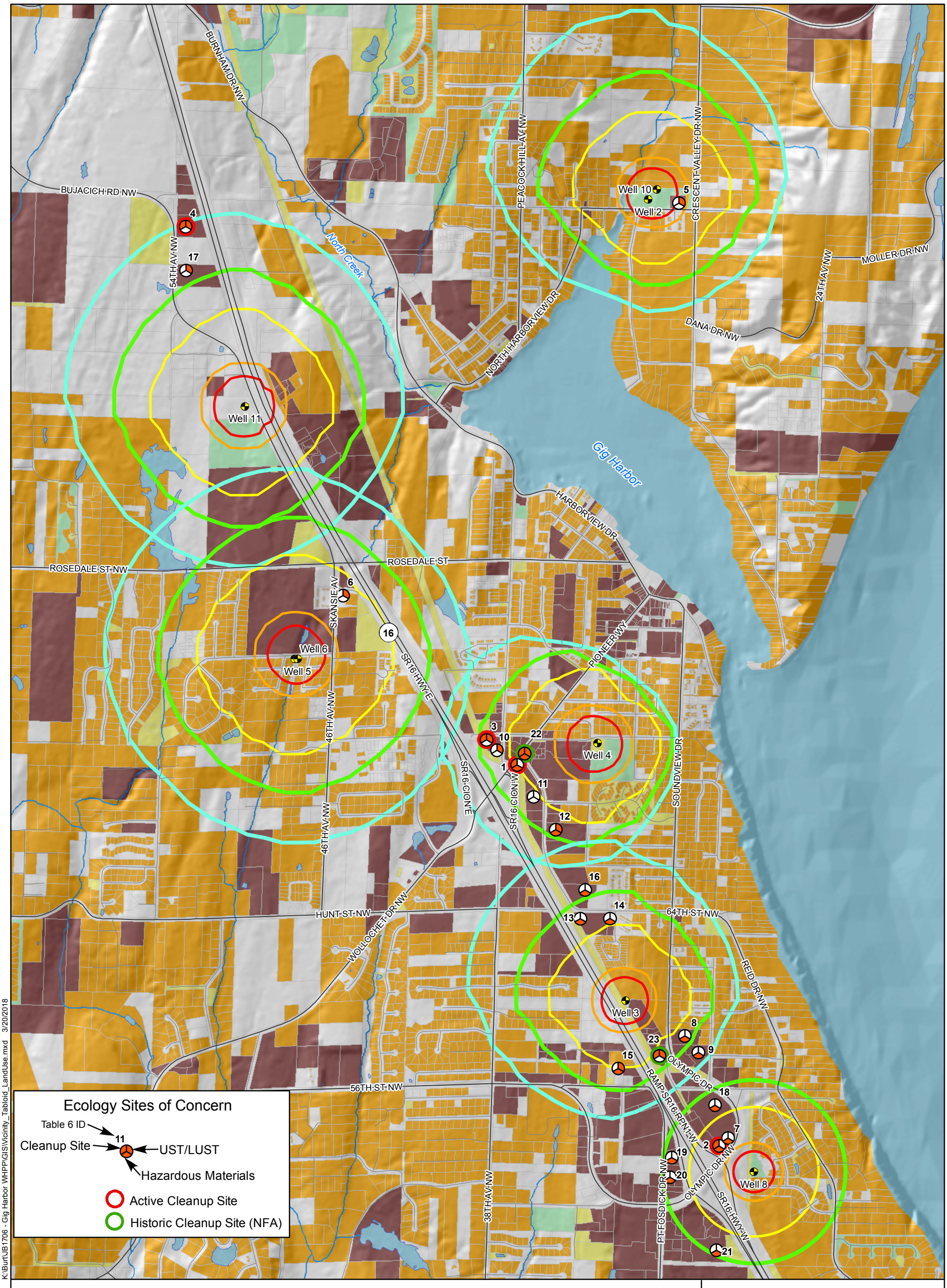
The enclosed map depicts the WHPA boundary, source wells, and identified potential contaminant sources. Also enclosed is a table providing the facility ID, name and location for each potential contaminant source. Please review the map and use it as a reference when inspecting and permitting the storage, use, and disposal of hazardous material within our WHPA.

Please note that the City of Gig Harbor has sent notices to each of these properties informing them of their location within the WHPA boundary. The City has also sent similar letters to businesses with land uses that could potentially contaminate groundwater quality.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (253) 853-7637.

Sincerely,

Trent Ward, P.E.
Senior Engineer
City of Gig Harbor


BURNHAM DR NW
BUJACICH RD NW
54TH AV NW
North Creek
PEACOCK HILL AV NW
CRESCENT VALLEY DR NW
NORTH HARBORVIEW DR
DANA DR NW
24TH AV NW
MOLLER DR NW
Gig Harbor
HARBORVIEW DR
ROSEDALE ST NW
ROSEDALE ST
SKANSIE AV
SR16 HWY E
46TH AV NW
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38TH AV NW
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Ecology Sites of Concern
Table 6 ID
Cleanup Site
11
UST/LUST
Hazardous Materials
Active Cleanup Site
Historic Cleanup Site (NFA)
City of Gig Harbor Wells
Wellhead Protection Area
6-Month
1-Year
5-Year
10-Year
20-Year
Current Land Use Type
Manufacturing/Trade/Services/Resource Production and Extraction
Residential
Transportation, Communication, and Utilities
Cultural, Entertainment, and Recreational
Vacant/Undeveloped Land and Water Areas
N
0
Feet
2,000
See section XX for WHPA definitions
Figure 1
Potential Contaminant Sources of Concern and Land Use by Parcel
JB1706
City of Gig Harbor
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Facilities of Potential Concern to Water-Supply Wells in Gig Harbor

Map ID (See Fig.X)	Facility Name	Facility ID	Site Address
1	T & Y Management Inc	72694822	6978 KIMBALL DR
2	Olympic Tire & Auto Svc Center Inc	91344771	5500 OLYMPIC DR NW STE I 101
3	U HAUL GIG HARBOR	84651569	3818 GRANDVIEW AVE
4	PAPE & SONS CONSTRUCTION INC	9566131	Unclear. Current business: 9401 54th Ave NW # 1A Address in Ecology: 9512 STATE HWY 16 NW Coordinates in Ecology: 47.33926, -122.60541 : located behind 8809 W-16
5	Pentecostals of Gig Harbor (Masonic Lodge)	n/a	3025 96th St NW
6	Baby Beau & Belle Inc	18680	7817 SKANSIE AVE
7	Sun Dry Cleaners	n/a	5500 Olympic Dr NW # I105
8	Pacific Endometriosis and Pelvic Surgery	n/a	5801 SOUNDVIEW DR
9	DPI Printing	n/a	5775 SOUNDVIEW DR
10	MARITIME MART CHEVRON	15598147	7102 Stinson Ave
11	Microlynx	1056975	6820 Kimball Dr
12	Pierce Cnty Fire Dist 5	63282214	6711 KIMBALL DR
13	WILCO WINFIELD GIG HARBOR	11279	3408 Hunt St NW
14	United Rentals Northwest Inc Gig Harbor	8281744	3302 Hunt St NW,
15	SE 15 GIG HARBOR	7014163	3213 56TH ST NW
16	Franciscan Medical Clinic	n/a	6401 KIMBALL DR
17	EYRISH HEMLEY LAND COMPANY	35923829	9303 54TH AVE NW
18	Bartells 39	63449638	5500 Olympic Dr NW
19	Walts Radiator & Muffler Gig Harbor	76926774	5309 Point Fosdick Dr NW
20	JIFFY LUBE STORE 2058	4013037	5121 Point Fosdick Dr NW
21	Safeway Store 2949	10976	4831 Point Fosdick Dr NW
22	Shell Station 121515	92722628	7101 PIONEER WAY
23	GIG HARBOR VETERINARY HOSPITAL INC	69461234	5606 Soundview Dr

DATE

John Burgess, Fire Chief
Gig Harbor Fire & Medic One
10222 Bujacich Road NW
Gig Harbor, Washington 98332

Re: City of Tumwater Wellhead Protection Plan

Dear Chief Burgess:

The City of Gig Harbor has developed an updated Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

As part of this Plan, the City must provide wellhead protection information to agencies responsible for incident/spill response procedures. It is important that you are aware of where potential contaminant releases could adversely impact the quality of our community's drinking water supply.

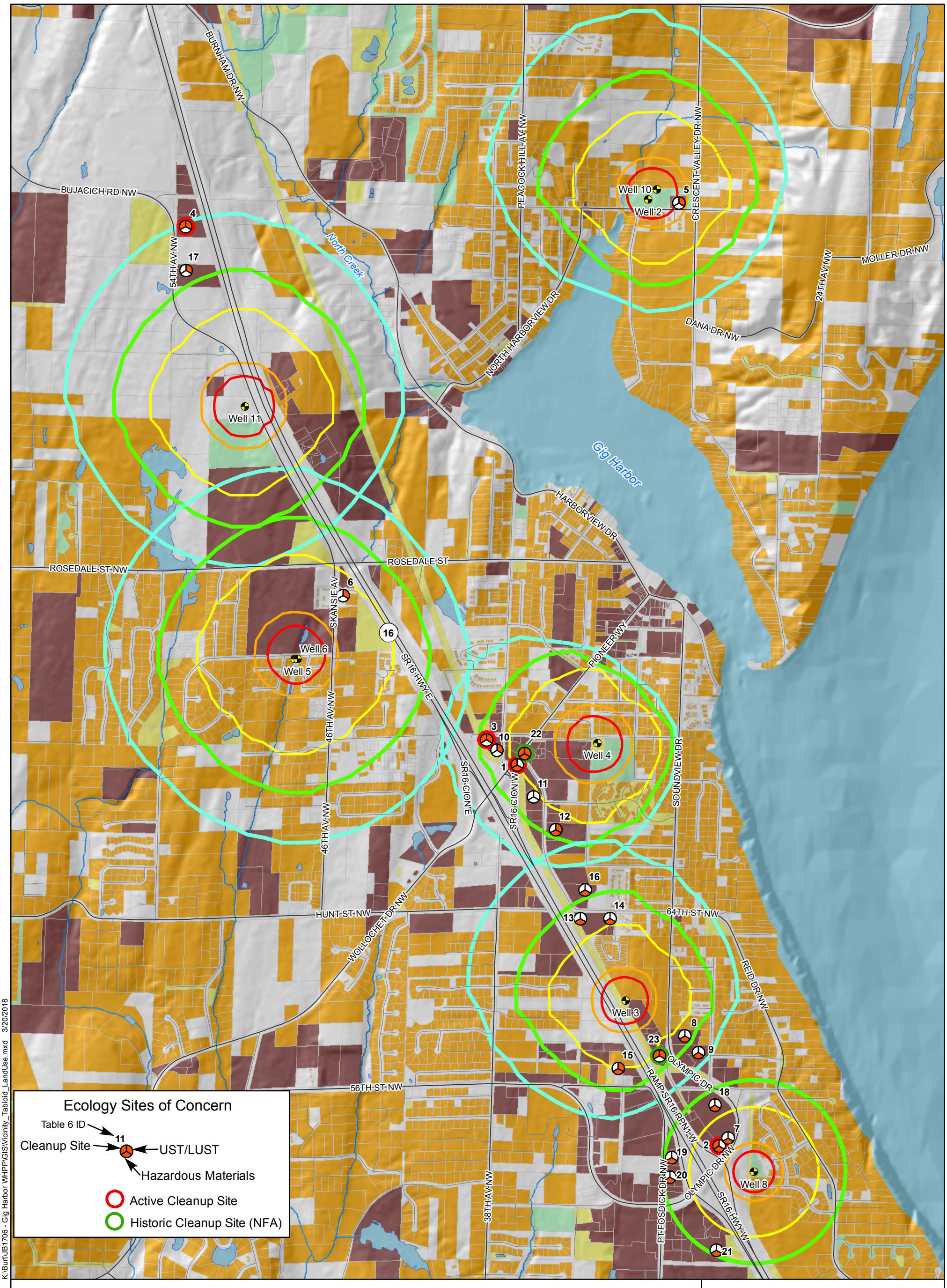
A map of the WHPAs and adjacent transportation routes is enclosed for your review. An acknowledgement of receipt of this information or a response from your office as part of our wellhead protection plan documentation would be appreciated.

In the event of a spill or contaminant release, we would ask that you notify immediately us and the Department of Ecology, so that we can take appropriate measures to deal with the problem.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (253) 853-7637.

Sincerely,

Trent Ward, P.E.
Senior Engineer
City of Gig Harbor


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DATE

Kelly Busey, Police Chief
Tumwater Police Department
3510 Grandview Street
Gig Harbor, Washington 98335

Re: City of Gig Harbor Wellhead Protection Plan

Dear Chief Busey:

The City of Gig Harbor has developed an updated Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

As part of this Plan, the city must provide wellhead protection information to agencies responsible for incident/spill response procedures. It is important that you are aware of where potential contaminant releases could adversely impact the quality of our communities drinking water supply.

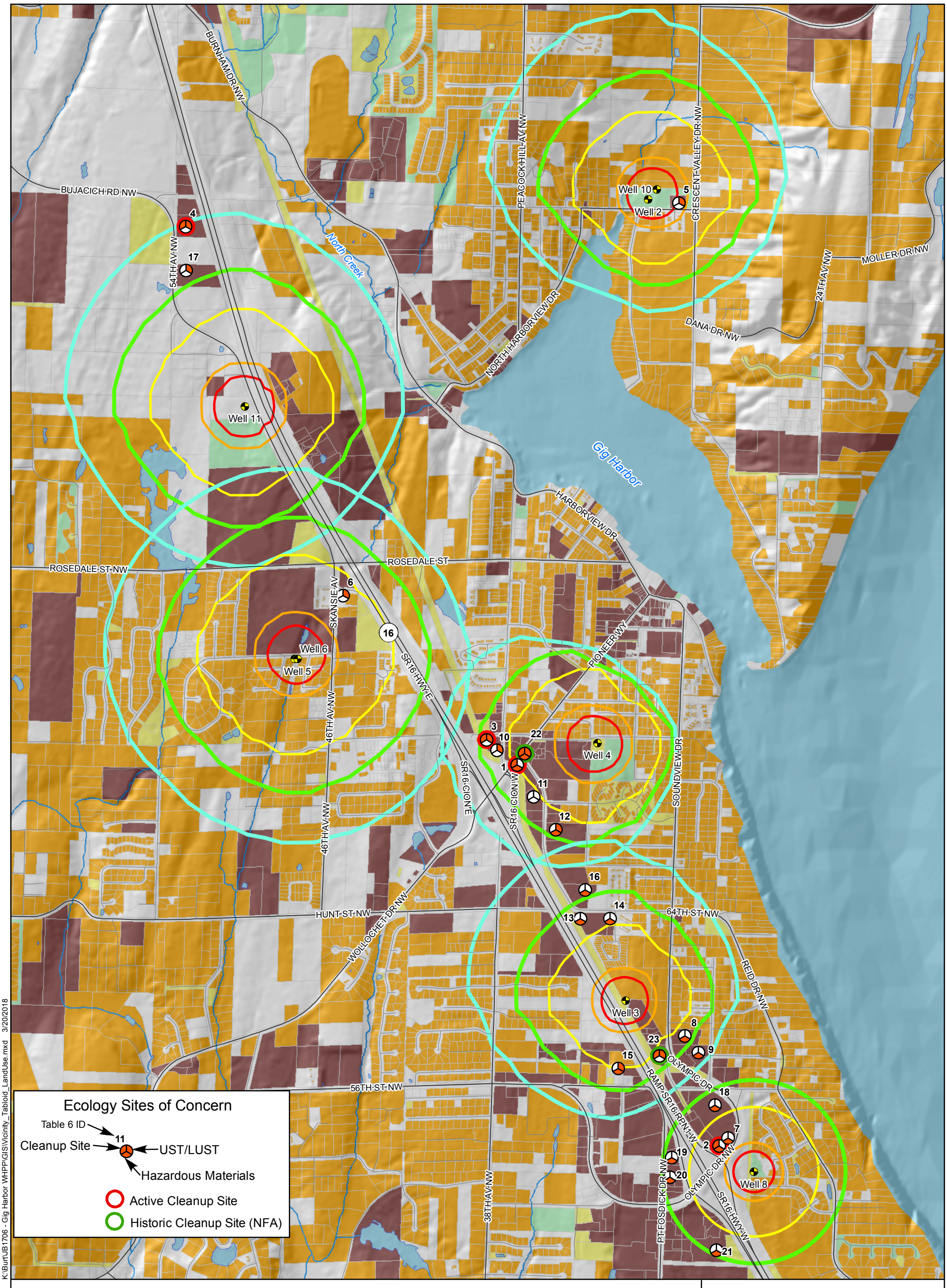
A map of the wellhead protection areas and adjacent transportation routes is enclosed for your review. An acknowledgement of receipt of this information or a response from your office as part of our wellhead protection plan documentation would be appreciated.

In the event of a spill or contaminant release, we would ask that you notify immediately us and the Department of Ecology, so that we can take appropriate measures to deal with the problem.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at please contact me at (253) 853-7637.

Sincerely,

Trent Ward, P.E.
Senior Engineer
City of Gig Harbor


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Appendix M

AGREEMENTS AND ORDINANCE 1181

Appendix M-1

SHORE ACRES WATER SYSTEM SUPPLY CONTRACT

AGREEMENT
BETWEEN THE CITY OF GIG HARBOR
AND THE SHORE ACRES WATER COMPANY

THIS AGREEMENT, made and entered into this 14 day of January, 2008, by and between the City of Gig Harbor, an optional code municipal corporation of the State of Washington, hereinafter called the "City," and Shore Acres Water Company, a nonprofit corporation, organized and existing under the laws of the State of Washington, hereinafter called the "Purchaser."

WITNESSETH:

WHEREAS, the Purchaser is the owner of a Water Company, and its customers own property located both inside and outside the City limits; and

WHEREAS, the Purchaser purchases water from the City for the use of its customers, who are billed by the Purchaser, and the Purchaser then pays the City for the water;

WHEREAS, the Purchaser desires to obtain additional hook-ups for property that has not yet been developed; and

WHEREAS, the City desires to provide water to the Purchaser, under the terms and conditions set forth in Title 13 of the Gig Harbor Municipal Code; and

WHEREAS, the City Council held a public hearing on this Agreement on January 14, 2008, during a regularly scheduled Council meeting, and authorized the Mayor to execute this Agreement on behalf of the City; NOW, THEREFORE,

That the parties heretofore and in consideration of the mutual covenants herein contained, agree as follows:

1. Agreement to Sell Water, Agreement to Purchase Water.

The City agrees to sell up to Seventeen Million (17,000,000) gallons of water annually to the Purchaser for the term of this Agreement, under the terms and conditions set forth herein. "Annually" shall mean from January 1st of any year until December 31st of that year. At the time a new connection to the Purchaser's system is added under Section 4 herein, the City agrees to increase this amount by Eighty Thousand (80,000) gallons of water annually to the Purchaser for the remaining term of the Agreement, under the terms and conditions set forth in this Agreement. The Eighty Thousand (80,000) gallons of water annual limit reflects

the amount included in the City's Water Comprehensive Plan used by a single household, multiplied by the number of connections in the Purchaser's system as of the date of this Agreement. The parties agree that if the City's Water Comprehensive Plan (or an ordinance adopted for the same purpose) is amended to reflect a new number for water use by a single household, then this shall thereafter be used in future calculations for the amount of increase for a single connection.

The amounts established in this Section 1 shall not apply during those times in which the City Council declares that there is a drought or other emergency necessitating the adoption of ordinances relating to water conservation. During such times, the Purchaser agrees to comply with the City's water conservation ordinances.

The parties agree that if the Purchaser draws more water from the City's water system than the Seventeen Million (17,000,000) gallon annual limit, payment for any gallons over the Seventeen Million limit shall include a surcharge of twenty-five percent (25%) of the current water rate, as established in the City's ordinances. In addition, if the Purchaser draws more water from the City's water system than ten percent (10%) above the Seventeen Million (17,000,000) gallon limit, the parties shall meet to renegotiate this Agreement, as set forth in Section 17 herein.

2. Term.

This Agreement shall be deemed effective as of January 14, 2008, and shall terminate on December 31, 2011. Without further action by either of the parties hereto, and as long as the Purchaser has not triggered the renegotiation provision of Section 1 above, this Agreement shall be renewed and continued in full force and effect for additional terms of four year periods after the anniversary date, unless the Purchaser or City, on or before three hundred (360) days prior to the termination of this Agreement, or on or before three hundred (360) days prior to the termination of any renewal period, gives written notice that the Agreement will not be renewed.

3. Payment for Water and Connection Fees.

Water delivered under this Agreement shall be billed by the City and paid by the Purchaser bi-monthly. Purchaser shall pay the water rate established by the City in its codes, as they now exist or may hereafter be amended. All conditions of payment which apply to City customers shall apply equally to the Purchaser.

4. New Connections and Payment for Connections.

For purposes of calculating billing from the City to the Purchaser, it shall be conclusively presumed that there are currently **214** connections to the

Purchaser's system. This presumption shall be reviewed and adjusted to reflect actual number of connections on the first day of June of each year this agreement shall remain in force. Currently, the Purchaser is approved by the Department of Health for a total of 357 connections.

Any property owner in the jurisdiction of the Purchaser's water system (up to the 357 approved connections) may apply to the City for a water concurrency certificate. If granted, the individual property owner(s) shall comply with the applicable City codes, as they now exist or as they may be amended in the future.

The individual property owner shall pay to the City for each new connection to the Purchaser's system a connection fee as established by the City Council in an ordinance adopted for this purpose. The individual property owner agrees to pay the connection fee at the rate schedules applicable at the time the individual property owner requests to actually connect to the system.

5. Point of Delivery and Character of Service.

The City will deliver or make available to the Purchaser, at the two master meters serving Shore Acres Water Company near the City's corporate limits or at such other sites as the City and the Purchaser may agree upon, wholesome water for residential and fire extinguishing uses. The water supplied shall be of the same quality as that distributed by the City to its users.

6. Master Meter System.

The City shall bi-monthly read the master meters in existence and the bill sent to the Purchaser from the City shall reflect that reading. The bi-monthly bill shall be computed as follows:

A. First, there shall be a determination of the total water consumed bi-monthly by reading the master meters.

B. Then, the billing shall be computed according to the current ordinance by multiplying the base charge for each 4" meter times the outside City multiplier, plus multiplying usage at the current ordinance rate per 100 cubic feet times the outside City multiplier, plus City taxes as applicable.

7. Load Changes.

The Purchaser shall not extend new service to any structure used for business or commercial purposes, as the same are defined in the City's Zoning Code, without first obtaining written approval from the City.

8. Resale of Water.

The Purchaser agrees that all water delivered by the City hereunder will be used for its own purposes as a distributing utility to distribute water to its members and that none will be delivered or sold to another distributing utility for resale.

9. Flushing.

The City shall notify the Purchaser prior to flushing any lines which affect the quality of the water delivered to the Purchaser, or before intentionally interrupting any water service to the Purchaser.

10. Interruption of Service for Causes Beyond Control of Parties.

If the operation of the City's source of water or means of distribution or the operation of the Purchaser's service is suspended, interrupted, or interfered with for any cause beyond the City's control, including, but not by way of limitation, the failure or breakdown or interruption of electrical power, floods, fires, acts of God or the public enemy, or other causes beyond the control of the parties, but expressly excluding a depression or recession in the economy, the City need not deliver water for such period of time to the extent that such suspension, interruption or interference makes it reasonably impractical to deliver such water; and monthly bills for any such period, including any such suspension, interruption of interference, shall be pro-rated by reducing the billing demand in the ratio of days of suspension of service to the total days in the billing period.

11. Area Served.

The Purchaser shall only serve members within the following described area:

Area Served.

The Purchaser shall only serve members within the following described area:

> Beginning at the Northeast corner of the Southeast quarter of the Southwest quarter of Section 8, Township 21 North, Range 2 East of W.M.;
>
> Thence West 30 feet more or less to the West line of Wickersham County Road;
>
> Thence Southerly along the West line of Wickersham County Road to the North line of the Southwest quarter of Section 17, Township 21 North, Range 2 East W.M.;

Thence Easterly along the North line of the Southwest quarter and the Southeast quarter of Section 17 to the point of intersection with the Government Meander line;

Thence Northwesterly along the Government Meander line to the City limits of the City of Gig Harbor, the current city limits as established on October 23, 1946;

Thence Westerly along said City limits to the point of beginning.

Excluding any area served by the City through the City's distribution lines prior to the 1st day of January, 2007, which has been annexed to the City of Gig Harbor. Nothing in this Agreement shall limit the City's exercise of its authority to annex property served by the Purchaser.

12. Specific Enforcement.

In addition to any other remedy provided by law or this Agreement, the terms of this Agreement may be specifically enforced by a court of competent jurisdiction.

13. Assignment and Assumption.

The Purchaser shall have the right to sell, assign or transfer this Agreement with all their rights, title and interests therein to any person, firm or corporation, provided that, the City shall provide its prior written consent to such sale, assignment or transfer. The Purchaser shall provide the City with written notice of any intent to sell, assign, or transfer, at least 30 days in advance of such action. The City's consent shall not be unreasonably withheld.

14. Amendment to Agreement; Effect of Agreement on Future Actions.

This Agreement may be amended by mutual consent of all of the parties, provided that any such amendment shall follow the process established by law. for the adoption of a development agreement (see, RCW 36.70B.200).

15. Notices.

Notices and correspondence to the City and Purchaser shall be sufficiently given if dispatched by pre-paid first-class mail to the addresses of the parties as designated below. Notice to the City shall be to the attention of both the City Administrator and City Attorney. The parties hereto may, from time to time, advise the other of any new addresses for notice and correspondence.

TO THE CITY: TO SHORE ACRES:

City Adminstrator
City of Gig Harbor
3510 Grandview Street
Gig Harbor, WA 98335

Shore Acres Water Company
3110 Judson St. PMB #232
Gig Harbor, WA 98335

City Attorney
Law Office of Carol A. Morris, P.C.
P.O. Box 948
Seabeck, WA 98380

16. Applicable Law and Attorneys' Fees.

This Agreement shall be construed and enforced in accordance with the laws of the State of Washington. If litigation is initiated to enforce the terms of this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs from the non-prevailing party. Venue for any action shall lie in Pierce County Superior Court or the U.S. District Court for Western Washington.

17. Default and Termination.

A. The occurrence of any one or more of the following events shall constitute a material default and breach of this Agreement by the non-performing Party:

1. The failure to make any payment required to be made hereunder within ten (10) days of the receipt of the notice of such failure to pay;

2. The failure of the City to provide water to the Purchaser, in the amounts agreed to herein, within twenty (20) days of the receipt of the notice of such failure to provide water;

3. The Purchaser's annual use of water in excess of ten percent (10%) over the amount established in Section 1; and

4. The failure to observe or perform any of the covenants, conditions or obligations of this Agreement, within ten (10) days of a notice by the other Party, specifying the nature of the default claimed.

B. With respect to any default under Section 17(A) above, the Purchaser shall be responsible for the default of any individual purchaser of water in the Purchaser's water system.

C. At the end of each year, the City shall calculate the amount of water used by the Purchaser. If the amount used by the Purchaser for the year

exceeds by ten percent (10%) the amount established in Section 1 of this Agreement, the City shall notify the Purchaser in writing that the parties shall meet to renegotiate this Agreement. At such time, the parties shall discuss the deadline for termination of this Agreement, which shall occur within six (6) months of the date the City mails the notice to Purchase for renegotiation. All of the terms of this Agreement may be renegotiated in any subsequent agreement.

D. In the event that the Purchaser fails to comply with any term or condition of this Agreement, the City shall have the right, at any time, to enter on the Purchaser's property, and for that purpose disconnect the water and terminate this Agreement. Such disconnection shall be a remedy available to the City in addition to any other remedy available at law, including, but not limited to, breach of contract.

18. Severability and Integration.

This Agreement and the Exhibits attached hereto constitute the agreement between the parties on this subject matter, and there are no other understandings, verbal or written, that modify the terms of this Agreement. If any phrase, provision, or section of this Agreement is determined by a court of competent jurisdiction to be invalid or unenforceable, or if any provision of this Agreement is rendered invalid or unenforceable according to the terms of any statute of the State of Washington which became effective after the effective date of the resolution or ordinance adopting this Agreement, such invalidity shall not affect the other terms of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the dates set forth below:

CITY OF GIG HARBOR

Charles L. Hunter, Mayor

SHORE ACRES WATER COMPANY

SCOTT WAGNER, President

ATTEST:

Molly Towslee, City Clerk

Secretary
DAVID HOPKINS

APPROVED AS TO FORM:

Carol A. Morris, City Attorney

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

I certify that I know or have satisfactory evidence that Charles L. Hunter is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the Mayor of Gig Harbor to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: 1-15-08

MOLLY M. TOWSLEE
NOTARY PUBLIC
STATE OF WASHINGTON
MY COMMISSION EXPIRES
DEC 2 2011
PIERCE CO., WASHINGTON

Molly M. Towslee

Molly M. Towslee
(print or type name)
NOTARY PUBLIC in and for the State of Washington, residing at:
Gig Harbor
My Commission expires: 12/2/2011

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

I certify that I know or have satisfactory evidence that SCOTT WAGNER is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the President of Shoreacres Water Company to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: 1/10/08

RYAN T. RYAN
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
DECEMBER 7, 2008

Ryan T. Ryan

Ryan T. Ryan
(print or type name)
NOTARY PUBLIC in and for the State of Washington, residing at:
Pierce County
My Commission expires: 12/7/08

Appendix M-2

CITY OF GIG HARBOR AND HARBOR WATER COMPANY WATER SUPPLY AGREEMENT

CITY OF GIG HARBOR - HARBOR WATER COMPANY, INC.
WATER SUPPLY AGREEMENT

THIS AGREEMENT, entered into this 14 day of October, 1986 between the City of Gig Harbor, hereafter referred to as "CITY" and Harbor Water Co., Inc., hereafter referred to as "HARBOR".

WITNESSETH:

WHEREAS, HARBOR is a regulated water purveyor under the State of Washington and the rules of the Department of Social and Health Services; and

WHEREAS, CITY services the Woodworth-Mountain View area with water pressure that is just at minimum city standards; and

WHEREAS, HARBOR owns and operates as part of its system two (2) water systems adjacent to the Woodworth-Mountain View area. The first system is Dogwood Estates, State Identification Number 323460 in which HARBOR wishes to have fire flow capacity. The second system is Peacock Hill, State Identification Number 666370 which could supplement the CITY's Woodworth-Mountain View area and HARBOR's Dogwood Estates system during extreme use and fire flow conditions from the existing five (5) wells and two (2) reservoirs.

NOW THEREFORE in consideration of the mutual covenants contained herein, the parties agree as follows:

A. HARBOR WATER CO., INC. agrees to:

1. Install an 8" Cl 200 PVC line from the Plat of North Ridge at 101st St. to 99th St. along Peacock Hill Ave. N.W. and install a 4" PRV and necessary fittings to connect this line to the CITY's 6" water line on 99th St. thus

connecting HARBOR's Peacock Hill system to the CITY's system serving the Woodworth area.

2. Extend an 8" Class 160 PVC line from the HARBOR's Dogwood Estates' system ID# 3232460 along Woodworth Ave. and the CITY's water tank site on Woodworth and Ringgold and connect to the CITY at the tank.

3. Install a check valve at the CITY's North tank site located at 99th St. and Woodworth Ave.

4. Operate the CITY's existing North tank with HARBOR's well that now services Dogwood Estates' system and to the Woodworth area. This will allow the CITY's tank serving the Woodward area to provide fire flow to the Dogwood Estates system and to the Woodworth area.

5. Provide engineering necessary to obtain Department of Social and Health Service's approval of said interities. Engineer to be at the discretion of HARBOR.

6. Own and maintain both proposed water lines.

7. Provide any maintenance required to the valve vaults. Any major repairs over $1,000.00 to be approved by City of Gig Harbor Public Works Director.

8. HARBOR has the right, with the CITY's approval, to expand its Dogwood Estates System so long as said expansion does not affect the quality of service provided to the CITY's customers.

9. Pay all power bills for Dogwood Estates' well pump and Peacock Hill water system.

10. Provide the CITY with copies of the results of all water samples taken from the systems affecting the CITY.

11. Reserve the right to install a booster pump at the CITY's existing north tank located at the intersection of 99th St. and Woodworth Ave. and a waterline which would connect to the 8" line on Peacock Hill at 99th St. to transfer water from Dogwood Estates and if needed, from the CITY to Peacock Hill in emergencies such as pump, well, or power system outages or as other needs may arise. Water will not be transferred from the CITY without prior approval of City of Gig Harbor.

B. CITY OF GIG HARBOR agrees to:

1. Pay to Harbor Water Co., Inc. $12,500.00 upon the completion of the aforesaid said installations and upon the receipt of HARBOR's engineer's approval.

2. Pay one-half of any maintenance required, the total maintenance estimated at $100.00 per year.

3. Maintain existing reservoir.

4. Pay all power bills for controls located within current City limits which would service CITY residents.

5. Reserve the right to transfer water from the Woodworth area to other parts of the City of Gig Harbor for emergency purposes, such as power, well or pump outages, or as other emergency needs may arise. Water will not be transferred without prior approval of HARBOR WATER CO.

6. Provide HARBOR with copies of the results of all water samples taken during the CITY's normal monitoring program.

C. MUTUAL AGREEMENT OF CITY AND HARBOR:

1. Both CITY and HARBOR agree that the only

compensation shall be as defined in this agreement.

2. Both parties reserve the right to terminate or re-negotiate the Agreement with 180 days written notice for termination or intent to re-negotiate.

3. Both CITY and HARBOR shall protect, indemnify, and hold the other party harmless from and against any damage, cost or liability for injury or death to persons or to damage or destruction of property, arising from the acts of the CITY or HARBOR, their employees or contractors in the performance of this Agreement, PROVIDED HOWEVER, neither CITY nor HARBOR agree to guaranty water flow to the other and neither shall be liable or responsible to the other or third parties for lack of such flow except for intentional intervention.

4. This Agreement shall be binding to both parties, their heirs, successors and assigns.

IN WITNESS WHEREOF, this Agreement was executed by the parties as of the day and year first above written.

CITY OF GIG HARBOR
BY:

Mayor, CITY OF GIG HARBOR

HARBOR WATER CO., INC.
BY:

President, Harbor Water Co., Inc.

ATTEST:

MICHAEL R. WILSON
City Administrator/Clerk

11/3/86
Date

Appendix M-3

ORDINANCE NO. 1181

ORDINANCE NO. 1181

AN ORDINANCE OF THE CITY OF GIG HARBOR, WASHINGTON, RELATING TO GROWTH MANAGEMENT AND PLANNING, MAKING THE FOLLOWING AMENDMENTS TO THE CITY OF GIG HARBOR COMPREHENSIVE PLAN FOR THE 2009 ANNUAL CYCLE: ADDING A 3.69 ACRE PARCEL LOCATED AT THE SOUTHEAST CORNER OF WOLLOCHET DRIVE AND STATE ROUTE 16 TO THE CITY'S WATER SERVICE AREA (COMP 09-0001); REPEALING THE PARKS RECREATION AND OPEN SPACE ELEMENT (COMP 09-0002); AMENDING THE TRANSPORTATION ELEMENT TO UPDATE THE SHORT-RANGE AND LONG-RANGE TRANSPORTATION IMPROVEMENT PLANS AND ADD POLICIES RELATED TO VEHICULAR AND PEDESTRIAN ACCESS IN THE DOWNTOWN AREA (COMP 09-0003); AMENDING THE COMPREHENSIVE PLAN LAND USE MAP TO CHANGE THE LAND USE DESIGNATION FOR 15.53 ACRES OF PROPERTY LOCATED ALONG BURNHAM DRIVE AND 112TH STREET NW FROM EMPLOYMENT CENTER (EC) TO COMMERCIAL/BUSINESS (C/B) (COMP 09-0004); ADOPTING A NEW STORMWATER COMPREHENSIVE PLAN (COMP 09-0007); ADOPTING A NEW WASTEWATER COMPREHENSIVE PLAN (COMP 09-0008); ADOPTING A NEW WATER SYSTEM PLAN (COMP 09-0009); AMENDING THE CAPITAL FACILITIES ELEMENT TO UPDATE THE SIX-YEAR IMPROVEMENT PROJECT LISTS (COMP 09-0010); AMENDING THE UTILITIES ELEMENT TO BE CONSISTENT WITH THE NEW WATER SYSTEM PLAN (COMP 09-0011); ADDING TWO PARCELS, 4.16 ACRES, LOCATED AT THE SOUTHEAST CORNER OF HUNT STREET AND STATE ROUTE 16 TO THE CITY'S WATER SERVICE AREA (COMP 09-0013) .

WHEREAS, the City of Gig Harbor plans under the Growth Management Act (chapter 36.70A RCW); and

WHEREAS, the Act requires the City to adopt a Comprehensive Plan; and

WHEREAS, the City adopted a revised GMA Comprehensive Plan as required by RCW 36.70A.130 (4) in December 2004; and

WHEREAS, the City is required to consider suggested changes to the Comprehensive Plan (RCW 36.70A.470); and

WHEREAS, except under circumstances not applicable here, the City may not amend the Comprehensive Plan more than once a year (RCW 36.70A.130); and

WHEREAS, the City is required to provide public notice and public hearing for any amendments to the Comprehensive Plan and the adoption of any elements thereto (RCW 36.70A.035, RCW 36.70A.130); and

WHEREAS, on May 11, 2009, the City Council evaluated the comprehensive plan amendment applications submitted for the 2009 annual cycle, and held a public hearing on such applications; and

WHEREAS, on May 26, 2009, the City Council forwarded twelve comprehensive plan amendment applications to the Planning Commission for further processing in the 2009 Comprehensive Plan annual cycle; and

WHEREAS, on July 16, 2009, the City's SEPA Responsible Official issued a Determination of Non-Significance (DNS) for comprehensive plan amendment applications, pursuant to WAC 197-11-340(2), which was not appealed; and

WHEREAS, the Planning Director notified the Washington State Department of Commerce of the City's intent to amend the Comprehensive Plan and forwarded a copy of the proposed amendments on July 16, 2009 pursuant to RCW 36.70A.106; and

WHEREAS, the Planning Commission held work study sessions on to discuss the applications on June, 18, 2009, July 16, 2009, July 30, 2009, August 6, 2009, August 20, 2009, September 3, 2009, September 17, 2009, September 24, 2009 and October 21, 2009; and

WHEREAS, the Planning Commission held public hearings on comprehensive plan amendments on July 16, 2009, July 30, 2009 and September 17, 2009; and

WHEREAS, on October 21, 2009 the Planning Commission voted to recommend approval of all twelve proposed amendments as documented in the Planning Commission's written recommendations signed by Planning Commission Chair, Harris Atkins, all dated October 21, 2009; and

WHEREAS, on November 9, 2009, the Gig Harbor City Council held a public hearing on all twelve proposed amendments to the Gig Harbor Comprehensive Plan for the 2009 annual review cycle; and

WHEREAS, the Gig Harbor City Council had a first reading of an Ordinance amending the Comprehensive Plan on November 23, 2009; and

WHEREAS, the Gig Harbor City Council had a second reading of an Ordinance amending the Comprehensive Plan on December 14, 2009;

Now, Therefore,

THE CITY COUNCIL OF THE CITY OF GIG HARBOR, WASHINGTON, ORDAINS AS FOLLOWS:

Section 1. Comprehensive Plan Text Amendments.

A. **Notice.** The City Clerk confirmed that public notice of the public hearings held by the City Council on the following applications was provided.

B. **Hearing Procedure**. The City Council's consideration of the comprehensive plan text amendments is a legislative act. The Appearance of Fairness doctrine does not apply.

C. **Testimony.** The following persons testified on the applications at the November 9, 2009 public hearing:

(COMP 09-0001) Michael Desmarteau, Paul Cyr; (COMP 09-0004) Walter Smith, Carl Halsan; (COMP 09-0005) Kathryn Jerkovich, Lee Murray, Patricia Manning, Mark Hoppen; (COMP 09-0009) Jim Pasin; (COMP 09-0012) Carl Halsan, Danielle Ittner, John McMillan, Kurt Salmon, Mark Hoppen, Bill Fogarty, Cliff Petersen, William Lynn; (COMP 09-0013) Paul Cyr.

D. **Criteria for Approval.** The process for Comprehensive Plan amendments (Chapter 19.09) states that the City Council shall consider the Planning Commission's recommendations and after considering the criteria found in GHMC 19.09.170 make written findings regarding each application's consistency or inconsistency with the criteria. The criteria found in GHMC 19.09.170 are as follows:

19.09.170 Criteria for approval.

A. The proposed amendment meets concurrency requirements for transportation as specified in Chapter 19.10 GHMC;

B. The proposed amendment will not adversely impact the city's ability to provide sewer and water, and will not adversely affect adopted levels of service standards for other public facilities and services such as parks, police, fire, emergency medical services and governmental services;

C. The proposed amendments will not result in overall residential capacities in the city or UGA that either exceed or fall below the projected need over the 20-year planning horizon; nor will the amendments result in densities that do not achieve development of at least four units per net acre of residentially designated land;

D. Adequate infrastructure, facilities and services are available to serve the proposed or potential development expected as a result of this amendment, according to one of the following provisions:

1. The city has adequate funds for needed infrastructure, facilities and services to support new development associated with the proposed amendments; or

2. The city's projected revenues are sufficient to fund needed infrastructure, facilities and services, and such infrastructure, facilities and

services are included in the schedule of capital improvements in the city's capital facilities plan; or

3. Needed infrastructure, facilities and services will be funded by the developer under the terms of a developer's agreement associated with this comprehensive plan amendment; or

4. Adequate infrastructure, facilities and services are currently in place to serve expected development as a result of this comprehensive plan amendment based upon an assessment of land use assumptions; or

5. Land use assumptions have been reassessed, and required amendments to other sections of the comprehensive plan are being processed in conjunction with this amendment in order to ensure that adopted level of service standards will be met.

E. The proposed amendment is consistent with the goals, policies and objectives of the comprehensive plan;

F. The proposed amendment will not result in probable significant adverse impacts to the transportation network, capital facilities, utilities, parks, and environmental features which cannot be mitigated and will not place uncompensated burdens upon existing or planned services;

G. In the case of an amendment to the comprehensive plan land use map, that the subject parcels being redesignated are physically suitable for the allowed land uses in the designation being requested, including compatibility with existing and planned surrounding land uses and the zoning district locational criteria contained within the comprehensive plan and zoning code;

H. The proposed amendment will not create a demand to change other land use designations of adjacent or surrounding properties, unless the change in land use designation for other properties is in the long-term interest of the community in general;

I. The proposed amendment is consistent with the Growth Management Act, the countywide planning policies and other applicable interjurisdictional policies and agreements, and/or other state or local laws; and

J. The proposed effect of approval of any individual amendment will not have a cumulative adverse effect on the planning area.

E. Applications. The City Council hereby enters the following findings and conclusions for each application:

1. COMP 09-0001 – Wollochet Water System Service Area Amendment

Summary: A water system service area amendment from Stroh's Water Company's service area to the City of Gig Harbor water service area for a 3.69 acre, vacant parcel located at the southeast corner of Wollochet Drive and SR 16.

Findings:

a) The amendment will not adversely impact the city's ability to provide water service. The City currently has water capacity to reserve for future development. The development of the subject parcel would require an

estimated 12,560 to 18,840 gallons per day of water and the City has over 200,000 gallons per day of water available for reservation. The city is also actively pursuing additional water rights from the Department of Ecology.

b) Adequate water service infrastructure is currently in place to serve the parcel with a minor extension of a water main. The City of Gig Harbor water service area exists adjacent to the property along Wollochet Drive. A City water main exists at the intersection of Wollochet Drive and Wagner Way approximately 350 feet south of the subject site. The developer would be required to extend the water main approximately 350 feet to service the site.
c) The water system plan allows limited expansion of the city's water service area. Comprehensive Plan Policy 2.1.3 Serviceable Areas states that urban uses should be allocated to lands which can be provided roads, sewer, water, storm drainage and other basic urban utilities and transportation facilities. Given the location of transportation services and water mains in relation to the subject property, urban development is appropriate. Redevelopment of this vacant property will be a value to the community
d) The water service amendment will not place uncompensated burdens on the existing water purveyor and customers as the developer will pay for the water main extensions and connection fees. With the proposed conditions, any fees incurred by the city for changing the water service area will be reimbursed by the applicant.
e) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
f) The City Council finds that the approval of this amendment will not have a cumulative adverse effect on the City. The City has a finite number of water ERUs to reserve to customers in the current service area, with over 1,000 water ERUs available.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approves** application COMP 09-0001, as identified in Exhibit A attached to this Ordinance with the following **conditions**:

1) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all consultant and legal expenses paid by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment; and
2) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all fees paid to the State of Washington and Pierce County by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment.

2. Parks, Transportation, Utility and Capital Facility Amendments. The Council made findings and conclusions on the following seven (7) amendments together:

Summary:

a) **COMP 09-0002**: **Parks, Recreation and Open Space Element**
   An amendment to repeal the existing PROS element, as identified in Exhibit B attached to this Ordinance
b) **COMP 09-0003: Transportation Element**
   Amendments to create a general short-range and long-range transportation improvement plans that will serve as a basis for the 6-year Transportation Improvement Plan (TIP) adopted each year and add policies related to vehicular and pedestrian access in the downtown area, as identified in Exhibit C attached to this Ordinance
c) **COMP 09-0007**: **Stormwater Comprehensive Plan**
   Adoption of a new Stormwater Comprehensive Plan, as identified in Exhibit D attached to this Ordinance
d) **COMP 09-0008**: **Wastewater Comprehensive Plan**
   Adoption of a new Wastewater Comprehensive Plan, as identified in Exhibit E attached to this Ordinance
e) **COMP 09-0009**: **Water System Plan**
   Adoption of a new Water System Plan for the City's water service area, as identified in Exhibit F attached to this Ordinance
f) **COMP 09-0010: Capital Facilities Element**
   Amendments to update the stormwater, wastewater, water system, parks, recreation and open space, and transportation improvement projects included in the Capital Facilities Plan, as identified in Exhibit G attached to this Ordinance
g) **COMP 09-0011: Utilities Element**
   An amendment to update the Utilities Element to be consistent with the new Water System Plan, as identified in Exhibit H attached to this Ordinance

Findings:

a) The amendments will improve the City's ability to provide sewer, water and other public facilities and services through updated funding mechanisms and new comprehensive utility plans based on existing conditions.
b) The amendments will update the transportation, sewer, park, stormwater, wastewater, water, parks and open space and capital facilities plan so that the City can provide necessary infrastructure to serve the development projected by the Comprehensive Plan.
c) The City's Comprehensive Plan seeks to keep pace with the population and commercial growth through the funding of capital improvements that manage and allow for the projected growth. The amendments will allow the city to better address the planning area's transportation, sewer, park, stormwater, wastewater, water and open space needs through adequate capital facility planning and funding.

d) The amendments are necessary so as not to create significant adverse impacts to the city's infrastructure. Updating the transportation, sewer, park, stormwater, wastewater, water, parks and open space and the capital facilities plan allows the City to plan for and provide the necessary infrastructure to serve the development projected by the Comprehensive Plan.
e) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
f) The approval of the amendments will not have a cumulative adverse effect on the City.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approve** applications COMP 09-0002, COMP 09-0003, COMP 09-0007, COMP 09-0008, COMP 09-0009, COMP 09-0010 and COMP 09-0011, as identified in Exhibits B, C, D, E, F, G, and H respectively attached to this Ordinance:

3. COMP 09-0004 – Sunrise Enterprise Land Use Map Amendment

Summary: A land use designation change from Employment Center (EC) to Commercial Business (C/B) of 15.53 acres located along Burnham Drive NW and 112th Street NW, currently occupied by a contractor's yard.

Findings:
a) The city performed a traffic capacity evaluation for the proposed land use designation change. Given the variety of uses allowed in both designations (EC and C/B), it is not possible to determine if an actual increase in trips will occur with the amendment until the specific use for the property is defined. Some uses allowed in the C/B designation will exceed the trip generation of some uses in the EC designation and vice versa. Given this variability, a change from EC designation to C/B designation is not considered an increase in land use intensity. In addition, the city's traffic modeling assumed this property was in the County and regulated by County zoning, given that the property was annexed to the City in March 2009. The County's zoning for this site prior to annexation was Community Commercial which is equivalent to the city's C/B designation.
b) The draft traffic impact analysis provided by the applicant indicated that more trips may be generated as a result of the redesignation. The city will fully evaluate the project once a project permit application is submitted committing to a particular use. If through that permitting process, deficiencies in the City's transportation system will occur, mitigation will be required by the applicant. The city does not believe the change in land use will result in an adverse impact that cannot be mitigated.

c) After an analysis of the anticipated sewer and service impacts under the existing designation and the proposed designation, no significant increase in services or infrastructure needs were documented and; therefore, no adverse impacts to the city's infrastructure. The subject property is not serviced by city water.
d) Goal 6.2.2 of the Economic Development Element encourages increased economic opportunities through the redevelopment of vacant properties and revitalizing older business districts within the city. The amendment will further this goal given that the subject property is under-utilized with outdated buildings.
e) Prior to annexation of this area on March 23, 2009, the County land use designation and zoning for this property was Community Commercial (CC). The CC zoning is most similar to the city's B-2 zoning. The County selected this designation and zoning as part of the Gig Harbor Peninsula Community sub-area plan adopted in 2002. The County and surrounding property owners have been contemplating a commercial designation and zoning of this property for seven years. This amendment will retain the commercial designation which was deemed compatible with the surrounding land uses and physically suitable for the property in 2002.
f) The Commercial/Business land use designation policy states that *"commercial areas which border residential designations or uses should use available natural features as boundaries."* (GHCP 2.2.3d) Residentially designated and zoned land exists both north and south of the proposal. The applicant has indicated that the mining permit for the current use of the subject property includes a 50 foot buffer to the residential use to the north. In addition along the north boundary, steep slopes rise up to the adjacent residential property. To the south, 112th Street NW separates the subject property from the residential zoning. The City Council finds that the existing road separation to the south and the topography in conjunction with a 40-foot zone transition buffer required by the Design Manual to the north is appropriate buffering from the residential zones.
g) The City Council finds that the amendment will not create a demand for land use designation changes in the surrounding areas. A right-of-way bounds the subject property on the south. The property to the east has commercial designations and uses. To the west is a gravel pit under the same ownership as the subject property. They have indicated that the gravel pit will remain in the near future. To the north, a property owner has indicated they may request a comprehensive plan amendment to redesignate his property from residential to commercial. However, the property owner stated he had considered such amendment at the existing EC designation; the C/B designation request does not change that consideration.
h) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
i) The approval of the amendment will not have a cumulative adverse effect on the City.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approves** application COMP 09-0004, as identified in Exhibit I attached to this Ordinance.

4. **Section 1.E.4 intentionally omitted.**

5. **Section 1.E.5 intentionally omitted.**

6. **COMP 09-0013 – Stroh's Water System Service Area Amendment**
Summary: A water system service area amendment from Stroh's Water Company's service area to the City of Gig Harbor water service area for two parcels, totaling 4.16 acres, located south of Hunt Street just east of SR16 and the existing Cushman Trail, currently occupied by Stroh's Feed & Garden Supplies and United Rentals.

Findings:

a) The water system plan allows limited expansion of the city's water service area. Goal 6.2.2 of the Economic Development Element encourages increased economic opportunities through the redevelopment of vacant properties and revitalizing older business districts within the city. Providing city fire flow to an underdeveloped commercial site will further this goal by allowing redevelopment without Stroh's Water Company incurring significant infrastructure costs.
b) Providing fire flow to the subject parcel will not adversely impact the city's ability to provide water service. A 12-inch City water main exists within Hunt Street along the north property line. A basic hook-up to that main would be required to provide water service. Given that the existing development has domestic water rights allocated to it, any redevelopment of the parcel should yield the transfer of those rights to the City provided the City takes over both domestic and fire flow water service. If only fire flow is provided, the city has adequate pressure to service the site and no additional water rights are needed. The water service amendment will not place uncompensated burdens on the existing water purveyor and customers as the developer will pay for connecting to the city's water main and associated fees. Any fees incurred by the city for changing the water service area will be reimbursed by the applicant.
c) The City Council finds that the proposed amendment is consistent with the Growth Management Act, the countywide planning policies and multi-county planning policies.
d) The City Council finds that the approval of this amendment will not have a cumulative adverse effect. Under condition 3a, the City does not reserve any additional water rights. Under condition 3b, the city allows a connection for fire flow only and an underdeveloped parcel is allowed to redevelop.

Conclusion: After consideration of the materials in the file, staff presentation, the Planning Commission recommendation, the City's Comprehensive Plan, criteria for approval found in Chapter 19.09 GHMC, applicable law, and public testimony, the City Council hereby **approves** application COMP 09-0013, as identified in Exhibit L attached to this Ordinance with the following **conditions**:

1) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all consultant and legal expenses paid by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment.
2) The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all fees paid to the State of Washington and Pierce County by the City of Gig Harbor for the revision to the City's Water System Plan and/or the Pierce County Coordinated Water System Plan related to the water service area amendment.

3a. IF THE CITY SUPPLIES BOTH DOMESTIC AND FIRE FLOW TO THE SITE: The applicant shall request the Stroh's Water System assign to the City of Gig Harbor from its existing water rights, the quantity required to serve the proposed development consistent with state law, including Washington State Department of Health water system planning statutes and regulations. Should the Stroh's Water System decline the requested assignment, or advise the City that the assignment cannot occur in a manner consistent with law, the applicant is advised that City of Gig Harbor has no duty to serve the subject property and reserves the right not to provide water service. The applicant's request for assignment and Stroh's Water System response shall be documented in writing and provided to the City of Gig Harbor. The applicant shall provide full cost reimbursement plus a 5% administration fee to the City of Gig Harbor for all consultant and legal expenses necessary for assignment of water rights.

OR

3b. IF THE CITY SUPPLIES ONLY FIRE FLOW SUPPLY TO THE SITE: The applicant shall pay the City's water system connection charge in effect at the time of building permit issuance based on the size of each water main serving the fire sprinkler system for the building(s).

Section 2. Transmittal to State. The Planning Director is directed to forward a copy of this Ordinance, together with all of the exhibits, to the Washington State Commerce Department within ten days of adoption, pursuant to RCW 36.70A.106.

Section 3. Severability. If any portion of this Ordinance or its application to any person or circumstances is held by a court of competent jurisdiction to be invalid or

unconstitutional, such invalidity or unconstitutionality shall not affect the remainder of the Ordinance or the application of the remainder to other persons or circumstances.

Section 4. Effective Date. This ordinance shall take effect and be in full force five (5) days after passage and publication of an approved summary consisting of the title.

PASSED by the Council and approved by the Mayor of the City of Gig Harbor this 14th day of December, 2009.

CITY OF GIG HARBOR

Mayor Charles L. Hunter

ATTEST/AUTHENTICATED:

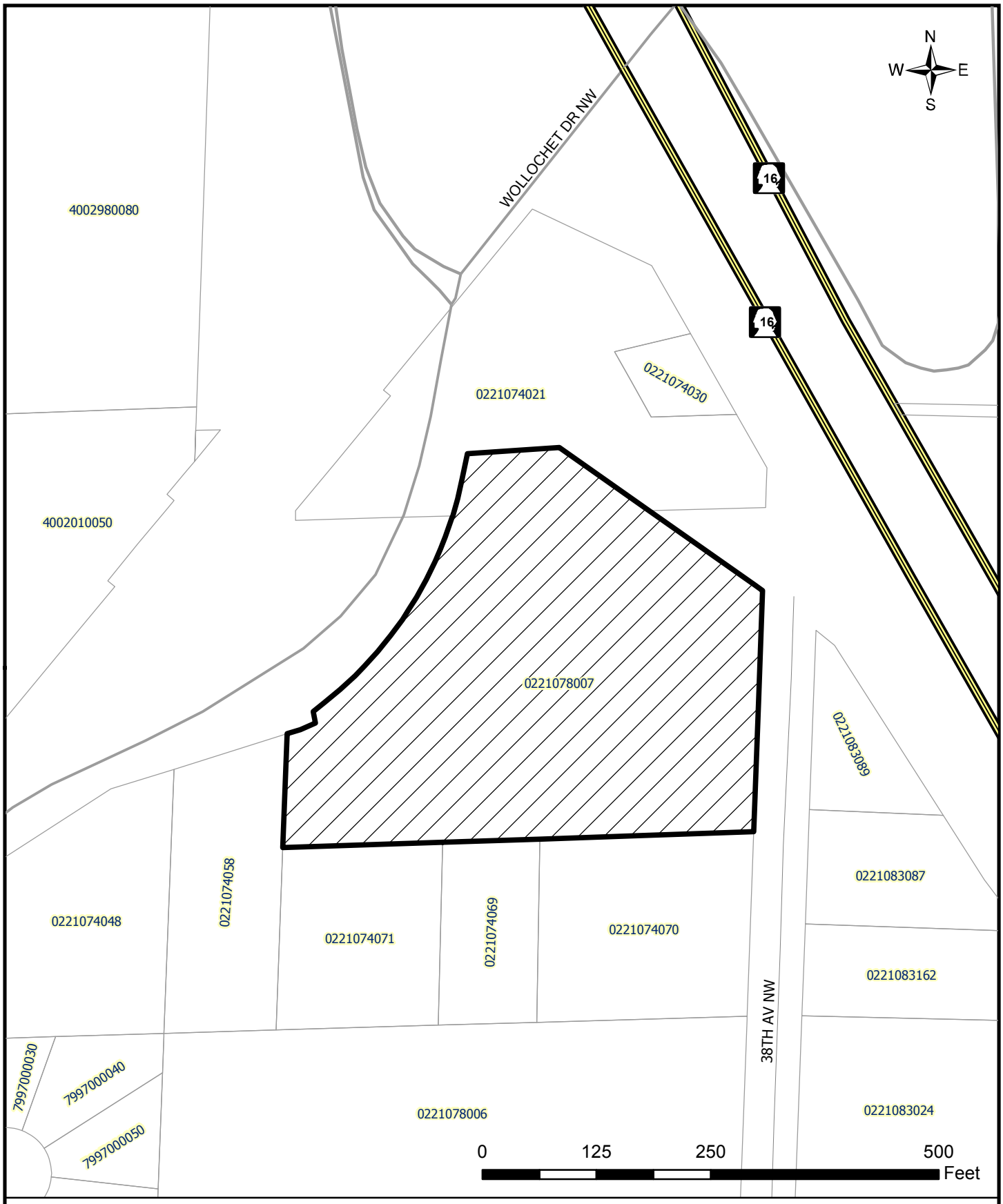
Molly M. Towslee, City Clerk

APPROVED AS TO FORM:
Office of the City Attorney

Angela S. Belbeck

FILED WITH THE CITY CLERK: 11/18/09
PASSED BY THE CITY COUNCIL: 12/14/09
PUBLISHED: 12/23/09
EFFECTIVE DATE: 12/28/09
ORDINANCE NO. 1181

Exhibit “A”
Application COMP 09-0001: Wollochet Water System Service Area Amendment



GIG HARBOR
"THE MARITIME CITY"

Wollochet Water Service Area Amendment
COMP 09-0001

Exhibit “B”
Application COMP 09-0002:
Parks, Recreation and Open Space Element

Chapter 10
PARKS, RECREATION AND OPEN SPACE

~~The Gig Harbor Park, Recreation and Open Space Plan (March 2001) is incorporated by reference as the City's Park and Recreation Element under Gig Harbor Ordinance No. 933. The element is bound separately from the remainder of the Comprehensive Plan.~~

~~On December 8, 2008, the City of Gig Harbor added the following properties to the Park and Recreation Element as recent or potential acquisitions (Ordinance No. 1151):~~

~~1. The Rohr Property. This property is located on the north side of the bike motocross property. It includes a single family home and the property abuts Crescent Creek on its westerly side. The property was purchased in 2008.~~

~~2. The Hoppen Property. This property is located at the mouth of Crescent Creek. The property is almost entirely a wetland that is tidally influenced. The property would be purchased with a combination of City and Conservation Futures funding.~~

~~3. Future Park Site – Gig Harbor North. The City is looking to acquire a park site in Gig Harbor North. Although no specific site has been identified at this time, it is anticipated that a suitable site may be identified in 2009.~~

This chapter is reserved for the parks, recreation and open space plan. The City has removed the expired 2001 plan and is working on a replacement plan for adoption in the 2010 Comprehensive Plan Amendment Cycle.

Exhibit “C”
Application COMP 09-0003:
Transportation Element

Showing pages with amendments.

- Pierce Transit

The projects proposed in the City of Gig Harbor or the UGA of the City are as follows:

Pierce County

- 36th Street NW (SR16 Trail Spur Connection). The project proposed to widen and construct 6 foot wide shoulders along both sides of 36th Ave. between 22nd Ave. and SR 16. The project will facilitate non-motorized access to the existing Cushman Trail and Scott Pierson Trail currently under construction.

- Jahn Avenue NW /32nd Street /22nd Avenue (SR 16 Trail Spur Connection). The project proposed to widen and construct 6 foot wide shoulders along both sides of the subject roadways. The project will facilitate non-motorized access to the existing Cushman Trail and Scott Pierson Trail currently under construction.

Pierce Transit

- Peninsula Park and Ride (Phase 1). This project is proposed in 2 phases. Phase 1 consists of constructing a new Park and Ride Lot in conjunction with the existing Kimball Drive Park and Ride facility and consists of a new parking lot facility proposed to accommodate 500 to 525 cars. Phase 1 will also include constructing a pedestrian bridge over SR16 to link the new facility with the existing facility located on Kimball Drive.

- Peninsula Park and Ride (Phase 2). The second phase of this project consists of the construction of a median in-line transit station on SR16 located approximately ¼ mile south of Pioneer Way/Wollochet Drive interchange.

Concurrency Ordinance

The City of Gig Harbor requires either the construction of or financial commitment for the construction of necessary transportation improvements from the private or public sector within six years of the impacts of a development. Methods for the City to monitor these commitments include:

- The City keeps a concurrency Traffic Model which tracks cumulatively the proposed development within the City. Utilizing the model, the City evaluates the available capacity and corresponding LOS at intersections throughout the City to determine if transportation concurrency is available for the proposed development. The City periodically updates the Traffic Model which includes calibrating to existing conditions and providing current information to document Transportation Capacity Availability.

- Monitoring intersections for compliance with the City's LOS Standard. The City of Gig Harbor LOS for intersections is LOS D; except for specified intersections in the Downtown Strategy Area and North Gig Harbor Study Area.

~~Short-Term (2013) Improvements~~ Range Transportation Improvements

As discussed previously, Gig Harbor, as with all Washington State cities and counties, adopts annually a 6-year transportation improvement program (TIP) that addresses safety, mobility and system continuity issues that are either existing or expected within that 6-year window. As required by state law, the TIP is financially constrained to the revenue for capital improvements expected within that 6-year period from all possible sources (taxes, grants and fees). The financial analysis is provided later in this chapter.

Figure 11-9 illustrates the short-range transportation improvement ~~roadway~~ projects needed ~~in Gig Harbor's~~ to meet acceptable levels of service to accommodate the traffic that is estimated to be generated by the short range growth forecast ~~. 2009-2013 TIP.~~ As shown in the previously presented tables, the short-range transportation improvement projects ~~2009-2013 TIP~~ addresses the ~~identified~~ unacceptable LOS identified in the 2013 "No Build" scenario while considering the special LOS standard applied in the "Downtown Strategy Area." **Table 11-5** summarizes the ~~2009-2013~~ short range transportation improvement projects.

Long-Range ~~(2028)~~ Transportation Improvements

Long-range improvements to the roadway, bicycle and pedestrian system were identified both by examining level-of-service deficiencies and through inspection of the existing roadway system considering the expected development of Gig Harbor in realization of the land use element of this comprehensive plan. **Figure 11-10** presents the location and extent of the long-range improvements proposed to address projected level-of-service deficiencies and system continuity needs. **Table 11-6** describes and provides cost estimates for the long-range transportation improvements.

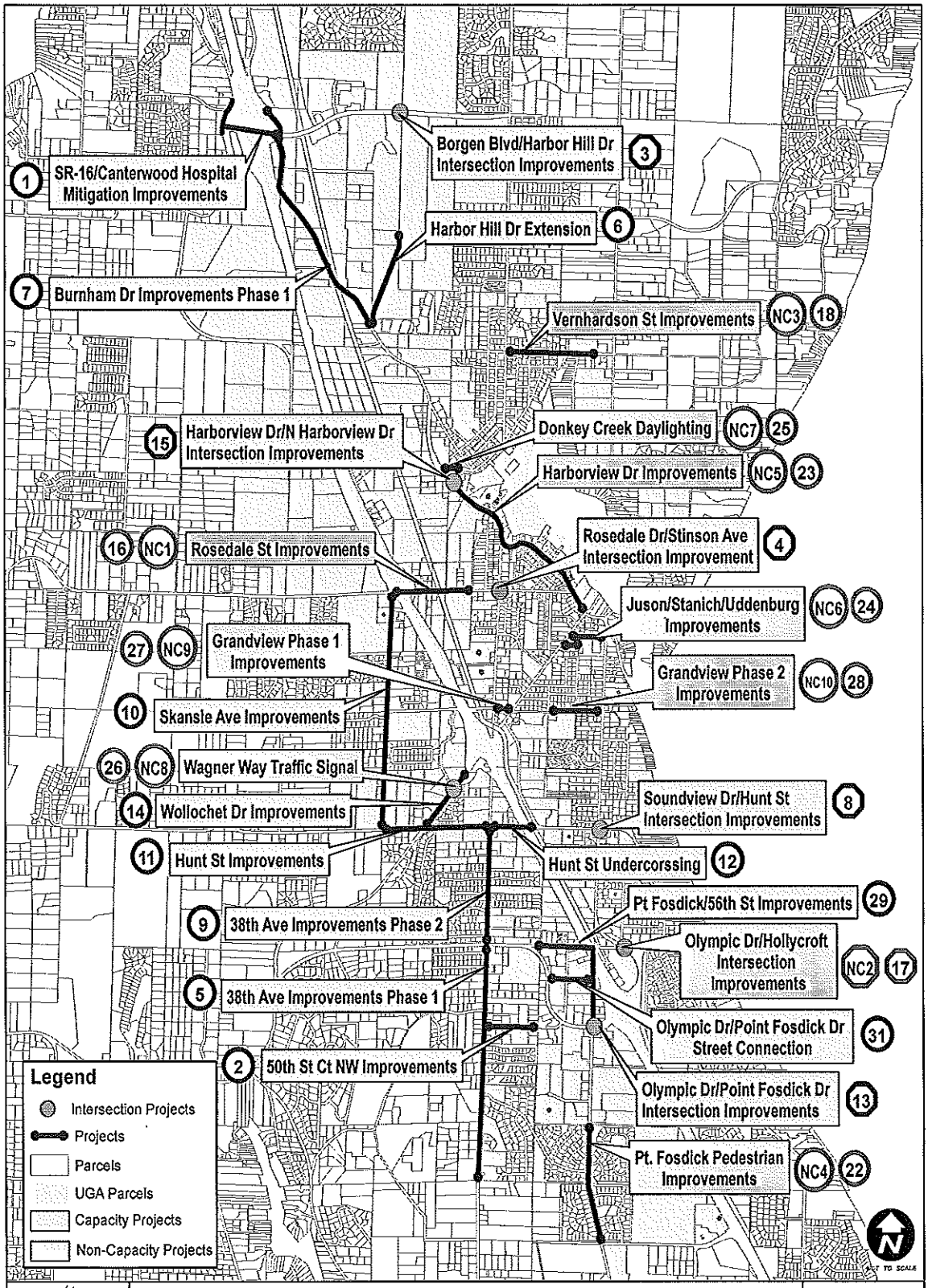


Figure 11-9
Short-Range Transportation Improvement Program

Table 11-5
Gig Harbor Short-Range Transportation Projects

No.	Roadway	From	To	Project Description	Estimated Cost (Thousands $)	Component	~~Year~~
1	SR-16/Borgen Blvd	Burnham Drive	Canterwood Blvd	Construct various short term roadway improvements to address concurrency as identified in the 2005 Final EIS for North Gig Harbor	$11,000	Construction	~~2009~~
2	50th St. Ct. NW	Olympic Drive	38th Street	Construct new 2-lane roadway with curb, gutter and sidewalks on both sides, illumination, storm water system	1,600	Construction	~~2009~~
3	Harbor Hill Drive / Borgen Blvd.	Intersection		Construct right-turn slip lane from EB Borgen Blvd to SB Harbor Hill Drive;	64	Engineering	~~2012-2014~~
				Construct right-turn slip lane from NB Harbor Hill Drive to EB Borgen Blvd.	640	Construction	~~2012-2014~~
4	Rosedale Drive / Stinson Avenue	Intersection		Construct left-turn pocket on south leg of Stinson for left turns onto WB Rosedale Dr.;	25	Engineering	~~2012-2014~~
				Construct right-turn only lane on north leg of Stinson to WB Rosedale	250	Construction	~~2012-2014~~
5	38th Avenue	City Limits	56th Street	Phase I improvements - Complete design & construction of 2-/3-lane section with left turn pockets, bicycle lanes, curbs & gutters on both sides, landscaped planter strips, sidewalk, storm sewer improvements, provisions for future lighting	890	Engineering	~~2009-2011~~
					8,900	Construction	~~2012-2014~~
6	Harbor Hill Drive	Terminus	Burnham Drive	Complete the extension of Harbor Hill Drive to Burnham Drive. Private funding.	1,000	Construction	~~2009-2010~~
7	Burnham Drive	Harbor Hill Drive Extension	SR 16 interchange	Phase I: Reconstruction, including minor widening, curbs, gutters, sidewalks, storm water improvements, landscaped planer strips and lighting.	1,000	Construction	~~2011~~
8	Soundview Drive / Hunt Street	Intersection		Construct new traffic signal at the intersection with associated left turn pockets	60	Engineering	~~2011~~
					600	Construction	~~2012-2014~~

Table 11-5 (Continued)
Gig Harbor Short-Range Transportation Projects

No.	Roadway	From	To	Project Description	Estimated Cost (Thousands $)	Component	~~Year~~
9	38th Avenue	56th Street	Hunt Street	Phase II - Complete design & construction of 2-/3-lane section with left turn pockets, bicycle lanes, curbs & gutters on both sides, landscaped planter strips, sidewalk, storm sewer improvements, provisions for future lighting	480	Engineering	~~2009-2011~~
					4,800	Construction	~~2012-2014~~
10	Skansie Avenue	Rosedale Street	Hunt Street	Minor widening to provide curb, gutter, storm water improvements, bicycle lanes and sidewalks on both sides of street	860	Engineering	~~2010~~
					8,600	Construction	~~2011~~
11	Hunt Street	Skansie Avenue	38th Street	Preliminary design of a 2-/3-lane section with median and/or left turn pockets, bicycle lanes, curbs, gutters, sidewalks and landscaped planter strip	480	Engineering	~~2012-2014~~
12	Hunt Street Undercrossing	Hunt Street	Kimball Street	Construct a new undercrossing connecting both sides of Hunt Street across SR-16	560	Engineering	~~2012-2014~~
					5,600	Construction	~~2012-2014~~
13	Olympic Drive / Point Fosdick Drive	Intersection		Construct right-turn only lane on NB Pt. Fosdick Drive and construct a dedicated right-turn lane to SR-16 EB on-ramp	40	Engineering	~~2009~~
					400	Construction	~~2010~~
14	Wollochet Drive	Hunt Street	Approximately 220 feet from Hunt Street	Widen roadway on one side to provide for 11-foot lane. This project completes corridor improvements provided by development	60	Engineering	~~2010~~
					600	Construction	~~2012-2014~~
15	Harborview Drive / N. Harborview Drive	Intersection		Construction new modern roundabout at the current location of the intersection	150	Engineering	~~2010~~
					1,500	Construction	~~2011~~

Table 11-5 (Continued)
Gig Harbor Short-Range Transportation Projects

No.	Roadway	From	To	Project Description	Estimated Cost (Thousands $)	Component	~~Year~~
16	SR-16/Olympic Dr.	Intersection		Widen to provide exclusive right-turn lane on east approach. Convert one existing through-lane on east approach to shared through-left turn lane. Adjust signal phasing as required.	75	Engineering	~~2012-2014~~
					750	Construction	~~2012-2014~~
17	Burnham Dr./Harbor Hill Dr.	Intersection		Reconfigure intersection to a modern roundabout	200	Engineering	~~2010~~
					2000	Construction	~~2011~~
18	Rosedale St. / Skansie Av.	Intersection		Widen to provide left-turn lanes on east and west approaches	25	Engineering	~~2011~~
					250	Construction	~~2012-2014~~
19 (NC1)	Rosedale St.	Skansie Av.	Shirley Av.	Minor widening to provide 2-through lanes, channelization, left-turn pockets, bicycle and sidewalks on both sides of street	340	Engineering	~~2010~~
					3400	Construction	~~2011~~
20 (NC2)	Olympic Drive / Hollycroft Street	Intersection		Convert existing 2-way traffic on spur street that connects Olympic Drive with Hollycroft Street in the SE quadrant of the intersection to one-way NB traffic. Angled parking to be added to spur to support the park to the SE of the spur.	2	Engineering	~~2012-2014~~
					24	Construction	~~2012-2014~~
21 (NC3)	Vernhardson St.	City Limits	Peacock Hill Av	Pavement restoration and/or overlay, storm sewer, curbs, gutters and sidewalk(s), bicycle lanes (east of N. Harborview Drive)	375	Engineering	~~2012-2014~~
22 (NC4)	Pt. Fosdick Pedestrian Improvements	Harbor County Dr.	36th	Add sidewalk and bioswale along Point Fosdick Drive	100	Engineering	~~2010~~
					1000	Construction	~~2011~~

Table 11-5 (Continued)
Gig Harbor Short-Range Transportation Projects

No.	Roadway	From	To	Project Description	Estimated Cost (Thousands $)	Component	~~Year~~
23 (NC5)	Harborview Drive	N. Harborview	Pioneer Dr.	Downtown beautification. Provide landscaping and pedestrian benches at key intersections	10	Engineering	~~2011~~
					90	Construction	~~2012-2014~~
24 (NC6)	Judson/ Stanich/ Uddenburg			Downtown beautification. Provide landscaping, pedestrian improvements, beautification, pavement rehabilitation	190	Engineering	~~2012-2014~~
					1900	Construction	~~2012-2014~~
25 (NC7)	Donkey Creek Daylighting.	N. Harborview	Harborview Dr.	Street and bridge improvements.	1,845 205	Construction Engineering	~~2009-2010~~
26 (NC8)	Wagner Way Traffic Signal	Wagner Way	Wollochet Dr.	Traffic signal at Wollochet Dr and Wagner Way.	270 30	Construction Engineering	~~2008~~
27 (NC9)	Grandview Phase 1 Improvements	Stinson Ave.	Pioneer Way	Road, stormwater, and lighting improvements.	450 50	Construction Engineering	~~2010~~
28 (NC10)	Grandview Phase 2 Improvements	Soundview Dr.	McDonald Ave.	Road, stormwater, and lighting improvements.	774 86	Construction Engineering	~~2008-2009~~
29	Pt Fosdick/ 56th Improvements	Pt. Fosdick Dr.	56th St.	Sidewalk and roadway improvements.	3,600 400	Construction Engineering	~~2010~~

Estimated Cost Summary (in thousands)		
	Engineering	**$6,357**
	Construction	**$56,077**
	Total	**$62,434**

Note: *The numbering of projects should not be considered fully indicative of the relative importance or timing of the projects. Projects are programmed based on known commitments and funding. Depending on future funding opportunities, higher number projects may be constructed sooner than lower number projects. Numbers 25 through 29 incorporated from the City's adopted transportation CIP with cost estimates provided by City staff.*

Source: *"Proposed Six Year Transportation Improvement Program From 2009 to 2014" (Draft) City of Gig Harbor Washington, July 15, 2008*

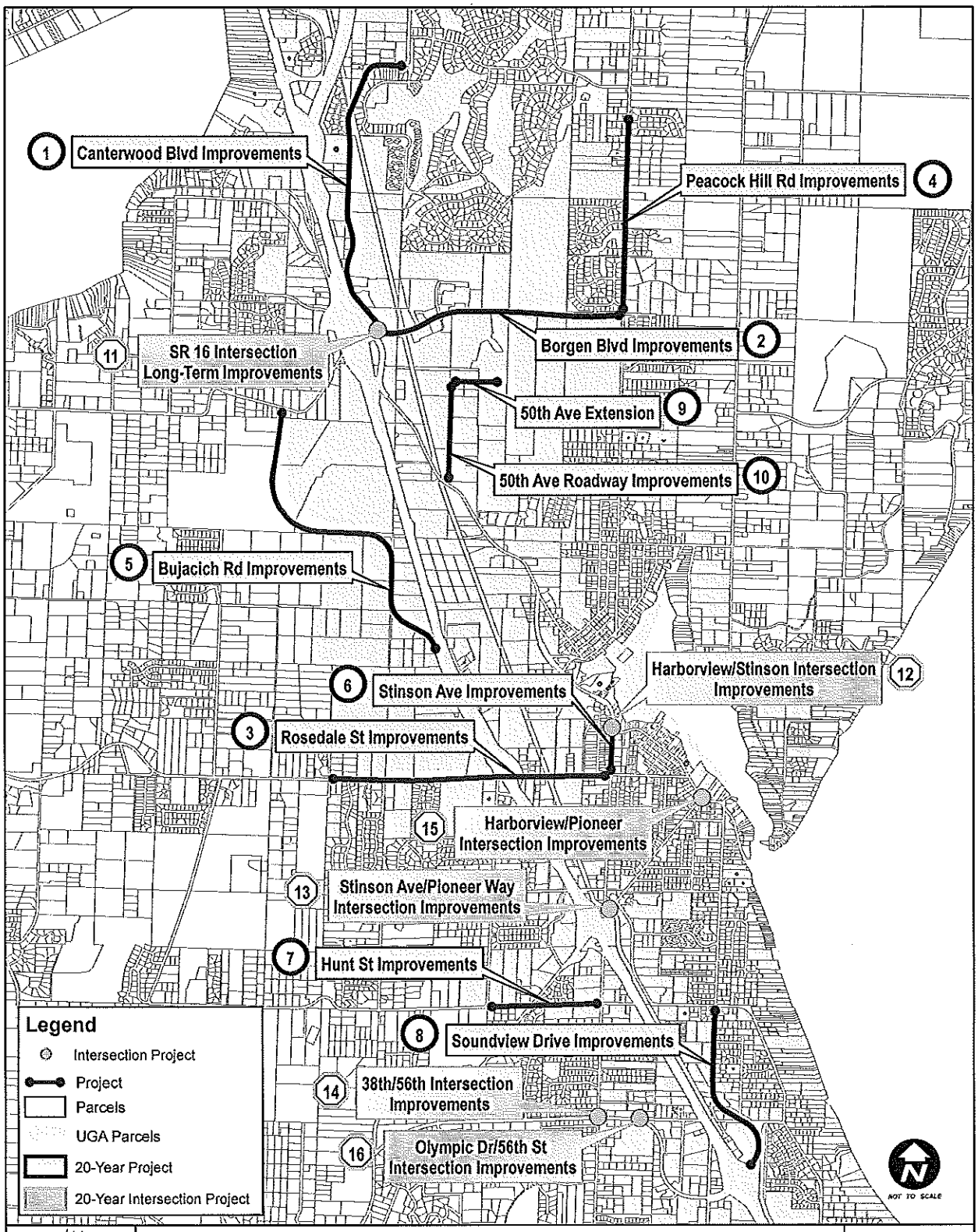


Figure 11-10
Long-Range Transportation Improvement Program

Table 11-6
Gig Harbor Long-Range Transportation Projects

No.	Roadway	From	To	Project Description	Purpose	Estimated Cost (Thousands $)
1	Canterwood Boulevard NW	SR-16 WB Roundabout	54th Avenue NW	Add lanes to existing roadway to provide a 4-through lane cross-section	Address projected LOS deficiency	$8,000
2	Borgen Boulevard	Peacock Hill Avenue	Burnham Drive NW	Widen roadway to 7-lane section with raised median and turn pockets at intersections	Address projected LOS deficiency	6,600
3	Rosedale Street NW	Skansie Avenue	58th Avenue NW	Phase I – Widen to standard	Address projected LOS deficiency Upgrade to urban standards	3,200
		Skansie Avenue	Stinson Avenue	Phase II - Widen	Address projected LOS deficiency	2,300
4	Peacock Hill Avenue	Borgen Boulevard	127th Street NW	Widen to 5 lane section (with two-way center left-turn lane)	Address projected LOS deficiency. Address existing local street pattern	4,100
5	Bujacich Road NW	Sehmel Drive NW	89th Street NW	Widen to three-lane section (with two-way center left-turn lane)	Address projected LOS deficiency. Address access requirements of expected development	6,900
6	Stinson Avenue	Rosedale Street NW	Harborview Drive	Implement selected widening for left-turn storage. Project should be refined with operational analysis when programmed on 6-Year TIP. Existing corridor LOS deficiency acceptable under Downtown Strategy Area LOS policy.	Manage access to preserve existing capacity and avoid widening.	220

Table 11-6 (Continued)
Gig Harbor Long-Range Transportation Projects

No.	Roadway	From	To	Project Description	Purpose	Estimated Cost (Thousands $)
7	Hunt Street NW	Skansie Avenue	38th Avenue NW	Widen to 3-lane section (with two-way center left-turn lane).	Address projected LOS deficiency	2,300
8	Soundview Drive	SR-16 WB Ramp	Hunt Street NW	Implement selected widening for left-turn storage and access management program. Project should be refined with operational analysis when programmed on 6-Year TIP.	Address projected LOS deficiency.	700
9	New Road	50th Avenue	Harbor Hill Drive	C-3 facility identified in the North Gig Harbor Final SEIS. The majority of this roadway is most likely to be provided with development by development.	System completion	1,100
10	50th Avenue	New Road (C-3)	Burnham Drive	50th Avenue identified in the North Gig Harbor Final SEIS. The majority of this roadway is most likely to be provided with development by development.	System completion	2,300
			Intersection Projects			
No.	**Intersection**			**Project Description**	**Purpose**	**Estimated Cost (Thousands $)**
11	SR 16 / Burnham Interchange Ramp Terminus and SR 16 / Borgen Boulevard Interchange Ramp Terminus			Rebuild interchange per Level III study (on-going) For purposes of this plan, an interchange replacement in place was assumed.	Address projected LOS deficiency	56,000
12	Harborview Drive / Stinson Avenue			Signalize intersection (under semi-actuated control)	Address projected LOS deficiency	660
13	Stinson Avenue / Pioneer Way			Signal upgrade: - Provide protected left-turns - Widen to add right-turn exclusive lane on east and west approaches Widen for double-left turn lanes on east approach	Address projected LOS deficiency	330

Table 11-6 (Continued)
Gig Harbor Long-Range Transportation Projects

Intersection Projects (Continued)

No.	Intersection	Project Description	Purpose	Estimated Cost (Thousands $)
6	38th Avenue NW/56th Street NW	Signal modification to adjust phasing plan (after detailed operational analysis)	Address projected LOS deficiency	150
7	SR 16/Olympic Drive NW	Widen to provide exclusive right-turn lane on east approach. Convert one existing through-lane on west approach to shared through-left turn lane. Adjust signal phasing as appropriate	Address projected LOS deficiency	440
			Total Estimated Cost (thousands)	$88,100

Source: "Analysis of Recommended Gig Harbor 20-Year Transportation Facility Plan" July 1, 2008

It should be noted that the analysis of model link volumes would suggest the following road widening projects. As a policy, the comprehensive plan recognizes these link deficiencies and finds them acceptable in light of the high probability of unacceptable environmental impacts (both to the built and natural environment) that would result.

Table 11-7
Potential 20-Year Projects NOT Recommended

Harborview Drive	N. Harborview Drive	Pioneer Way	No project recommended. LOS deficiency is acceptable under Downtown Strategy Area LOS policy.
N. Harborview Drive	Peacock Hill Avenue	Harborview Drive	No project recommended. Addressing LOS deficiency would have severe impacts on built and natural environment along roadway.

Table 11-11. Capacity Projects ~~–Six-Year~~ Short Range Transportation Projects ~~Improvement~~ Program

~~2009 to 2010~~

TIP #	Description	Estimated Cost
1	SR-16/Borgen Blvd	$11,000,000
2	50th St Ct NW Improvements	1,600,000
3	Harbor Hill/Borgen Intersection Improvements	704,000
4	Rosedale/Stinson Intersection Improvements	275,000
5	38th Ave Improvements Phase 1	9,790,000
6	Harbor Hill Drive Extension	1,000,000
7	Burnham Dr Phase 1	1,000.000
8	Soundview/Hunt Intersection Improvements	660,000
9	38th Ave Improvements Phase 2	4,848,000
10	Skansie Ave Improvements	9,460,000
11	Hunt St (engineering only)	480,000
12	Hunt St Undercrossing	6,160,000
13	Olympic/Fosdick Intersection Improvements	440,000
14	Wollochet Dr Improvements	660,000
15	Harborview/N Harborview Intersection Improvements	1,650,000
16	SR-16/Olympic Dr. Intersection Improvements	825,000
17	Burnham Dr/Harbor Hill	2,200,000
18	Rosedale St./ Skansie Avenue Intersection	275,000
29	Pt. Fosdick/56th Improvments	4,000,000
Total Costs	**(Capacity projects only)**	**$56,028,000**

Summary of Costs and Revenues

Based on the revenues and costs listed above, the proposed transportation element improvements are affordable within the City's expected revenues for transportation capital costs. **Table 11-12** summarizes costs and revenues for the six and twenty year periods analyzed in the transportation element. It is important to note that the revenues portrayed include the proceeds of additional debt issues for the six year improvement timeframe. This is based upon a City assumption that additional debt will be necessary to fully fund the transportation improvement program. The new

SECTION 7. GOALS AND POLICIES

The transportation goals contained in this element are:

- Create an Effective Road and Sidewalk Network.
- Create an appropriate balance between transportation modes where each meets a different function to the greatest efficiency.
- Design and Construction Standards
- Level of Service Standards
- Air Quality

GOAL 11.1: CREATE AN EFFECTIVE ROAD AND SIDEWALK NETWORK.

The City of Gig Harbor shall plan for an effective road network system.

Policy 11.1.1 Complete development of the arterial road grid serving the planning area.
Policy 11.1.2 Develop a trans-highway connector across SR-16 at Hunt Street.
Policy 11.1.3 Establish a functional classification system which defines each road's principal purpose and protects the road's viability.
Policy 11.1.4 Develop an arterial and collector system which collects and distributes area traffic to SR-16.
Policy 11.1.5 Define a collector road system which provides methods for transversing the neighborhoods, districts and other places within the area without overly congesting or depending on the arterial system or any single intersection.
Policy 11.1.6 Establish effective right-of-way, pavement widths, shoulder requirements, curb-gutter-sidewalk standards for major arterials, collectors and local streets.
Policy 11.1.7 Improve collector roads in the planning area to provide adequate capacity for present and future projected traffic loads, pedestrian and bicyclist activities.
Policy 11.1.8 Work with downtown property owners to determine an effective parking plan, which increases on-street parking.
Policy 11.1.9 Provide planning and design assistance in establishing a local parking improvement district for the downtown area.
~~Policy 11.1.10 Improve the effectiveness of the road and sidewalk network in the downtown area through the implementation of applicable information provided in the "Harborview Drive and Judson Street Improvement Master Plan" dated February 3, 2009~~
Policy 11.1.10 Enhance walkability in the downtown area through sidewalk widening and improved sidewalk connections.
Policy 11.1.11 Increase pedestrian enjoyment of the downtown area through beautification and preservation activities.
Policy 11.1.12 Improve existing sidewalk and intersection conditions in the downtown area to increase pedestrian and vehicular safety.

GOAL 11.2: MODAL BALANCE

Exhibit “D”
Application COMP 09-0007:
Stormwater Comprehensive Plan

A copy of the “Stormwater Comprehensive Plan – October 2009” is located in the Public Works Department.

Exhibit “E”
Application COMP 09-0008:
Wastewater Comprehensive Plan

A copy of the “Wastewater Comprehensive Plan – November 2009” is located in the Public Works Department.

Exhibit “F”
Application COMP 09-0009:
Water System Plan

A copy of the “Water System Plan – 2008” is located in the Public Works Department.

Exhibit “G”
Application COMP 09-0010:
Capital Facilities Element

Chapter 12
CAPITAL FACILITIES

INTRODUCTION

A Capital Facilities Plan is a required element under the State Growth Management Act, Section 36.70A.070 and it addresses the financing of capital facilities in the City of Gig Harbor and the adjacent urban growth area. It represents the City and community's policy plan for the financing of public facilities over the next twenty years and it includes a six-year financing plan for capital facilities. The policies and objectives in this plan are intended to guide public decisions on the use of capital funds. They will also be used to indirectly provide general guidance on private development decisions by providing a strategy of planned public capital expenditures.

The capital facilities element specifically evaluates the city's fiscal capability to provide public facilities necessary to support the other comprehensive plan elements. The capital facilities element includes:

- Inventory and Analysis
- Future Needs and Alternatives
- Six-Year Capital Improvement Plan
- Goals, Objectives and Policies
- Plan Implementation and Monitoring

Level of Service Standards

The Capital Facilities Element identifies a level of service (LOS) standard for public services that are dependent on specific facilities. Level of service establishes a minimum capacity of capital facilities that must be provided per unit of demand or other appropriate measure of need. These standards are then used to determine whether a need for capacity improvements currently exists and what improvements will be needed to maintain the policy levels of service under anticipated conditions over the life of the Comprehensive Plan. The projected levels of growth are identified in the Land Use and Housing Elements.

Major Capital Facilities Considerations and Goals

The Capital Facilities Element is the mechanism the city uses to coordinate its physical and fiscal planning. The element is a collaboration of various disciplines and interactions of city departments including public works, planning, finance and administration. The Capital Facilities Element serves as a method to help make choices among all of the possible projects and services that are demanded of the City. It is a basic tool that can help encourage rational decision-making rather than reaction to events as they occur.

The Capital Facilities Element promotes efficiency by requiring the local government to

prioritize capital improvements for a longer period of time than the single budget year. Long range financial planning presents the opportunity to schedule capital projects so that the various steps in development logically follow one another respective to relative need, desirability and community benefit. In addition, the identification of adequate funding sources results in the prioritization of needs and allows the tradeoffs between funding sources to be evaluated explicitly. The Capital Facilities Plan will guide decision making to achieve the community goals as articulated in the Vision Statement of December, 1992.

INVENTORY AND ANALYSIS

The inventory provides information useful to the planning process. It also summarizes new capital improvement projects for the existing population, new capital improvement projects necessary to accommodate the growth projected through the year 2010 and the major repair, renovation or replacement of existing facilities.

Inventory of Existing Capital Facilities

Wastewater System ~~Facilities~~

Existing Capital Facilities

~~The City's waste-water treatment facility is located on five acres, west of Harborview Drive at its intersection with North Harborview Drive. The principal structure on the site consists of a 2,240 square feet building which houses the offices, testing lab and employee lunch room. The treatment facility consists of an activated sludge system which provides secondary level treatment of municipal sewage. After treatment, the effluent is discharged into Gig Harbor Bay via a submarine outfall pipe. The system was upgraded in 1996 to its present capacity of 1.6 MGD. The existing facility is very near actual capacity at historical month and peak flow of 1.1 MGD and 2.0 MGD, respectively. A proposed 2.4MGD expansion of the treatment plant is anticipated to provide sufficient capacity through the 20-year planning horizon.~~

~~A 2003 and a 2007 report by the Cosmopolitan Engineering Group, Inc analyzed the operation, maintenance, and capacity problems at the treatment plant, including odor and noise complaints. The report proposed a number of phased system improvements that have been incorporated in the wastewater capital improvement program.~~

~~The existing collection system serves a population of 6,820 and includes approximately 141,000 feet of gravity pipe, 27,000 feet of force main, 13 lift stations. Detailed descriptions of the existing sewer system, including location and hydraulic capacities, are found in the Gig Harbor Wastewater Comprehensive Plan (2002).~~

~~The downtown portion of the collection system was constructed under ULID No.1 in the mid-1970s. ULID No. 2 was constructed in the late 1980's to serve areas to the South of Gig Harbor, including portions of Soundview Drive, Harbor County Drive, Point Fosdick-Gig Harbor Drive,~~

~~56th Street NW, 32nd Avenue, and Harborview Drive. ULID No. 3 was constructed in the early 1990's to connect the Gig Harbor collection system to points north including portions of Burnham Drive NW and 58th Avenue NW.~~

Gig Harbor's original collection system, constructed in 1974-1975, served the downtown area and an area south of downtown. The original system was called Utility Local Improvement District (ULID) #1 and included six lift stations. ULID #2 was constructed to the south of ULID #1 in 1988 to serve south Gig Harbor including portions of Soundview Drive, Harbor Country Drive, Point Fosdick Drive, and Olympic Drive. ULID #3 was constructed north of ULID #1 in 1992 to serve North Gig Harbor including the area along Burnham Drive north of Harborview Drive, the Washington State Women's Corrections Center off Bujacich Drive, and the Purdy area including the Peninsula School District campus in Purdy.

Further expansions of the City's collection system were built under development agreements and as mitigation conditions of proposed development through the state environmental policy act (SEPA) process. As of 2009 the City's collection system consisted of approximately 150,000 feet of gravity sewers, 32,000 feet of sewer force mains, and 15 lift stations.

The City's wastewater treatment plant (WWTP) is located on five acres, west of Harborview Drive at its intersection with North Harborview Drive. The original WWTP was brought online to provide secondary treatment of municipal sewage in 1975. The original WWTP had a design capacity of 0.45 million gallons per day (MGD) with an average organic loading of 700 lbs BOD_5/day. In 1988, the WWTP was expanded to treat 0.7 MGD and an average organic loading of 1,800 lbs BOD_5/day. The WWTP was expanded again in 1996 to treat 1.0 MGD and permitted to treat a capacity of 1.6 MGD and an average organic loading of 3,400 lbs BOD_5/day. In 2009 the City started construction of Phase I of additional improvements to the WWTP to expand the treatment capacity to the permitted capacity.

The WWTP consists of the following major components: influent flow meter, influent screens, screening press, aeration basins, blowers, secondary clarifiers, return activated sludge pumps, waste activated sludge pump, aerobic digester, digested sludge pumps, sludge dewatering centrifuge, chlorinators, chlorine contact tanks, dechlorination system, and effluent discharge pumps. Effluent from the WWTP is piped through an outfall that discharges in to Gig Harbor.

In addition to sewer service within the Gig Harbor UGA, the City of Gig Harbor owns, operates, and maintains a septic system for the Shorecrest Development along Ray Nash Drive NW ~~Ray Nash Development~~, located about 5 miles west of the City. The Shorecrest septic system ~~Ray Nash~~ is a 12-unit development with an on-site septic system and pressurized drainfield. ~~The City also maintains an on-site septic system for the Olympic Theater.~~

Level of Service

The City introduced a requirement in May 2006 through Ordinance #1044 for most new development and redevelopment projects to request a portion of the treatment capacity at the City's wastewater treatment plant (WWTP) through the sewer capacity reservation certificate

(CRC) process. Since the WWTP has limited capacity to treat wastewater, the City identifies by way of the sewer CRC process those projects that the City's WWTP has adequate public wastewater facilities to treat.

In August 2007 the City released a statement indicating the City may not be able to grant any additional sewer CRCs until a planned expansion project at the WWTP is completed. Upon completion of design on Phase 1 expansion at the WWTP the City started construction of the design improvements in 2009 with the intent of providing additional treatment capacity.

Forecast of Future Needs

The City has used a demographics forecasting allocation model (DFAM) to forecast future population growth on undeveloped and underdeveloped parcels within the City's urban growth area (UGA). The primary input to the DFAM was a result of the City's Buildable Lands Analysis. The resulting population growth was then correlated to the generation of sewer flows to provide an estimate of the distribution of sewer flows throughout the City's UGA. These forecasted flows and descriptions of future wastewater needs are described further in the City's Wastewater Comprehensive Plan.

Future Wastewater Collection Needs

The City's collection system is planned at full build-out to expand to the limits of the UGA. The collection system has been divided into a total of 21 topographic basins, also known as sewer basins. At build-out each sewer basin will have one sewer pump station and a mixture of sewer gravity mains and sewer force mains. The design and construction of undeveloped and under-developed sewer basins may be financed by developers as conditions of SEPA or land use approval, and/or utility local improvement districts (ULIDs).

As noted above in the description of the existing capital facilities, the City's core area has an established sewer collection system. Some areas within the City's UGA are capable of having sewer flows conveyed through the use of gravity to existing sewer lift stations. However, in most areas the future development of the City's sewer collection system will occur in areas beyond the City's core area. These areas have a topographic low point where wastewater must be collected and pumped and may require construction of a new sewer pump station, also known as a lift station. Only one lift station shall be utilized in each sewer basin.

In situations where a new sewer lift station must be constructed two scenarios exist. The first scenario is where no lift station is located in the sewer basin. The proposed development activity shall design and construct a new lift station that will collect sewer flows from the proposed development and all future development upstream in the sewer basin.

The second scenario is where an existing lift station is already located in the sewer basin but the proposed development activity is located lower in elevation than the existing lift station. The proposed development activity shall design and construct a new lift station that will collect sewer flows from the existing lift station, the proposed development and all future development upstream in the sewer basin. The existing lift station would then be demolished.

Due to the likely potential for mechanical and electrical failures and the complications that arise when these failures occur, developments shall maximize gravity flows while minimizing the use of lift stations and grinder pumps.

Only developments lower in elevation than an existing lift station or gravity main AND lower in elevation that the path of sewer main construction may, upon approval of the Public Works Director, use grinder pumps in lieu of constructing a new lift station.

The City's Public Works Department provides continuous maintenance of the existing collection system. Future needs of the existing collection system are mostly limited to projects requiring rehabilitation of the lift stations. However, through the modeling of projected wastewater flows, no projects have been identified in the short term as necessary to increase the capacity of a gravity sewer main. Funding for the ongoing maintenance of the existing collection system, including rehabilitation of existing lift stations and replacement of existing sewer mains may be funded by utility connection fees and utility rates.

Specific facility improvements anticipated to accommodate the upcoming six year planning period are listed in Table 12.5.

Future Wastewater Treatment Plant Needs
To treat wastewater flows and waste load projections for the anticipated 20 year planning horizon the City will need to increase the permitted capacity of the treatment plant. With the construction of the Phase I improvements to the WWTP in 2009, the City anticipates the need for completing the design and construction of the Phase II WWP improvements and extending the marine portion of the wastewater outfall into Colvos Passage to receive approval on an increased wastewater discharge.

Reclaimed Water Investigation.
The State has identified reclaimed water as an important water resource management strategy that can offer benefits related to potable water supply, wastewater management, and environmental enhancement. The City has acknowledged the State's acceptance and promotion of reclaimed water as being a viable and important water resource management tool through the adoption of a comprehensive plan goal for the wastewater utility to explore options to create reclaimed water. Table 12.5 identifies an annual project for the study and investigation of wastewater reuse and reclaimed water.

~~In order to provide service to the urban growth area within 20 years, the City's sewer system of Gig Harbor will need to be extended its system into areas that currently do not have sewers. Collection system expansions will be financed by developer fees and/or utility local improvement districts (ULIDs), and maintained by the City. A conceptual plan for extending sewers into the unsewered parts of the city and urban growth area is included in the City's Wastewater Comprehensive Plan (2002). Individual basins in the unsewered areas were prioritized as 6-year or 20-year projects based on anticipated development.~~

~~The service area as configured in 1999 represented 2,270 equivalent residential units (ERUs).~~

~~By 2019, this total is projected to reach 8,146 ERUs within the exiting service area boundaries, with an additional 11,219 in the currently unsewered areas, for a system-wide total of 19,365 ERUs. Specific facilities improvements required to accommodate the short-term (6-year) and long-term (20-year) growth are listed in Table 12.5.~~

~~With completion of the proposed treatment plant expansion and other proposed system improvements, no significant capacity issues are anticipated through the 2022 planning horizon.~~

Water System

Existing Capital Facilities

The City~~'s~~ of Gig Harbor W~~w~~ater S~~s~~ystem, ~~and~~ limited by its retail water service area (RWSA), is ~~are~~ unique in that many residents within the City limits and the City's UGA receive water service from adjacent water purveyors. Approximately 35% of the population within the City limits and City's UGA receives water from the City, and the remainder within the City limits and City's UGA receive water from other water purveyors or from private wells. ~~Over 6,300 of the 12,113 people (52%) within the City's UGA and over 500 people within the City limits receive water from water purveyors other than the City.~~

The City of Gig Harbor Water System was originally built in the late 1940's. Today, the City's RWSA encompasses approximately 4.4 square miles with 1,927 service connections serving approximately 4,700 people. The City operates six groundwater wells that supply water to its water service customers, and has more than 37 miles of pipeline and six reservoirs located around the City. Summaries of the City's well source supply and storage facilities are provided in Table 12.1 and Table 12.2, respectively, below. The City also provides wholesale water service to multiple customers outside the City's RWSA, and has an emergency intertie with one purveyor. ~~The system has experienced considerable growth and served 1,391 connections and a service area population of 5,636 in 1999, including the Washington Corrections Center for Women and the Shore Acres Water System.~~

~~The City owns and draws water from six wells. The City's wells have a combined capacity of 2,705 gallons per minute (GPM) and are exclusively groundwater wells.~~

Table 12.1 - Summary of Well ~~Existing~~ Source Supply

Well No.	Location (Sec-Twnshp-Rge)	Date Drilled	Capacity (GPM)	Depth (Ft.)	Status
1	8-21N-2E	1949	120~~N/A~~	246 ~~320~~	Inactive ~~Abandoned~~
2	32-22N-2E	1962	280 ~~330~~	116 ~~121~~	Active ~~In Use~~
3	17-21N-2E	1978	750 ~~625~~	745 ~~920~~	Active ~~In Use~~
4	8-21N-2E	1988	200 ~~230~~	399 ~~443~~	Active ~~In Use~~
5	7-21N-2E	1990	543 ~~500~~	705 ~~818~~	Active ~~In Use~~
6	7-21N-2E	1991	975 ~~1,000~~	566 ~~600~~	Active ~~In Use~~
7	31-22N-2E	N/A	40 ~~N/A~~	393	Inactive ~~Class B~~

8	17-21N-2E	1965	20	231 ~~240~~	~~Well~~ Active ~~In Use~~

Source: City of Gig Harbor Water Facilities Inventory (WFI) Report, 2008 ~~1998~~; DOE Water Right Certificates

~~The City also has six storage facilities with a combined capacity of 4,550,000 gallons as shown in Table 12.2. Recently, a 2.4 million gallon storage reservoir was constructed in 2006. The tank was privately constructed as a condition of a pre-annexation agreement for Gig Harbor North. Upon completion, the facility was turned over to the City.~~

Table 12.2 - Summary of ~~Existing~~ Storage Facilities

Storage Facility	Associated with Well No.	Total Capacity (gallons)	Base Elevation (ft)	Overflow Elevation (ft)
East Tank	2	250,000	304	320
Harbor Heights Tanks~~(1)~~ 1	4	~~500~~250,000	290	320
Harbor Heights Tank 2	4	250,000	290	320
Shurgard Tank	3	~~500~~590,000	339	450
Skansie Tank	5 & 6	1,000,000	338	450
Gig Harbor North Tank	None	2,300,000	301	450
Total		4,640~~550~~,000-		

~~(1) There are two Harbor Heights tanks, each with a volume of 250,000 gallons.~~

Source: City of Gig Harbor 2009 Water System ~~Comprehensive~~ Plan

As with most municipalities, the City's water distribution system has developed continuously as demands and the customer base have grown. This evolution has created a distribution system comprised of pipes of various materials, sizes, and ages. Some areas of the City have pipe materials, sizes, and age that do not meet current construction standards or underperform. ~~The City's distribution system is comprised primarily of six-inch and eight-inch pipe. Ten-inch and twelve-inch pipes are located mostly at reservoir and pump outlets in order to maximize flows to the distribution system. There is also a 16-inch main along Skansie Avenue that serves the City maintenance shops and the Washington Correctional Center for Women facility in the Purdy area of the City's UGA. Approximately five percent of the system consists of four-inch pipe. The City is systematically replacing these undersized lines as budget allows. The City is also replacing older asbestos cement (AC) lines with ductile iron pipe as budget allows.~~

A detailed description of the existing water supply system may be found in the City of Gig Harbor ~~Comprehensive~~ Water System Plan ~~(2001)~~.

Level of Service

The City introduced a requirement in January 2001 through Ordinance #862 for most new development and redevelopment projects to request a portion of capacity of the City's water system through the water capacity reservation certificate (CRC) process. Since the City has limited capacity to withdraw water, the City identifies by way of the water CRC process those

projects that the City's water system has adequate public facilities to treat.

Forecast of Future Needs

~~The water use projections for the existing service area indicate an increase from 5,636 people in 2000 to 7,590 people in 2019. Projected populations for the City's new service area are estimated at an additional 4,650 people by 2019.~~

The City has used a demographics forecasting allocation model (DFAM) to forecast future population growth on undeveloped and underdeveloped parcels within the City's RWSA. The primary input to the DFAM was a result of the City's Buildable Lands Analysis. The resulting population growth was then correlated to the generation of water demands to provide an estimate of the water demands throughout the City's UGA. These forecasted water demands are described further in the City's Water System Plan.

The City has used results of the DFAM and water system modeling to analyze future demands and the resulting impacts to the City's water supply, distribution system, and storage.

The City's planned water supply meets the short-term projected demands. However, it is the City's goal to meet the maximum day water demand with the largest source out of service. This increases the City's reliability and redundancy of their water supply system. Currently the City's water system cannot meet this goal. Therefore additional sources, including up to two new deep aquifer wells and one shallow aquifer well, are planned to meet this goal. The deep aquifer wells may produce up to 1,000 acre-ft per year and 1,000 gallons per minute each and are denoted as Well No. 9 (adjacent to the Gig Harbor North reservoir), Well 11 (adjacent to the Skansie reservoir) or Well 12 (adjacent to the Harbor Heights reservoirs). The shallow aquifer well may produce up to 750 acre-ft per year and 500 gallons per minute and is denoted as Well No. 10 (located within Crescent Creek Park).

The City's water distribution system is generally strong. The strong water system is, in part, due to the replacement of undersized pipes and the replacement of older asbestos cement (AC) water mains. As a result the programming is continued for systematic replacement of undersized pipes to meet minimum fire flows and replacing older AC water mains with either ductile iron pipe or polyvinyl chloride (PVC) pipe.

Analysis of the existing storage facilities in the City of Gig Harbor Water System Plan indicates that the City can meet all of its storage needs through the 20-year planning horizon with existing facilities by nesting standby storage and fireflow storage. Consequently the City is not currently planning for additional storage facilities in the 20-year planning horizon. ~~However, development in the Gig Harbor North area will require additional storage to supply future connections in this area. The City plans to construct a 500,000-gallon, ground-level steel tank near the existing maintenance shop on Skansie Avenue.~~

~~Planned improvements for the distribution system generally include AC pipe replacement and capacity upgrades to provide fireflow.~~

~~The City has recently been granted an additional water right of 1,000 gallons per minute, sufficient to serve about 2,547 additional equivalent residential units. With other planned water system improvements and programmatic measures, the City anticipates sufficient water supplies through 2019~~. Specific facility~~ies~~ improvements required to accommodate the upcoming six-year planning period ~~short-term (6-year) and long-term (20-year) growth~~ are listed in Table 12.5.

Parks, ~~and~~ Recreation & Open Space Facilities

Existing Facilities

The City has a number of public park facilities, providing a range of recreational opportunities. These facilities are listed in Table 12.3 and described in greater detail below.

Table 12.3. Existing Park Facilities

Facility	Size (Acres)	Location	Type of Recreation
City Park at Crescent Creek	9.8~~5.8~~	Vernhardson Street	Active; Park, athletic facilities, play fields Passive; picnic area
Jerisich Dock	1.5	Rosedale Street at Harborview Drive	Moorage; water access; fishing
Grandview Forest Park	8.8	Grandview Drive	Passive; trail system
Old Ferry Landing-	0.1	Harborview Drive, east end	Passive; view point
Donkey Creek Park	~~0.96 acre~~ 1.3	Located at the intersecting parcel defined by Austin Street, Harborview Drive and North Harborview Drive	Passive; historical, scenic, nature area
Eddon Boat Park	2.9	Located at the intersection of Stinson Avenue and Harborview Drive.	Passive; historical.
Wilkinson's Homestead	16.3	Rosedale Street	Passive~~:~~; Historical, walking trail, community garden
Tallman's Wetlands	16.0	Wollochet Drive NW	Passive~~:~~; Trails
WWTP (Wastewater Treatment Plant)	9.3	Burnham Drive	Passive; (proposed) walking trails Active; (proposed) hike, bike and horse trails
Wheeler Street ROW end	0.4	Vernhardson Street	Passive; beach access
Bogue Viewing Platform	0.4	North Harborview Drive	Passive; picnic area
Finholm Hillclimb	0.4	Fuller Street between Harbor Ridge Middle School and the Northshore area.	Passive; walkway and viewing point
Dorotich Street ROW	0.4	West side of bay	Passive; Street End Park
Soundview Drive ROW end	0.4	West side of bay adjoining Tides Tavern	Passive; Public Access dock
Harborview Trail	1.4	Harborview Drive and North Harborview Drive	Passive; bike and pedestrian trails
Bogue Building	0.04	3105 Judson Street	Passive; historical
Public Works/ Parks Yard	7.5	46th Avenue NW	Passive; storage of parks equipment

City Hall/Civic Center	10.0	Grandview Drive adjacent to Grandview Forest Park	Active; athletic fields, recreational courts, skatepark Passive; picnic area
Kenneth Leo Marvin Veterans Memorial Park	5.5	50th Street near Olympic Drive.	~~Undeveloped – athletic fields under design and constriction.~~ Active: multi-purpose field, and play structures Passive: picnic area and open space
Skansie Brothers Park	2.0	Rosedale Street at Harborview Drive	Passive; historical, picnic area.
Austin Estuary	1.8	Located adjacent to Donkey Creek in the Northwest corner of the harbor.	Passive; historical, scenic, nature area

City Park - this ~~5.8~~ 9.8 acre property is located on Vernhardson Street on the east side of Crescent Creek. The ~~eastern portion of the former Peninsula School District site has been~~ park is improved with athletic facilities including a tennis court, basketball court, and youth baseball/softball field. The park's active recreation has been expanded in recent years to include a BMX dirt bike course and a sand volleyball court accessed off of Crescent Valley Drive. The City purchased property in 2008 north of the existing park site for future development and open space preservation. Additional open space property was also acquired west of the stream through the County Conservation Futures program in 2008.

The western portion of the site conserves the banks, wetlands, and other natural areas adjacent to Crescent Creek. This portion of the site has been improved with a playground structure, picnic tables, viewing platform, picnic shelter, restrooms, parking area and a pump house building.

Skansie Brothers Park/Jerisich Dock ~~– this downtown waterfront property is located within the extended right-of-way of Rosedale Street NW on Harborview Drive and was expanded with the acquisition of the adjacent Skansie Brothers property.~~ These waterfront parks are located adjacent to each other at 3207 and 3211 Harborview Drive respectively and have a total area of 3.5 acres. The ~~waterfront~~ Jerisich Dock site has been developed with a flagpole, ~~and~~ monument for lost fishermen ~~along Harborview Drive~~, and recreational pier. The acquisition of the Skansie Brothers property in 2002 expanded the park to include a netshed and historic house which both stand south of Jerisich Dock.

Restrooms, picnic tables, and benches are provided on Jerisich's 1,500 square foot pier supported deck overlooking the harbor and adjacent marinas. The deck provides gangplank access to a 352 foot long, 2,752 square foot ~~pile supported~~ fishing and boat moorage ~~pier~~ floating dock. The ~~pier~~ dock provides 420 feet of day-use boat moorage ~~for 20 slips~~, access for kayaks and other hand-carry watercraft, and fishing. The ~~pier~~ dock is used on a first-come basis to capacity, particularly during summer weekends. The Skansie Brothers site has been developed with a covered pavilion with adjacent grass area that is utilized for seasonal public events. A boat sewage pump-out is provided at no charge, April through October.

~~The pier was extended another 160 linear feet to the edge of the harborline in 1998. The additional platform area provides day-use boat moorage and fishing access. A pay-per-use sanitary sewage pump-out station was constructed at the same time along with lighting fixtures along the floats.~~

~~Expansion of the pier is under review.~~

Grandview Forest Park - Grandview Forest Park – this 8.8 acre site is located on Grandview Drive adjacent to the ~~City Hall~~ Civic Center. The park site surrounds the city water storage towers on a hilltop overlooking the harbor and downtown district. The densely wooded site has been improved with ~~bark- covered~~ walking trails and paths that provide access to surrounding residential developments and the ~~athletic fields located behind the school~~ Civic Center complex. ~~The park is accessed by vehicle from Grandview Drive onto an informal graveled parking area located adjacent to the water storage tanks on an extension of McDonald Avenue.~~ Parking for this park is located on the Civic Center site.~~-~~

Old Ferry Landing - this 1.0 acre site is located at the east end of Harborview Drive overlooking Point Defiance across the Narrows and Dalco passage. Portions of the original marine and ferry dock landing piles are visible from the end of the road right-of-way that extends into the tidelands. Site has been improved to include picnic facilities, parking and a shoreline view platform.

Donkey Creek Park – this ~~recently acquired~~ ~~0.96~~ 1.3 acre property is located in the intersecting parcel defined by Austin Street, North Harborview Drive, and ~~Old~~ Burnham Drive. The site historically was the site of the ~~includes the original wood structure that housed~~ the Borgen lumber yard ~~and hardware sales offices and displays, along with a number of out buildings and yard that stored lumber and other materials.~~ The site is presently developed with a restroom facility, picnic tables and open field.

The site is bisected by Donkey (North) Creek – a perennial stream that provides salmonoid habitat including an on-going hatchery operation located on the north bank adjacent to North Harborview Drive. ~~Some of the lumber yard buildings and improvements extend into the buffer zone area that has recently been defined for salmon-bearing water corridors. Future plans for the property will need to restore an adequate natural buffer area along the creek while determining how best to establish an activity area on the site commensurate with the property's strategic natural area, historical, and scenic.~~ A viewing platform allows for visual stream access.

Wilkinson's Homestead - ~~Wilkinson's Homestead~~ – this 16.3 acre site is located on Rosedale Street adjacent to Tacoma City Light powerlines. ~~The site is being acquired from the heir of a previous property owner.~~ The property contains large wetlands, steep hillsides under the powerline corridor, the family homestead, barn, outbuildings, former holly orchard, and meadows. The site is accessed from a driveway off Rosedale Street and from the Cushman Trail.

Tallman's Wetlands - this 16.0 acre property is located on Wollochet Drive NW south of SR-16 ~~and outside of existing city limits~~. The site contains significant wetlands that collect~~s~~ and filter~~s~~ stormwater runoff from the surrounding lands. ~~This portion of the property will be conserved and provided with interpretive trails by the developer~~ This park was developed with interpretive trails and off street parking. The park was constructed and dedicated to the City by the developer of the Mallards Landing plat in accordance with the annexation agreement.

Wastewater Treatment Plant - the 9.3 acre wastewater treatment plant facility is located on the west side of Burnham Drive on ~~North (Donkey)~~ Donkey (North) Creek. ~~The property was recently expanded to provide a buffer between the plant and uphill portions of the creek.~~ While the principal use of the site is treatment of wastewater, the site includes preserved open space associated with Donkey Creek and adjacent wetlands.

A 3.3 acre portion of the expansion area may be developed to provide a trailhead connection to the Cushman Trail on the overhead powerline property located parallel to SR-16. The powerline right-of-way ~~could be~~ has been improved to provide a non-motorized trail system. ~~access to a multipurpose system of hike, bike, and horseback riding trails in this portion of the urban growth area~~.

Wheeler Street Right-of-Way (ROW) End - this 0.4 acre road right-of-way is located at the north end of the bay adjacent to Crescent Creek in a quiet residential neighborhood. ~~The site provides beach access.~~ This site is presently undeveloped.

Bogue Viewing Platform - this 0.4 acre harbor overlook is located on waterfront side of North Harborview Drive north of the intersection with Burnham Drive. The site has been improved with a pier supported, multilevel wood deck, picnic tables, benches, and planting. A sanitary sewer pump station is located with the park.

Finholm Hillclimb – this 0.4 acre road right-of-way is located in Fuller Street extending between Harbor Ridge Middle School and the North shore business district. A wooden stairway system with overlook platforms, viewing areas, and benches has been developed between Franklin Avenue and North Harborview Drive as a joint effort involving the Lions Club, volunteers and city materials.

Dorotich Street (ROW) - this 0.4 acre road right-of-way is located on the west side of the bay adjoining residential condominiums and some commercial waterfront facilities. A private access dock has been developed at Arabella's Landing Marina that serves as the street-end park.

Soundview Drive ROW - – this 0.4 acre road right-of –way is located on the ~~Westside~~ west side of the bay adjoining Tides Tavern (the former Westside Grocery). The present and former owners maintain and provide a public access dock on the right-of-way for use of tavern patrons.

Harborview Trail - this 1.4 mile trail corridor is located within the public street right-of-way of Harborview Drive and North Harborview Drive. Additional road width was constructed (between curbs) to provide for painted on-road bike lanes on both sides of the roadway around the west and north shores of the harbor from Soundview Drive to Vernhardson/96th Street NW and City Park.

Curb gutters, sidewalks, and occasional planting and seating areas have been developed on both sides of the roadway from Soundview Drive to Peacock Hill Avenue ~~Road~~. Sidewalks have also been extended on Soundview Drive, Pioneer Way, Rosedale Street, Austin Street adjacent to North (Donkey) Creek, and Burnham Drive will include provisions for pedestrians and bicyclists. Limited improvements have been constructed on Peacock Hill.

Bogue Building – this 0.4 acre property and 1, 800 square foot building is located ~~adjacent to old City Hall~~ on Judson Street within the downtown district. The one-story, wood frame building was previously used by the Gig Harbor Planning and Building Department and is ~~now~~ presently a volunteer and visitor center.

Public Works / Parks Yard - the 7.5 acre Public Works Yard is located north of Gig Harbor High School just west of 46th Street NW. The shop compound includes 3 buildings that provide 4,760 square feet, 2,304 square feet, and 1,800 square feet or 8,864 square feet in total of shop and storage space. Approximately 3,000 square feet of building or 0.52 acres of the site are used to store park equipment, materials, and plantings.

City Hall/Civic Center - this 10.0 acre site is located on Grandview ~~Drive~~ Street adjacent to Grandview Forest Park. The site currently contains City offices, multi-use athletic fields, playground, recreational courts, a skateboard court, a boulder rock climbing wall, and wooded picnic area.

Kenneth Leo Marvin Veteran~~'~~s Memorial Park – the "Westside" park is accessible from 50th ~~Avenue~~ Street. ~~will be~~ This park is a memorial park and includes a dual purpose baseball/soccer field, restrooms~~/~~, picnic shelter, big toy~~, nature trails~~ and veterans monument ~~Memorial~~. Future plans for the park include additional play structures, nature trails and half basketball court.

Eddon Boat Park – with the support of the community and funding raised through a bond levy, the City purchased ~~these parcels~~ the Eddon Boat facility at the intersection of Harborview Drive and Stinson Avenue. The park currently includes a historic boat building ~~dock~~ and small brick house. ~~Once the tideland clean-up is completed,~~ The City plans to provide ~~the open space parcel will be developed for~~ passive recreational water access and to restore the historic boat building and dock ~~will be restored~~ for public access and maritime programming.

Austin Estuary – The estuary and upland tidelands will be preserved in connection with the Donkey Creek Restoration ~~and Harbor History Museum project~~ for passive recreational use. The park is located in the northwest corner of the harbor near the intersection of Harborview Drive and North Harborview Drive.

Cushman Trail – the current trail runs from 14th Avenue NW in the County north to 96th Street. ~~Kimball Drive. In partnership with Pierce County, the City is planning to expand the existing trail to run further north along the power lines to Borgen Boulevard. Trailheads may be developed at the Wilkerson's Farm Park, the Donkey Creek/Sewer Treatment Plant property, Burnham Drive and Borgen Boulevard.~~ City trailhead facilities are located at Hollycroft Street and at Grandview Street. Future plans include expansion of the trail first to Borgen Boulevard (where another trailhead is planned) and then north to the Purdy Spit.

Long term the City and the county would like to develop the trail further so that it connects to the bike lanes of the new Gig Harbor Narrow~~'~~s Bridge and north to the Purdy Spit.

Forecast of Future Needs

The City has adopted a level of service for community parks of 7.1 gross acres of general open space and 1.5 gross acres of active recreational area per 1,000 residents. According to the parks inventory conducted for the Park, Recreation, and Open Space Plan, the City had about 54 acres of public open space (passive recreation) and about 16 acres of active recreation facilities in

2001. Using the 2000 Census population figure, the City met its level of service standards at that time.

Table 12.4. Recreational Facilities and Level of Service

Type of Facility	LOS Standard (Acres/1,000)	2001 Need (Acres)	2001 Actual (Acres)	2022 Need (Acres)	Additional Acreage
Open Space:	7.1	46	53.6	76.7	23.1
Active Recreation:	1.5	9.7	15.8	16.2	0.40
Total:		55.7	69.4	92.9	23.5

Alternative level of service standards, such as those recommended by the National Recreation and Park Association (NRPA) are compared to the City's current service levels in the Park, Recreation, and Open Space Plan. The NRPA standards provide a finer level of measurement for specialized function facilities relative to the population size. This can provide an additional planning tool to ensure that all segments of the community are served according to their needs.

In addition to City-owned facilities, residents of the greater Gig Harbor community have access to facilities owned and operated by others. These include facilities associated with the Peninsula School District schools in and around the City, Pierce County's Peninsula Recreation Center and Randall Street Boat Launch, Tacoma's Madrona Links public golf course, and various private parks, including Canterwood Golf Course, sporting facilities, marinas, and boat landings. According to the Park, Recreation and Open Space Plan, all public and private agencies, and other public and private organizations owned 963.4 acres or about 80.3 acres for every 1,000 persons living within the City and its urban growth area in 2000. Therefore, while the City's level of service standards provides a guide for ensuring a minimum provision of park and recreation land, the actual capacity of all such facilities is significantly higher.

Proposed parks capital facility improvements are listed on Table 12.5

Stormwater System ~~Facilities~~

Existing Facilities

The Puget Sound and in particular Gig Harbor, Henderson Bay, and Wollochet Bay are the receiving water bodies of the City of Gig Harbor's storm system. The storm system consists of catch basins, pipe, drainage ditches, natural streams such as Donkey Creek and McCormick Creek, wetlands, ponds, and stormwater detention and water quality facilities. The Operations and Maintenance Department is responsible for approximately 30 stormwater ponds, 1,650 catch basins, 12 miles of drainage ditches and over 33 miles of storm pipe. Annually these numbers will increase as development continues to occur, CIP projects are constructed and new areas are annexed by the City. With the approximately 45 miles of pipe and drainage ditches discharging to the receiving waters of the Puget Sound, which is habitat to various fish and wildlife such as Chinook, coho, steelhead, bald eagles and herons. It is important to protect and improve the water quality of the various water bodies in the City.

The objective of the City's stormwater operation and maintenance program is to assure that all the elements of the stormwater system are functioning properly to avoid any impacts to the environment and properties. The program includes operation and maintenance of storm systems being performed by many entities, including the City's Public Works Department, homeowners association, and property management companies. Scheduled maintenance tasks and inspections are regularly performed and are essential to the program. Major system problems are avoided when defects are identified and addressed in a timely manner.

~~The City of Gig Harbor is divided into six major drainage basins that drain the urban growth area. These are North/Donkey Creek, Gig Harbor, Bitter/Garr/Wollochet Creek, Gooch/McCormick Creek, Crescent Creek, and the Puget Sound. These basins drain to Gig Harbor, Wollochet Bay, and Henderson Bay. The storm drainage collection and conveyance system consists of typical components such as curb inlets, catch basins, piping ranging from 8-inch to 48-inch, open ditches, natural streams, wetlands, ponds, and stormwater detention and water quality ponds.~~

Level of Service

Through the Clean Water Act and other legislation at the federal level, the Washington State Department of Ecology has been delegated the authority to implement rules and regulations that meet the goals of the Clean Water Act. As part of these rules and regulations, the Department of Ecology issued the Western Washington Phase II Municipal Stormwater Permit (Permit) to the City of Gig Harbor in January 2007. The Permit authorizes the discharge of stormwater to surface waters and to ground waters of the State from Municipal Separate Storm Sewer System (MS4) owned or operated by the City of Gig Harbor. By being identified as a Permittee the City is required to satisfy many obligations during the five-year permit period.

The City has been proactive in satisfying the requirements of this Permit. In 2006, the City prepared a gap analysis comparing the existing City stormwater program to the Permit requirements. According to the gap analysis, public participation, City staff training and stormwater policies appear to be the areas that the City will need to focus their efforts. Other obligations required by the Permit include the development of a stormwater management program and development of an enforceable mechanism, such as an ordinance, controlling runoff from development and construction sites, including adoption of a new stormwater technical manual. The City's stormwater management program along with the City's stormwater-related ordinances establishes a level of service for both public and private development projects.

The Permit requirements are being phased in over the course of the life of the permit. At the end of the permit, or sooner if required by law, the City will likely be issued a new permit with new permit requirements that are additive to the existing permit requirements.

~~The role of federal, state, and local stormwater regulations is to provide minimum standards for the drainage and discharge of stormwater runoff. Specifically, the goal of these regulations is to reduce the damaging effects of increased runoff volumes to the natural environment as the land surface changes and to remove pollutants in the runoff.~~

~~Through the Clean Water Act and other legislation at the federal level, the states have been delegated the authority to implement rules and regulations that meet the goals of this legislation. The states, subsequently, have delegated some of this authority to the local agencies. The local agencies, in turn, enact development regulations to enforce the rules sent down by the state. Therefore, the level of service is represented by the regulations adopted and enforced by the City. The City of Gig Harbor has adopted the 1997 Kitsap County Stormwater Management Design Manual as the City of Gig Harbor Stormwater Management Design Manual. The manual outlines water quantity design criteria, water quality controls, erosion and sediment control practices, and site development.~~

Forecast of Future Needs

In connection with the preparation of the City's Stormwater Comprehensive Plan, storm system modeling was performed at a planning level to identify system needs under future full build-out land use conditions. The City selected seven storm trunklines to be analyzed. These trunklines were selected based on known past conveyance and/or sedimentation problems and possible future system impacts due to development.

Recommended storm system improvements are identified in the Capital Improvement Plan of the Stormwater Comprehensive Plan and to meet the needs of the environment, future development and growth. In March 2008 the City initiated a Stormwater General Facility Charge for funding stormwater CIP projects.

The types of improvements identified and scheduled include capacity, facility and habitat projects. Capacity problems can also be resolved in many ways including increased facility sizing, pipe replacement, and flow control facilities. Onsite or regional facilities can reduce flows to minimize capacity impacts on the existing storm system. Regional facility locations should be considered as an alternative to pipe replacement. Storm system and habitat improvement projects identified in the CIP are based on the Staff's knowledge of the service area, past studies and the hydrologic/hydraulic system analysis.

~~The development of stormwater facilities is largely driven by developer improvements, although the City provides oversight and system upgrades to remedy capacity issues. Proposed storm and surface water capital facility improvements are listed on Table 12.5.~~

CAPITAL FACILITIES PROGRAM

A Capital Facilities Program (CFP) is a six-year plan for capital improvements that are supportive of the City's population and economic base as well as near-term (within six years) growth. Capital facilities are funded through several funding sources which can consist of a combination of local, state and federal tax revenues.

The Capital Facilities Program works in concert generally with the land-use element. In essence, the land use plan establishes the "community vision" while the capital facilities plan provides for the essential resources to attain that vision. An important linkage exists between the capital

facilities plan, land-use and transportation elements of the plan. A variation (change) in one element (i.e. a change in land use or housing density) would significantly affect the other plan elements, particularly the capital facilities plan. It is this dynamic linkage that requires all elements of the plan to be internally consistent. Internal consistency of the plan's elements imparts a degree of control (checks and balances) for the successful implementation of the Comprehensive Plan. This is the concurrence mechanism that makes the plan work as intended.

The first year of the Capital Facilities Program will be converted to the annual capital budget, while the remaining five year program will provide long-term planning. It is important to note that only the expenditures and appropriations in the annual budget are binding financial commitments. Projections for the remaining five years are not binding and the capital projects recommended for future development may be altered or not developed due to cost or changed conditions and circumstances.

Definition of Capital Improvement

The Capital Facilities Element is concerned with needed improvements which are of relatively large scale, are generally non-recurring high cost and which may require financing over several years. The list of improvements is limited to major components in order to analyze development trends and impacts at a level of detail which is both manageable and reasonably accurate.

Smaller scale improvements of less than $25,000 are addressed in the annual budget as they occur over time. For the purposes of capital facility planning, capital improvements are major projects, activities or maintenance, costing over $25,000 and requiring the expenditure of public funds over and above annual operating expenses. They have a useful life of over ten years and result in an addition to the city's fixed assets and/or extend the life of the existing infrastructure. Capital improvements do not include items such as equipment or "rolling stock" or projects, activities or maintenance which cost less than $25,000 or which regularly are not part of capital improvements.

Capital improvements may include the design, engineering, permitting and the environmental analysis of a capital project. Land acquisition, construction, major maintenance, site improvements, energy conservation projects, landscaping, initial furnishings and equipment may also be included.

Capital Facilities Needs Projections

The City Departments of ~~Operations and Engineering~~ Public Works, Planning, Building and Fire Safety, Finance and Administration have identified various capital improvements and projects based upon recent surveys and planning programs authorized by the Gig Harbor City Council. Suggested revenue sources were also considered and compiled.

Currently, ~~six capital facilities~~ five functional plans have been completed:

- City of Gig Harbor Water System ~~Comprehensive~~ Plan ~~– Volumes 1 & 2~~ (April 2009

~~June 2001~~), as may later be amended by ~~ordinance~~ resolution.
- City of Gig Harbor Wastewater Comprehensive Plan (April 2009 ~~February, 2002~~), as may later be amended by ~~ordinance~~ resolution.
- City of Gig Harbor Wastewater Treatment Plan Improvements Engineering Report (April 2003)
- City of Gig Harbor Phase 1 Wastewater Treatment Plan Improvements Technical Memorandum (August 2007)
- City of Gig Harbor Stormwater Comprehensive Plan (April 2009 ~~February, 2001~~), as may later be amended by ~~ordinance~~ resolution.
- ~~City of Gig Harbor Park, Recreation & Open Space Plan (March 2001), as amended by ordinance~~

All the plans identify current system configurations and capacities and proposed financing for improvements, and ~~are adopted by reference as part~~ provide the technical information needed to develop the capital facility project lists for this Comprehensive Plan.

Prioritization of Projected Needs

The identified capital improvement needs listed were developed by the City Community Development Director, Finance Director, and the City Administrator. The following criteria were applied informally in developing the final listing of proposed projects:

Economics
- Potential for Financing
- Impact on Future Operating Budgets
- Benefit to Economy and Tax Base

Service Consideration
- Safety, Health and Welfare
- Environmental Impact
- Effect on Service Quality

Feasibility
- Legal Mandates
- Citizen Support
- 1992 Community Vision Survey

Consistency
- Goals and Objectives in Other Elements
- Linkage to Other Planned Projects
- Plans of Other Jurisdictions

Cost Estimates for Projected Needs

The majority of the cost estimates in this element are presented in ~~2000~~ 2009 dollars and were derived from various federal and state documents, published cost estimates, records of past

expenditures and information from various private contractors.

FUTURE NEEDS AND ALTERNATIVES

The Capital Facility Plan for the City of Gig Harbor is developed based upon the following analysis:

- Current Revenue Sources
- Financial Resources
- Capital Facilities Policies
- Method for Addressing Shortfalls

Current Revenue Sources

The major sources of revenue for the City's major funds are as follows:

Fund	Source	Projected (2009) ~~2004 $~~
General Fund	Sales tax	~~$3,862,000 (60%)~~ 4,744,000
	Utility tax	~~$944,000 (14%)~~ 1,351,000
	Property tax	~~$337,000 (5%)~~ 408,000
Street Fund- Operations	Property tax	~~$1,010,000 (80%)~~ 1,223,000
Water Operating Fund	Customer charges	~~$34,000~~ 906,000
Sewer Operating Fund	Customer charges	~~$1,498,000~~ 2,319,000
Storm Drainage Fund	Customer charges	~~$400,000~~ 645,000

Financial Resources

In order to ensure that the city is using the most effective means of collecting revenue, the city inventoried the various sources of funding currently available. Financial regulations and available mechanisms are subject to change. Additionally, changing market conditions influence the city's choice of financial mechanism. The following list of sources include all major financial resources available and is not limited to those sources which are currently in use or which would be used in the six-year schedule of improvements. The list includes the following categories:

- Debt Financing
- Local Levies
- Local Non-Levy Financing
- State Grants and Loans
- Federal Grants and Loans

Debt Financing Method

Short-Term Borrowing: Utilization of short-term financing through local banks is a means to

finance the high-cost of capital improvements.

Revenue Bonds: Bonds can be financed directly by those benefiting from the capital improvement. Revenue obtained from these bonds is used to finance publicly-owned facilities, such as new or expanded water systems or improvement to the waste water treatment facility. The debt is retired using charges collected from the users of these facilities. In this respect, the capital project is self supporting. Interest rates tend to be higher than for general obligation bonds and the issuance of the bonds may be approved by voter referendum.

General Obligation Bonds: These are bonds which are backed by the full faith and credit of the city ~~value of the property within the jurisdiction~~. Voter-approved bonds increase property tax rate and dedicate the increased revenue to repay bondholders. Councilmanic bonds do not increase taxes and are repaid with general revenues. Revenue may be used for new capital facilities or maintenance and operations at an existing facility. ~~Revenue may be used for new capital facilities or the maintenance and operations at existing facilities.~~ These bonds should be used for projects that benefit the City as a whole.

Local Multi-Purpose Levies

Ad Valorem Property Taxes: The tax rate is in mills (1/10 cent per dollar of taxable value). The maximum rate is ~~$3.60~~ 1.60 per $1,000 assessed valuation. In ~~2004~~ 2009, the City's tax rate is ~~$1.4522~~ 0.9406 per $1,000 assessed valuation. The City is prohibited from raising its levy more than one percent ~~or the rate of inflation, whichever is lower~~. A temporary or permanent excess levy may be assessed with voter approval. Revenue may be used for new capital facilities or maintenance and operation of existing facilities.

Business and Occupation (B and O) Tax: This is a tax of no more that 0.2% of the gross value of business activity on the gross or net income of a business. Assessment increases require voter approval. The City does not currently use a B and O tax. Revenue may be used for new capital facilities or maintenance and operation of existing facilities.

Local Option Sales Tax: The city has levied the maximum of tax of 1%. ~~Local governments that levy the second 0.5% may participate in a sales tax equalization fund. Assessment of this option requires voter approval.~~ Revenue may be used for new capital facilities or maintenance and operation of existing facilities.

Utility Tax: This is a tax on the gross receipts of electric, gas, telephone, cable TV, water/sewer, and stormwater utilities. Local discretion up to 6% of gross receipts with voter approval required for an increase above this maximum. Revenue may be used for new capital facilities or maintenance and operation of existing facilities. The city currently levies a 5% utility tax.

Real Estate Excise Tax: ~~The original 1/2% was authorized as an option to the sales tax for general purposes. An additional 1/4% was authorized for capital facilities, and the Growth Management Act authorized another 1/4% for capital facilities. Revenues must be used solely to finance new capital facilities or maintenance and operations at existing facilities, as specified in~~

~~the plan. An additional option is available under RCW 82.46.070 for the acquisition and maintenance of conservation areas if approved by a majority of voters of the county.~~ The real estate excise tax is levied on all sales of real estate, measured by the full selling price. In addition to the state rate of 1.28 percent, a locally-imposed tax is also authorized. The city may levy a quarter percent tax and additional quarter percent tax. These funds may only be used to finance eligible capital facilities.

Local Single-Purpose Levies

~~Emergency Medical Services Tax: Property tax levy of up to $.50 per $1,000 of assessed value for emergency medical services. Revenue may be used for new capital facilities or operation and maintenance of existing ones.~~

Motor Vehicle Fuel Tax – "Gas Tax": ~~Tax is paid by gasoline distributors. Cities receive about 10.7 percent of motor vehicle fuel tax receipts. State shared revenue is distributed by the Department of Licensing. Revenues must be spent for streets, construction, maintenance or operation, the policing of local streets, or related activities.~~
The state currently levies a tax of 37.5 cents per gallon on motor vehicle fuel under RCW 82.36.025(1) through (6) and on special fuel (diesel) under RCW 82.38.030(1) through (6). Cities receive 10.6961 percent of the 23 cents per gallon tax levied under RCW 82.36.025(1). These funds are distributed monthly on a per capita basis and are to be placed in a city street fund to be spent for street construction, maintenance or repair.

Local Option Motor Vehicle Fuel Excise Tax: ~~A county-wide voter-approved tax equivalent to 10% of statewide Motor Vehicle fuel tax and a special fuel tax of 2.3 cents per gallon. Revenue is distributed to the city on a weighted per capita basis. Revenues must be spent for city streets, construction, maintenance, operation policing of local streets or related activities.~~ Upon a vote of the people, a local option gas tax can be levied countywide at a rate equal to 10 percent of the state rate. Since the state rate is 37.5 cents per gallon, 10 percent currently would be 3.75 cents per gallon. The tax may be implemented only on the first day of January, April, July, or October and expenditure of these funds is limited solely to transportation purposes.

Local Option Commercial Parking Tax
This tax may be levied by a city within its boundaries and by a county in the unincorporated areas. There is no limit on the tax rate and many ways of assessing the tax are allowed. If the city chooses to levy it on parking businesses, it can tax gross proceeds or charge a fixed fee per stall. If the tax is assessed on the driver of a car, the tax rate can be a flat fee or a percentage amount. Rates can vary by any reasonable factor, including location of the facility, time of entry and exit, duration of parking, and type or use of vehicle. The parking business operator is responsible for collecting the tax and remitting it to the city, which must administer it. This tax is subject to a voter referendum. At the present time, Bainbridge Island, Bremerton, Mukilteo, SeaTac, and Tukwila are the only cities that we know are levying this tax. Expenditure of these funds is limited solely to transportation purposes.

Transportation Benefit Districts

Cities, along with counties, may form transportation benefit districts to acquire, construct, improve, provide, and fund transportation improvements in the district that is consistent with any existing state, regional, and local transportation plans and necessitated by existing or reasonably foreseeable congestion levels. The area may include other cities and counties, as well as port and transit districts through interlocal agreements.

Any city passing on ordinance to form a transportation benefit district must also identify revenue options for financing improvements in the district. A district that has coterminous boundaries with a city may levy a $20 per vehicle license fee or impose transportation impact fees on commercial or industrial buildings, both without voter approval. A credit must be provided for any transportation impact fee on commercial or industrial buildings that the city has already imposed. Similarly, any district that imposes a fee that, in combination with another district's fee, totals more than $20, must provide a credit for the previously levied fee.

Voter-approved revenue options include a license fee of up to $100 per vehicle and a 0.2 percent sales tax. Like many other special districts, transportation benefit districts may levy a one-year O&M levy under RCW 84.52.052 and do an excess levy for capital purposes under RCW 85.52.056. The funds must be spent on transportation improvements as set forth in the district's plan.

Local Non-Levy Financing Mechanisms

Reserve Funds: Revenue that is accumulated in advance and earmarked for capital improvements. Sources of the funds can be surplus revenues, funds in depreciation revenues, or funds resulting from the sale of capital assets.

Fines, Forfeitures and Charges for Services: This includes various administrative fees and user charges for services and facilities operated by the jurisdiction. Examples are franchise fees, sales of public documents, property appraisal fees, fines, forfeitures, licenses, permits, income received as interest from various funds, sale of public property, rental income and private contributions to the jurisdiction. Revenue from these sources may be restricted in use.

User and Program Fees: These are fees or charges for using park and recreational facilities, sewer services, water services and surface drainage facilities. Fees may be based on a measure of usage on a flat rate or on design features. Revenues may be used for new capital facilities or maintenance and operation of existing facilities.

Street Utility Charges: A fee of up to 50% of actual costs of street construction, maintenance and operations may be charged to households. Owners or occupants of residential property are charged a fee per household that cannot exceed ~~$6.00~~ $2.00 per month. ~~The tax requires local referendum.~~ The fee charged to businesses is based on the number of employees and cannot exceed $2.00 per employee per month. Both businesses and households must be charged. Revenue may be used for activities such as street lighting, traffic control devices, sidewalks, curbs, gutters, parking facilities and drainage facilities.

Special Assessment District: Special assessment districts are created to service entities completely or partially outside of the jurisdiction. Special assessments are levied against those who directly benefit from the new service or facility. The districts include Local Improvement Districts, Road Improvement Districts, Utility Improvement Districts and the collection of development fees. Funds must be used solely to finance the purpose for which the special assessment district was created.

Impact Fees: Impact fees are paid by new development based upon the development's impact to the delivery of services. Impact fees must be used for capital facilities needed by growth and not to correct current deficiencies in levels of service nor for operating expenses. These fees must be equitably allocated to the specific entities which will directly benefit from the capital improvement and the assessment levied must fairly reflect the true costs of these improvements. Impact fees may be imposed for public streets, parks, open space, recreational facilities, and school facilities.

State Grants and Loans

Public Works Trust Fund: Low interest loans to finance capital facility construction, public works emergency planning, and capital improvement planning. To apply for the loans the city must have a capital facilities plan in place and must be levying the original 1/4% real estate excise tax. Funds are distributed by the Department of Community Development. Loans for construction projects require matching funds generated only from local revenues or state shared entitlement revenues. ~~Public works emergency planning loans are at 5% interest rate, and capital improvement planning loans are no interest loans, with a 25% match.~~ Revenue may be used to finance new capital facilities, or maintenance and operations at existing facilities.

State Parks and Recreation Commission Grants: Grants for parks capital facilities acquisition and construction. They are distributed by the Parks and Recreation Commission to applicants with a 50% match requirement.

~~Arterial Improvement Program: AIP provides funds to improve mobility and safety. Funds are administered by the Transportation Improvement Board.~~

Urban Transportation Improvement Programs: The State Transportation Improvement Board offers three grant programs to cities exceeding a population of 5,000 : Urban Arterial Program for roadway projects which improve safety and mobility; Urban Corridor Program, for roadway projects that expand capacity; and, Sidewalk Program for sidewalk projects that improve safety and connectivity.

~~Transportation Partnership Program: TPP provides grants for mobility improvements.~~

~~Intermodal Surface Transportation Efficiency Act (ISTEA): ISTEA provides grants to public agencies for historic preservation, recreation, beautification, and environmental protection projects related to transportation facilities. These enhancement grants are administered by the~~

~~state Department of Transportation and regional transportation planning organizations (RTPOs).~~

Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) SAFETEA-LU represents the largest surface transportation investment in our Nation's history with guaranteed funding for highways, highway safety, and public transportation totaling $244.1 billion. SAFETEA-LU supplies funds for investments needed to maintain and grow vital transportation infrastructure.

~~Transportation Improvement Account: Revenue available for projects to alleviate and prevent traffic congestion caused by economic development or growth. Entitlement funds are distributed by the State Transportation Improvement Board with a 20% local match requirement. For cities with a population of less than 500 the entitlement requires only a 5% local match. Revenue may be used for capital facility projects that are multi-modal and involve more than one agency.~~

Centennial Clean Water Fund: Grants and loans for the design, acquisition, construction, and improvement of Water Pollution Control Facilities, and related activities to meet state and federal water pollution control requirements. Grants and loans distributed by the Department of Ecology with a 75%-25% matching share. Use of funds is limited to planning, design, and construction of Water Pollution Control Facilities, stormwater management, ground water protection, and related projects.

Water Pollution Control State Revolving Fund: Low interest loans and loan guarantees for water pollution control projects. Loans are distributed by the Department of Ecology. The applicant must show water quality need, have a facility plan for treatment works, and show a dedicated source of funding for repayment.

Federal Grants and Loans

Department of Health Water Systems Support: Grants for upgrading existing water systems, ensuring effective management, and achieving maximum conservation of safe drinking water. Grants are distributed by the state Department of Health through intergovernmental review and with a 60% local match requirement.

Capital Facility Strategies

In order to realistically project available revenues and expected expenditures on capital facilities, the city must consider all current policies that influence decisions about the funding mechanisms as well as policies affecting the city's obligation for public facilities. The most relevant of these are described below. These policies, along with the goals and policies articulated in the other elements were the basis for the development of various funding scenarios.

Mechanisms to Provide Capital Facilities

Increase Local Government Appropriations: The city will investigate the impact of increasing current taxing rates, and will actively seek new revenue sources. In addition, on an annual basis,

the city will review the implications of the current tax system as a whole.

Use of Uncommitted Resources: The city has developed and adopted its Six-Year capital improvement schedules. With the exception of sewer facilities, however, projects have been identified on the 20-year project lists with uncommitted or unsecured resources.

Analysis of Debt Capacity: Generally, Washington state law permits a city to ensure a general obligation bonded debt equal to 3/4 of 1% of its property valuation without voter approval. By a 60% majority vote of its citizens, a city may assume an additional general obligation bonded debt of 1.7570%, bringing the total for general purposes up to 2.5% of the value of taxable property. The value of taxable property is defined by law as being equal to 100% of the value of assessed valuation. For the purpose of applying municipally-owned electric, water, or sewer service and with voter approval, a city may incur another general obligation bonded debt equal to 2.5% of the value of taxable property. With voter approval, cities may also incur an additional general obligation bonded debt equal to 2.5% of the value of taxable property for parks and open space. Thus, under state law, the maximum general obligation bonded debt which the city may incur cannot exceed 7.5% of the assessed property valuation.

Municipal revenue bonds are not subject to a limitation on the maximum amount of debt which can be incurred. These bonds have no effect on the city's tax revenues because they are repaid from revenues derived from the sale of service.

The City of Gig Harbor has used general obligation bonds and municipal revenue bonds very infrequently. Therefore, under state debt limitation, it has ample debt capacity to issue bonds for new capital improvement projects. ~~However, the city does not currently have policies in place regarding the acceptable level of debt and how that debt will be measured. The city believes that further guidelines, beyond the state statutory limits on debt capacity, are needed to ensure effective use of debt financing. The city intends to develop such guidelines in the coming year. When the city is prepared to use debt financing more extensively, it will rely on these policies, the proposed method of repayment, and the market conditions at that time to determine the appropriateness of issuing bonds.~~

User Charges and Connection Fees: User charges are designed to recoup the costs of public facilities or services by charging those who benefit from such services. As a tool for affecting the pace and pattern of development, user fees may be designed to vary for the quantity and location of the service provided. Thus, charges could be greater for providing services further distances from urban areas.

Mandatory Dedications or Fees in Lieu of: The jurisdiction may require, as a condition of plat approval, that subdivision developers dedicate a certain portion of the land in the development to be used for public purposes, such as roads, parks, or schools. Dedication may be made to the local government or to a private group. When a subdivision is too small or because of topographical conditions a land dedication cannot reasonably be required, the jurisdiction may require the developer to pay an equivalent fee in lieu of dedication.

The provision of public services through subdivision dedications not only makes it more feasible to service the subdivision, but may make it more feasible to provide public facilities and services to adjacent areas. This tool may be used to direct growth into certain areas.

Negotiated Agreement: An agreement whereby a developer studies the impact of development and proposes mitigation for the city's approval. These agreements rely on the expertise of the developer to assess the impacts and costs of development. Such agreements are enforceable by the jurisdiction. The negotiated agreement will require lower administrative and enforcement costs than impact fees.

Impact Fees: Impact fees may be used to affect the location and timing of infill development. Infill development usually occurs in areas with excess capacity of capital facilities. If the local government chooses not to recoup the costs of capital facilities in underutilized service areas then infill development may be encouraged by the absence of impact fees on development(s) proposed within such service areas. Impact fees may be particularly useful for a small community which is facing rapid growth and whose new residents desire a higher level of service than the community has traditionally fostered and expected.

Obligation to Provide Capital Facilities

Coordination with Other Public Service Providers: Local goals and policies as described in the other comprehensive plan elements are used to guide the location and timing of development. However, many local decisions are influenced by state agencies and utilities that provide public facilities within the Urban Growth Area and the City of Gig Harbor. The planned capacity of public facilities operated by other jurisdictions must be considered when making development decisions. Coordination with other entities is essential not only for the location and timing of public services, but also in the financing of such services.

The city's plan for working with the natural gas, electric, and telecommunication providers is detailed in the Utilities Element. This plan includes policies for sharing information and a procedure for negotiating agreement for provision of new services in a timely manner.

Other public service providers such as school districts and private water providers are not addressed in the Utilities Element. However, the city's policy is to exchange information with these entities and to provide them with the assistance they need to ensure that public services are available and that the quality of the service is maintained.

Level of Service Standards: Level of service standards are an indicator of the extent or quality of service provided by a facility that are related to the operational characteristics of the facility. They are a summary of existing or desired public service conditions. The process of establishing level of service standards requires the city to make quality of service decisions explicit. The types of public services for which the city has adopted level of service standards will be improved to accommodate the impacts of development and maintain existing service in a timely manner with new development.

Level of service standards will influence the timing and location of development, by clarifying which locations have excess capacity that may easily support new development, and by delaying new development until it is feasible to provide the needed public facilities. In addition, to avoid over-extending public facilities, the provision of public services may be phased over time to ensure that new development and projected public revenues keep pace with public planning. The city has adopted level of service standards for six public services. These standards are to be identified in Section V of this element.

Urban Growth Area Boundaries: The Urban Growth Area Boundary was selected in order to ensure that urban services will be available to all development. The location of the boundary was based on the following: environmental constraints, the concentrations of existing development, the existing infrastructure and services, and the location of prime agricultural lands. New and existing development requiring urban services will be located in the Urban Growth Area. Central sewer and water, drainage facilities, utilities, telecommunication lines, and local roads will be extended to development in these areas. The city is committed to serving development within this boundary at adopted level of service standards. Therefore, prior to approval of new development within the Urban Growth Area the city should review the six-year Capital Facilities Program and the plan in this element to ensure the financial resources exist to provide the services to support such new development.

Methods for Addressing Shortfalls

The city has identified options available for addressing shortfalls and how these options will be exercised. The city evaluates capital facility projects on an individual basis rather than a system-wide basis. This method involves lower administrative costs and can be employed in a timely manner. However, this method will not maximize the capital available for the system as a whole. In deciding how to address a particular shortfall the city will balance the equity and efficiency considerations associated with each of these options. When evaluation of a project identifies shortfall, the following options would be available:

- Increase revenue
- Decrease level of service
- Decrease the cost of a facility
- Decrease the demand for the public service or facility
- Reassess the land use assumptions in the Comprehensive Plan

SIX-YEAR CAPITAL FACILITY PLAN

In addition to the direct costs for capital improvements, this section analyzes cost for additional personnel and routine operation and maintenance activities. Although the capital facilities program does not include operating and maintenance costs, and such an analysis is not required under the Growth Management Act, it is an important part of the long-term financial planning. The six-year capital facilities program for the City of Gig Harbor was based upon the following analysis:

- Financial Assumptions
- Projected Revenues
- Projected Expenditures
- ~~Operating Expenses~~
- Future Needs

Financial Assumptions

The following assumptions about the future operating conditions in the city operations and market conditions were used in the development of the six-year capital facilities program:

1. The city will maintain its current fund accounting system to handle its financial affairs.

2. The cost of running local government will continue to increase due to inflation and other growth factors while revenues will also increase.

3. New revenue sources, including new taxes, may be necessary to maintain and improve city services and facilities.

4. Capital investment will be needed to maintain, repair and rehabilitate portions of the city's aging infrastructure and to accommodate growth anticipated over the next twenty years.

5. Public investment in capital facilities is the primary tool of local government to support and encourage economic growth.

6. A consistent and reliable revenue source to fund necessary capital expenditures is desirable.
7. A comprehensive approach to review, consider, and evaluate capital funding requests is needed to aid decision makers and the citizenry in understanding the capital needs of the city.

Capital improvements will be financed through the following funds:

- General Fund
- Capital Improvement Fund
- Transportation Improvement Fund
- Enterprise Funds

Projected Revenues

Tax Base

The City's tax base is projected to increase at a rate of ~~6%~~ 2% in 2010 and 1-2% in 2011 for the

adjusted taxable value of the property, including new construction. The City's assessment ratio is projected to remain constant at 100%. Although this is important to the overall fiscal health of the city, capital improvements are funded primarily through non-tax resources.

Revenue by Fund

General Fund: The General Fund is the basic operating fund for the city. ~~Ad valorem tax yields were projected using the current tax rate and the projected 10% annual rate of growth for the adjusted taxable value of the property.~~ The General Fund is allocated ~~a~~ 25 percent of the annual tax yield from ad valorem property values. Since 2000, the average annual increase in tax levy was 6%. This was mostly due to new construction and annexations as regular growth in property tax levy is limited to 1 percent a year. The city is projecting a 1 to 2 percent increase in tax base for 2010 and 2011 due to the current economy. The City has a maximum rate of $1.60 per $1,000 ad valorem. The actually rate collected by the city has fallen from $1.58 in 1999 to $0.9293 in 2010 (est.)

Capital Improvement Funds: In the City of Gig Harbor, the Capital Improvement Funds accounts for the proceeds of the first and second quarter percent of the locally-imposed real estate excise tax. Permitted uses are defined as "public works projects for planning, acquisition, construction, reconstruction, repair, replacement, rehabilitation or improvements of streets, roads, highways, sidewalks street and road lighting systems, traffic signals, bridges, domestic water systems, storm and sanitary sewer systems, and planning, acquisition, construction, reconstruction, repair, replacement, rehabilitation or improvements of parks. These revenues are committed to annual debt service and expenditures from this account are expected to remain constant ~~through the year 2000~~, based upon the existing debt structure. The revenues in these funds represent continued capture of a dedicated portion of the ad valorem revenues necessary to meet annual debt service obligations on outstanding general obligation bonds. In 2018, the City is scheduled to repay the 2008 LTGO Bonds.

~~**Transportation Improvement**~~ **Street and Street Capital Funds:** Expenditures from ~~this account~~ these funds include direct annual outlays for capital improvement projects ~~and debt service for revenue bonds~~. The revenues in this fund represent total receipts from state and local gas taxes and 75% of property taxes collected. The ~~projection estimates~~ projected revenues are based upon state projections for gasoline consumption, current state gas tax revenue sharing and continued utilization of local option gas taxes at current levels. This fund also includes state and federal grant monies dedicated to transportation improvements.

Enterprise Funds: The revenue in ~~this fund is~~ these funds are used for the annual capital and operating expenditures for services that are operated and financed similar to private business enterprises. The projected revenues depend upon the income from user charges, connection fees, bond issues, state or federal grants and carry-over reserves.

~~Operation and Maintenance Costs~~

~~In addition to the direct costs of providing new capital facilities, the city will also incur increases~~

~~in annual operating and maintenance costs. These are recurring expenses associated with routine operation of capital facilities. The anticipated increase in annual operating and maintenance costs associated with the new capital improvements and operation costs will initiate in the year following completion of the capital improvement~~

~~Operating costs are estimated by dividing the 1993 year expenditures for operation or maintenance by the number of units of output. This rate per unit of output is then used to calculate the estimated costs for operating and maintenance attributed to new capital improvements. The city has attempted to make various adjustments to the type and location of land use as well as adjustments in the timing and funding sources for financing capital improvements. The plan contained in this element represents a realistic projection of the city's funding capabilities and ensures that public services will be maintained at acceptable levels of service.~~

GOALS AND POLICIES

GOALS

GOAL 12.1. PROVIDE NEEDED PUBLIC FACILITIES TO ALL OF THE CITY RESIDENTS IN A MANNER WHICH PROTECTS INVESTMENTS IN EXISTING FACILITIES, WHICH MAXIMIZES THE USE OF EXISTING FACILITIES AND WHICH PROMOTE ORDERLY AND HIGH QUALITY URBAN GROWTH.

GOAL 12.2. PROVIDE CAPITAL IMPROVEMENT TO CORRECT EXISTING DEFICIENCIES, TO REPLACE WORN OUT OR OBSOLETE FACILITIES AND TO ACCOMMODATE FUTURE GROWTH, AS INDICATED IN THE SIX-YEAR SCHEDULE OF IMPROVEMENTS.

GOAL 12.3. FUTURE DEVELOPMENT SHOULD BEAR ITS FAIR-SHARE OF FACILITY IMPROVEMENT COSTS NECESSITATED BY DEVELOPMENT IN ORDER TO ACHIEVE AND MAINTAIN THE CITY'S ADOPTED LEVEL OF STANDARDS AND MEASURABLE OBJECTIVES.

GOAL 12.4. THE CITY SHOULD MANAGE ITS FISCAL RESOURCES TO SUPPORT THE PROVISION OF NEEDED CAPITAL IMPROVEMENTS FOR ALL DEVELOPMENTS.

GOAL 12.5. THE CITY SHOULD COORDINATE LAND USE DECISIONS AND FINANCIAL RESOURCES WITH A SCHEDULE OF CAPITAL IMPROVEMENTS TO MEET ADOPTED LEVEL OF SERVICE STANDARDS, MEASURABLE OBJECTIVES AND PROVIDE EXISTING FUTURE FACILITY NEEDS.

GOAL 12.6. THE CITY SHOULD PLAN FOR THE PROVISION OR EXTENSION OF CAPITAL FACILITIES IN SHORELINE MANAGEMENT AREAS, CONSISTENT WITH THE GOALS, POLICIES AND OBJECTIVES OF THE CITY OF GIG HARBOR SHORELINE MASTER PROGRAM.

POLICIES

12.1.1. Capital improvement projects identified for implementation and costing more than $25,000 shall be included in the Six Year Schedule of Improvement of this element. Capital improvements costing less than $25,000 should be reviewed for inclusion in the six-year capital improvement program and the annual capital budget.

12.1.2. Proposed capital improvement projects shall be evaluated and prioritized using the following guidelines as to whether the proposed action would:

a. Be needed to correct existing deficiencies, replace needed facilities or to provide facilities required for future growth;

b. Contribute to lessening or eliminating a public hazard;

c. Contribute to minimizing or eliminating any existing condition of public facility capacity deficits;

d. Be financially feasible;

e. Conform with future land uses and needs based upon projected growth;

f. Generate public facility demands that exceed capacity increase in the six-year schedule of improvements;

g. Have a detrimental impact on the local budget.

12.1.3. The City sewer and water connection fee revenues shall be allocated to capital improvements related to expansion of these facilities.

12.1.4. The City identifies its sanitary sewer service area to be the same as the urban growth area. Modifications to the urban growth boundary will constitute changes to the sewer service area.

12.1.5. Appropriate funding mechanisms for development's fair-share contribution toward other public facility improvements, such as transportation, parks/recreation, storm drainage, will be considered for implementation as these are developed by the City.

12.1.6. The City shall continue to adopt annual capital budget and six-year capital improvement program as part of its annual budgeting process.

12.1.7. Every reasonable effort shall be made to secure grants or private funds as available to finance the provision of capital improvements.

12.1.8. Fiscal policies to direct expenditures for capital improvements will be consistent with other Comprehensive Plan elements.

12.1.9. The City and/ or developers of property within the City shall provide for the availability of public services needed to support development concurrent with the impacts of such development subsequent to the adoption of the Comprehensive Plan. These facilities shall meet the adopted level of service standards.

12.1.10. The City will support and encourage joint development and use of cultural and community facilities with other governmental or community organizations in areas of mutual concern and benefit.

12.1.11. The City will emphasize capital improvement projects which promote the conservation, preservation or revitalization of commercial and residential areas within the downtown business area and along the shoreline area of Gig Harbor, landward of Harborview Drive and North Harborview Drive.

12.1.12. If probable funding falls short of meeting the identified needs of this plan, the City will review and update the plan, as needed. The City will reassess improvement needs, priorities, level of service standards, revenue sources and the Land Use Element.

LEVEL OF SERVICE STANDARDS

The following Level of Service Standards (LOS) shall be utilized by the City in evaluating the impacts of new development or redevelopment upon public facility provisions:

1. Community Parks:
   7.1 gross acres of general open space per 1,000 population.
   1.5 gross acres of active recreational area per 1,000 population.
2. Transportation/Circulation:
   Transportation Level of Service standards are addressed in the Transportation Element.
3. Sanitary Sewer:
   Sanitary sewer level of service standards are addressed in the ~~City of Gig Harbor Wastewater Comprehensive Plan~~ Wastewater System "Inventory and Analysis" section of this Chapter.
4. Potable Water:
   Potable water level of service standards are addressed in the ~~City of Gig Harbor Water System Comprehensive Plan~~ Water System "Inventory and Analysis" section of this Chapter.

Six Year Capital Improvement Program

PLAN IMPLEMENTATION AND MONITORING

Implementation

The six-year schedule of improvements shall be the mechanism the City will use to base its timing, location, projected cost and revenue sources for the capital improvements identified for implementation in the other comprehensive plan elements.

Monitoring and Evaluation

Monitoring and evaluation are essential to ensuring the effectiveness of the Capital Facilities Plan element. This element will be reviewed annually and amended to verify that fiscal resources are available to provide public facilities needed to support LOS standards and plan objectives. The annual review will include an examination of the following considerations in order to determine their continued appropriateness:

a. Any corrections, updates and modifications concerning costs, revenue sources, acceptance of facilities pursuant to dedication which are consistent with this element, or to the date of construction of any facility enumerated in this element;
b. The Capital Facilities Element's continued consistency with the other element of the plan and its support of the land use element;
c. The priority assignment of existing public facility deficiencies;
d. The City's progress in meeting needs determined to be existing deficiencies;
e. The criteria used to evaluate capital improvement projects in order to ensure that projects are being ranked in their appropriate order or level of priority;
f. The City's effectiveness in maintaining the adopted LOS standard and objectives achieved;
g. The City's effectiveness in reviewing the impacts of plans of other state agencies that provide public facilities within the City's jurisdiction;
h. The effectiveness of impact fees or fees assessed new development for improvement costs;
i. Efforts made to secure grants or private funds, as available, to finance new capital improvements;
j. The criteria used to evaluate proposed plan amendments and requests for new development or redevelopment;
k. Capital improvements needed for the latter part of the planning period for updating the six-year schedule of improvements;
j. Concurrency status.

Table 12.5 Capital Facilities Projects

Wastewater System Projects

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Sources
~~6-Year Wastewater Capital Improvement Projects*~~					
Wastewater Treatment System					
~~1~~	~~Outfall Onshore Construction Phase I~~	~~2008~~	~~$574,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
T1~~2~~	Outfall Construction Marine Portion (Bogue View Park to Colvos Passage)~~Phase II From GH Bay out to Puget Sound~~	2010~~11~~	$8,791,~~000,~~000	6-year	PWTF/ SRF/ revenue bonds /Connection Fees/~~Sewer~~ Utility Rates
T2~~3~~	WWTP Expansion Phase I	2010~~09~~	$7,000,000 ~~10,000,000~~	6-year	PWTF/ SRF/ revenue bonds /Connection Fees/~~Sewer~~ Utility Rates
T3~~4~~	WWTP Expansion Phase II	2011-2012	$8,210,000~~6,000,000~~	6-year	PWTF/ SRF/ revenue bonds /Connection Fees/~~Sewer~~ Utility Rates
T4	Reuse and Reclamation Studies ($100,000/yr)	2009-2014	$500,000	6-year	Connection Fees/Utility Rates
T5	Annual Replacement, Rehabilitation and Renewal	2009-2014	$610,000	6-year	Connection Fees/Utility Rates
~~5~~	~~Lift Station 4 Replacement~~	~~2008-2011~~	~~$1,250,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
~~6~~	~~N. Harborview Sewer~~	~~2010~~	~~$1,000,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
~~7~~	~~Harborview Main Sewer Upsize/Replacement~~	~~2009~~	~~$1,000,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
~~8~~	~~Odor Control~~	~~2008-2012~~	~~$250,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
~~9~~	~~Reid Drive Lift Station Replace~~	~~2009~~	~~$1,250,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
T6~~10~~	Annual Water Quality Reporting	~~2008-2012~~ 2009-2014	$400,000	6-year	PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates
~~11~~	~~Annual Sewer Flow Metering Program~~	~~2008-2012~~	~~$1,250,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
~~12~~	~~WWTP Centrifuge~~	~~2008~~	~~$400,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
~~13~~	~~Lift Station MCC Upgrades~~	~~2008-2012~~	~~$2,500,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Sources
~~14~~	~~Comprehensive Plan Completion~~	~~2008~~	~~$75,000~~	~~6-year~~	~~PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates~~
~~15~~	~~Spadoni Gravel Pit and adjacent property north of 96th street between SR-16 and Burnham Drive for Reclamation Purposes~~	~~2010~~	~~$1,700,000~~	~~6-year~~	~~State and Federal Transportation Funding/Grant~~
	Wastewater Treatment Subtotal		**$25,511,000** **~~35,649,000~~**		
Wastewater Collection ~~or~~ System ~~Expansions~~					
~~C1~~	~~West Side of Hwy 16 from Tacoma community College to Rosedale Street~~	~~2012~~	~~$2,977,000~~	~~6-year~~	~~Developer-funded~~
~~C2~~	~~Gig Harbor North (West Side)~~	~~2010~~	~~$2,535,000~~	~~6-year~~	~~Developer-funded~~
~~C3~~	~~Sehmel Drive~~	~~2013~~	~~$1,949,000~~	~~6-year~~	~~Developer-funded~~
~~C4~~	~~Purdy Drive from Hwy 16 to Peninsula High School~~	~~2013~~	~~$4,504,000~~	~~6-year~~	~~Developer-funded~~
~~C5~~	~~Hunt & Skansie Drainage Basin~~	~~2009~~	~~$10,145,000~~	~~6-year~~	~~Developer-funded~~
C1	Lift Station 1 Improvements (Crescent Creek Park)	2013	$130,000	6-year	Connection Fees/Utility Rates
C2	Lift Station 3A Jockey Pump Replacement (Harborview Dr./N. Harborview Dr.)	2014	$156,000	6-year	Connection Fees/Utility Rates
C3	Lift Station 4 Improvements (Harborview Dr./Rosedale St.)	2010-2013	$2,595,100	6-year	Connection Fees/Utility Rates
C4	Lift Station 5 Improvements (Harborview Ferry Landing)	2013	$130,000	6-year	Connection Fees/Utility Rates
C5	Lift Station 6 Improvements (Ryan St./Cascade Ave)	2009-2010	$700,000	6-year	Connection Fees/Utility Rates
C6	Lift Station 7 Improvements (Ried Dr./Hollycroft St.)	2010	$203,000	6-year	Connection Fees/Utility Rates
C7	Lift Station 8 Improvements (Harbor Country Dr.)	2012-2013	$532,800	6-year	Connection Fees/Utility Rates
C8	Lift Station 9 Improvements (50th St./Reid Dr.)	2013	$127,000	6-year	Connection Fees/Utility Rates
C9	Lift Station 11 Improvements (38th Ave./48th St.)	2014	$139,000	6-year	Connection Fees/Utility Rates
C10	Lift Station 12 Improvements (Woodhill Dr./Burnham Dr.)	2012-2013	$1,502,500	6-year	Connection Fees/Utility Rates
C11	Lift Station 13 Improvements (Purdy Dr/SR-302)	2012-2013	$400,900	6-year	Connection Fees/Utility Rates
C12	Install Flow Meter at LS1	2010	$29,000	6-year	Connection Fees/Utility Rates
C13	Install Flow Meter at LS2	2011	$31,000	6-year	Connection Fees/Utility Rates
C14	Install Flow Meter at LS3A	2014	$38,000	6-year	Connection Fees/Utility Rates
C15	Install Flow Meter at LS4	2011	$31,000	6-year	Connection Fees/Utility Rates
C16	Install Flow Meter at LS5	2013	$36,000	6-year	Connection Fees/Utility Rates

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Sources
C17	Install Flow Meter at LS6	2010	$29,000	6-year	Connection Fees/Utility Rates
C18	Install Flow Meter at LS7	2010	$29,000	6-year	Connection Fees/Utility Rates
C19	Install Flow Meter at LS8	2013	$36,000	6-year	Connection Fees/Utility Rates
C20	Install Flow Meter at LS9	2013	$36,000	6-year	Connection Fees/Utility Rates
C21	Install Flow Meter at LS10	2011	$31,000	6-year	Connection Fees/Utility Rates
C22	Install Flow Meter at LS11	2014	$38,000	6-year	Connection Fees/Utility Rates
C23	Install Flow Meter at LS12	2010	$29,000	6-year	Connection Fees/Utility Rates
C24	Install Flow Meter at LS13	2014	$38,000	6-year	Connection Fees/Utility Rates
C25	Install Flow Meter at LS14	2013	$36,000	6-year	Connection Fees/Utility Rates
C26	Install Flow Meter at LS5	2013	$36,000	6-year	Connection Fees/Utility Rates
C27	Install Future Lift Station 10A (56th St./36th Ave.) and Forcemain	2010	$1,206,000	6-year	Developer Funded
C28	Install Future Lift Station 17A (Skansie Ave./90th St.) and Forcemain	2011	$1,581,000	6-year	Developer Funded
C29	Install Future Lift Station 21A (Hunt St/Skansie Ave.) and Forcemain	2010	$1,518,000	6-year	Developer Funded
C30	Wastewater Comprehensive Plan	2014	225,100	6-year	Connection Fees/Utility Rates
-	~~**Subtotal**~~		~~**$22,110,000**~~		
		~~**Gravity Sewer Replacements**~~			
~~E1~~	~~Harborview Drive from WWTP to Rosedale~~	~~2012~~	~~$2,137,000~~	~~6-year~~	~~Capital reserves~~
~~E2~~	~~Rosedale Street from Hwy 16 to Shirley Avenue~~	~~2010~~	~~$1,193,000~~	~~6-year~~	~~Capital reserves~~
~~E3~~	~~Harborview Drive from Rosedale to Soundview~~	~~2010~~	~~$808,000~~	~~6-year~~	~~Capital reserves~~
~~E4~~	~~Soundview Drive from Harborview to Grandview~~	~~2009~~	~~$972,000~~	~~6-year~~	~~Capital reserves~~
~~E5~~	~~Soundview Drive from Erickson to Olympic~~	~~2013~~	~~$1,512,000~~	~~6-year~~	~~Capital reserves~~
	Wastewater Collection Subtotal		**$10,064,400** ~~**6,622,000**~~		
	Wastewater Total ~~**6-year**~~		**$35,575,400** ~~**64,381,000**~~		
		~~**20-Year Sewer Capital Improvement Projects****~~			
		~~**Collection System**~~			
~~1~~	~~Harborview Drive to WWTP~~	~~2014-2028~~	~~$4,000,000~~	~~20-year~~	~~PWTF/ SRF/ revenue~~

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Sources
					bonds /Connection Fees/Sewer Rates
2	Rosedale Drive Main Upsize	2010-2030	$3,000,000	20-year	PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates
3	Soundview Dr – Harborview to Grandview Main Upsize	2010-2030	$3,000,000	20-year	PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates
4	Soundview Drive to Erickson Main Upsize	2010-2030	$4,000,000	20-year	PWTF/ SRF/ revenue bonds /Connection Fees/Sewer Rates
-	**Subtotal**	-	**$14,000,000**	-	-
	Gravity Sewer Replacements				
E6	Burnham Drive from Harborview Drive to 96th Street	2010-2030	$456,000	20-year	Capital Reserves
E7	N. Harborview Dr. from Peacock Hill Ave. to L.S. #2	2010-2030	$238,000	20-year	Capital Reserves
E8	45th Street and Easement East of Point Fosdick Drive	2010-2030	$953,000	20-year	Capital Reserves
-	**Subtotal**	-	**$1,647,000**	-	-
	Lift Station and Force Main Improvements				
L4-1	Lift Station 4, Phase 1	2010-2030	$1,121,000	20-year	
L4-2	Lift Station 4, Phase 2	2010-2030	$295,000	20-year	
L8	Lift Station No.8	2010-2030	$568,000	20-year	Capital Reserves
L3-2	Lift Station No. 3, Phase 2	2010-2030	$162,000	20-year	Capital Reserves
L1	Lift Station No. 1	2010-2030	$470,000	20-year	Capital Reserves
-	**Subtotal**	-	**$2,616,000**	-	-
-	**Total 20-year**	-	**$18,263,000**	-	-

* Estimated costs are in year of project
** Estimated costs are in 2009 dollars

Notes:

(1) PWTF - Public Works Trust Fund
(2) SFR - State Revolving Fund
Estimated costs are based on dollars value in the estimated year of the project.

Water System Projects

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Source
	6-Year Water Capital Improvement Projects*				
1	Storm Tank Maintenance	2008-2010	$500,000	6-year	Local Utility Fees &/or Revenue Bonds
2	Design Harborview/Stinson	2008	$180,000	6-year	Local Utility Fees &/or Revenue Bonds
3	Design Harborview Water Main	2008	$200,000	6-year	Local Utility Fees &/or Revenue Bonds

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Source
14	Asbestos Cement Water Line Rreplacement Program ~~City Wide~~ ($75,000/yr)	201008-201412	$375340,000	6-year	Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
25	Water Systems Upgrades ($50,000/yr)	200908-201412	$300278,000	6-year	Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
36	Stinson Avenue Water Main Replacement ~~Harborview/ Stinson 12" Upsize~~	201009	$275,000 ~~800,000~~	6-year	Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
47	Harborview Drive Water Main Replacement – N. Harborview Dr. to Rosedale St.	2010-201109	$1,400950,000	6-year	Development Mitigation/Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
~~8~~	~~Well No. 6~~	~~2009-2014~~	~~$1,740,000~~	~~6-year~~	~~Local Utility Fees &/or Revenue Bonds~~
59	Water Rights Annual Advocate for /Permitting ($4075,000/year)	200908-2012	$160375,000	6-year	Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
~~10~~	~~GIS Inventory~~	~~2008-2012~~	~~$80,000~~	~~6-year~~	~~Local Utility Fees &/or Revenue Bonds~~
611	Well No. 11 – Deep Aquifer Well ~~Gig Harbor North Well Permitting/Design~~	~~2008~~-2009-2013	$4,174,600 ~~2,000,000~~	6-year	~~SEPA Mitigation/Developers/~~ Connection Fees /Utility Rates
712	Well No. 10	~~2008-2009~~ 2010	$350150,000	6-year	~~SEPA Mitigation/Developers~~ Utility Rates/ Connection Fees
813	Harbor Hill Drive Water Main Extension	~~2009-~~2014	$450,200 ~~160,000~~	6-year	Development Mitigation/Connection Fees/Utility Rates ~~Local Utility Fees, Revenue Bonds, &/or Developer Funded~~
914	Harborview Drive Loop ~~Dead End~~	2011 ~~2009-2014~~	$503,500 ~~405,000~~	6-year	Development Mitigation/Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
1015	Tarabochia Street Water Main Replacement	201209-~~2014~~	$44,000 ~~40,000~~	6-year	Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
1116	Grandview Street Water Main Replacement	201209-~~2014~~	$424,400 ~~59,000~~	6-year	Development Mitigation/Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Source
12~~17~~	96th Street Water Main Extension	2014~~09-2014~~	$269,000	6-year	Development Mitigation/Connection Fees/Utility Rates ~~Local Utility Fees, Revenue Bonds, &/or Developer Funded~~
13~~18~~	Woodworth Avenue Water Main Replacement	2013~~09-2014~~	$116,700 ~~50,000~~	6-year	Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
14~~19~~	Shurgard East Tee and Water Main Replacement	2013 ~~2009-2014~~	$437,100 ~~52,000~~	6-year	Development Mitigation/Connection Fees/Utility Rates ~~Local Utility Fees &/or Revenue Bonds~~
15	Water System Plan Update	2014	$112,600	6-year	Connection Fees/Utility Rates
	~~Subt~~ Water Total		**$9,392,100 ~~8,628,000~~ ***		
~~20-Year Water Capital Improvement Projects~~					
~~1~~	~~Upgrade Perrow Well~~	~~2010-2030~~	~~$92,000~~	~~20-year~~	~~Undetermined~~
~~2~~	~~500,000 Gallon Storage Tank~~	~~2010-2030~~	~~$1,500,000~~	~~20-year~~	~~Undetermined~~
~~3~~	~~Shurgard Tank to Soundview~~	~~2010-2030~~	~~$122,000~~	~~20-year~~	~~Undetermined~~
~~4~~	~~Pioneer Way~~	~~2010-2030~~	~~$74,000~~	~~20-year~~	~~Undetermined~~
~~5~~	~~Reid & Hollycroft Intertie~~	~~2010-2030~~	~~$3,000~~	~~20-year~~	~~Undetermined~~
~~6~~	~~Shore Acres Connection Improvements~~	~~2010-2030~~	~~$56,000~~	~~20-year~~	~~Undetermined~~
~~7~~	~~Schmel Drive Extension~~	~~2010-2030~~	~~$543,000~~	~~20-year~~	~~Undetermined~~
~~8~~	~~Conjunctive Strategy~~	~~2010-2030~~	~~$2,000,000~~	~~20-year~~	~~Undetermined~~
	~~Subtotal~~	-	**~~$ 4,390,000 **~~**	-	-

Note:

~~*Estimated costs are in year of project ** Estimated costs are in 2009 dollars~~

Park, Recreation & Open Space Projects

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Sources
1	City Park Improvements	ongoing		6 year	Grants/Local
~~2~~	~~City Skate Park Improvements~~	~~2008-2010~~	~~$30,000~~	~~6 year~~	~~Local~~
~~3~~ 2	GHPHS Museum Creek Easement Acquisition	2008-~~2009~~ 2012	~~$400,000~~ $425,000	6 year	Local
~~4~~ 3	Gig Harbor North Park	2008-2012	$3,000,000	6 year	Developer Mitigation/Impact
~~5~~ 4	Jerisich Dock Moorage Extension	~~2008-2009~~ 2010-2012	~~$200,000~~ $300,000	6 year	Fees/Grants/Donations
~~6~~ 5	Cushman Trail Phase III ~~Kimball~~ 96th to Borgen	2008-~~2009~~ 2011	~~$664,000~~ 1,500,000	6 year	Local/County
~~7~~ 6	Boys and Girls Club/ Senior Center	~~2009~~2010-2011	~~$150,000~~ 250,000	6 year	Local
~~8~~ 7	Pioneer Way Streetscape	2008-2012	$127,000	6 year	Local

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Sources
~~9~~ 8	Austin Estuary Park	2008-2012	~~$100,000~~ 455,000	6 year	~~Local~~ RCO Grant
~~10~~ 9	Skansie House Remodel	2010-2012	$60,000 - $100,000 ~~$300,000~~	6 year	PSRC Grant/Local/Lodging Tax
~~11~~ 10	Skansie Netshed Repair and Restoration	~~2008-2010~~ 2010-2014	$450,000	6 year	Heritage Grant/Local
~~12~~ 11	Wheeler Pocket Park	~~2009~~ 2012	~~$35,000~~ 70,000	6 year	Local
~~13~~ 12	Wilkinson Farm Barn Restoration	~~2009~~ 2010-2014	$200,000	6 year	Heritage Barn Grant/Local Match
~~14~~ 13	Wilkinson Farm Park Development	2010-2013	$900,000	6 year	State ~~IAC~~ RCO Grant/Preservation Grants/Local Match
~~15~~ 14	WWTP/Cushman Trail Access	~~2008-2009~~ 2010-2012	$25,000	6 year	Local
~~16~~	~~Crescent Creek West Shore Acquisition~~	~~2008-2011~~	~~$200,000~~	~~6 year~~	~~Grant/Local~~
~~17~~ 15	Kenneth Leo Marvin Veterans Memorial Park Phase 2	~~2008~~ 2010 - 2015	~~$900,000~~ $250,000	6 year	IAC Grant/Impact Fees/Local
~~18~~ 16	Eddon Boatyard ~~Building~~ Dock Restoration	~~2008~~ 2010-2011	~~$980,000~~ $250,000	6 year	Heritage Grant
~~19~~	~~Eddon Boatyard Building Impervious Containment Barrier~~	~~2007~~	~~$25,000~~	~~6 year~~	~~Heritage Grant/Local~~
~~20~~ 17	Eddon Boat Park Development	~~2009~~ 2011-2014	$2,000,000	6 year	RCO Grants/ Local
~~21~~	~~Eddon Park Environmental Cleanup~~	~~2007-2008~~	~~$2,000,000~~	~~6 year~~	~~Brownsfields Grants/ Harbor Cove Escrow Account~~
~~22~~	~~Taraboachia Public Parking Lot~~	~~2007-2008~~	~~$30,000~~	~~6 year~~	~~Local~~
~~23~~ 18	Maritime Pier – Dock Improvements	~~2008~~ 2010-2012	~~$50,000~~ $4,500,000	6 year	Local
~~30~~	~~Old Miller Property acquisition and development.~~	~~2009~~	~~$360,000~~	~~6 year~~	~~Local/Impact Fees~~
~~31~~	~~Hoppen Property at the mouth of Crescent Creek.~~	~~2009-2014~~	~~$250,000~~	~~6 year~~	~~Pierce County Conservation Futures/Local~~
~~32~~	~~Cushman Trail Extension North to Borgen Boulevard~~	~~2009~~	~~$7,000,000~~	~~6 year~~	~~Pierce County Funds/Local~~
~~33~~ 19	North/Donkey Creek Corridor. (Conservation Properties) Northwest of Donkey Creek Park along the Creek.	2010-2014	$1,500,000	6 year	County Conservation Futures
~~34~~ 20	Jerisich / Skansie Park Development	2009-2010	$150,000	6 year	Local
~~35~~	~~Sand Volleyball Court @ Crescent Creek Park~~	~~2009~~	~~$30,000~~	~~6 year~~	~~Private Funding/Local~~
~~36~~ 21	Sewer Easement Trail (Veterans Park to 45th Street Court)	2009-2014	$300,000	6 year	Local
22	Donkey Creek Restoration	2010 - 2016	$1,200,000	6 year	Local/Federal
	Subtotal		**~~$20,331,000~~ $17,912,000**		

Notes:

(1) CFP - Capital Facilities Program
(2) GI Fee - Growth Impact Fee
(3) Bond - Park, Recreation & Open Space Bond

Storm ~~W~~water System ~~P~~rojects

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Source
1	Update storm facilities mapping ($50,000/yr)	Annually	$300~~30~~,000	6-year	Connection Fees/Utility Rates ~~Local~~
2	Garr Creek Tributary Channel (38th St)/WWTP Erosion Study ~~Hot Spot~~	2010~~Annually~~	$50,000~~25,000~~	6-year	Connection Fees/Utility Rates ~~Local~~
~~3~~	~~38th Street - Hunt to Goodman~~	~~2008-2009~~	~~$1,000,000~~	~~6-year~~	~~TIB/Safe Routes to Schools/Local~~
3	38th /Quail Run Ave Storm Culverts	2014	$208,200	6-year	Connection Fees/Utility Rates
4	Donkey Creek Daylighting	2011~~09~~	$1,236,000 ~~1,200,000~~	6-year	State/Federal Salmon Recovery Grants/Earmarks
5	Donkey Creek Culvert under Harborview Drive	20~~14~~13	$546,400 ~~500,000~~	6-year	State/Federal Salmon Recovery Grants/Earmarks
6	Annual Storm Culvert Replacement Program ($50,000/yr)	2009-2014~~3~~	$300~~250~~,000~~/ year~~	6-year	~~Storm Water Utility Fees~~ Connection Fees/Utility Rates
7	50th Street Box Culvert	20~~08~~12	$371,300 ~~350,000~~	6-year	~~Storm Water Utility Fees~~ Connection Fees/Utility Rates
8	Quail Run Water Quality System Improvements ~~Storm Comp Plan Update~~	2010~~08~~	$15,000~~1,000,000~~	6-year	~~Storm Water Utility Fees~~ Connection Fees/Utility Rates
9	Annual NPDES Implementation Expenses	2009~~8~~-2014	$100,000	6-year	~~Storm Water Utility Fees~~ Connection Fees/Utility Rates /State Grant
~~10~~	~~Stormwater retention, wetland mitigation and detention for Burnham interchange improvements:~~ ~~- Potential properties in proximity to Burnham interchange.~~	~~2010~~	~~$2,000,000~~	~~6-year~~	~~State/Federal Transportation Funding/Grant~~
10~~1~~	Aquifer Re-charge - Spadoni Gravel Pit and adjacent property north of 96th street between SR-16 and Burnham Drive.	2011~~0~~	$1,700,000	6-year	State/Federal Transportation Funding/Grant

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Source
11	Burnham Drive/96th Street Culvert Replacement	2014	$56,300	6-year	Connection Fees/Utility Rates
12	Borgen Boulevard/Peacock Hill Avenue Culvert Replacement	2014	$36,600	6-year	Connection Fees/Utility Rates
13	102nd Street Court Culvert Replacement	--	$20,000	6-year	Private Development
14	Burnham Drive/Harborview Drive Rock Spall Pad Construction	--	$15,000	6-year	Private Development
15	101st Street Court Detention Pond Reconstruction	--	$25,000	6-year	Private Development
16	101st Street Court Culvert Replacement	--	$20,000	6-year	Private Development
17	Stormwater Comprehensive Plan Update	2014	$112,600	6-year	Connection Fees/Utility Rates
	~~Subt~~ **Stomwater Total**		**$5,112,400** ~~**8,155,000**~~		

~~* Private property – costs to be borne by property owner or developer~~

Notes:

- Costs shown above are estimates and do not include such items as permitting costs, sales tax, right-of-way acquisition, utility relocations, trench dewatering, traffic control or other unforeseen complications.
- Private Development funding indicates the full cost for the project shall be borne by property owner(s) or developer(s).

~~(2) "Hot Spots" refers to the discretionary funds for emergencies and small projects that can be easily repaired or otherwise taken care of quickly~~

Transportation Improvement Projects

Project No.	Project Name	Projected Start Year	Estimated Cost	Plan	Funding Source
1	SR-16/Borgen/Canterwood Hospital Mitigation Improvements	2009	$11,000,000	6-Year	State/Local
2	50th St Ct NW Improvements	2009	$1,600,000	6-Year	State/Local
3	Harbor Hill and Borgen Intersection Improvements	2013	$704,000	6-Year	Developer/Local
4	Rosedale and Stinson Intersection Improvements	2013	$275,000	6-Year	Local
5	38th Ave Improvements Phase 1	2009	$9,790,000	6-Year	State/Local
6	Harbor Hill Drive Extension	2009	~~$1,000,000~~ $5,500,000	6-Year	Developer/Local
7	Burnham Dr Phase 1	2011	$6,700,000	6-Year	State/Local/Developer
~~8~~ 9	Soundview and Hunt Intersection Improvements	2012	$660,000	6-Year	Developer/Local
~~9~~ 15	38th Ave Improvements Phase 2	2009	$5,280,000	6-Year	State/Local
~~10~~ 16	Skansie Ave Improvements	2010	$9,460,000	6-Year	Local
~~11~~	~~Hunt St~~	~~2014~~	~~$480,000~~	~~6-Year~~	~~Local~~
~~12~~	~~Hunt St Undercrossing~~	~~2012~~	~~$6,160,000~~	~~6-Year~~	~~Local~~

Project No.	Project Name	Projected Start Year	Estimated Cost	Plan	Funding Source
~~13~~ 10	Olympic/Fosdick Intersection Improvements	2009	$440,000	6-Year	Developer/Local
~~14~~ 11	Wollochet Dr Improvements	2010	$660,000	6-Year	Developer/Local
~~15~~ 12	Harborview/N Harborview Intersection Improvements	2010	$1,650,000	6-Year	Local
~~16~~ 13	SR 16/Olympic Drive	2012	$825,000	6-Year	State/Local
~~17~~ 8	Burnham Dr/Harbor Hill Drive Intersection Improvements	2010	$2,200,000	6-Year	Developer/Local
~~18~~ 14	Rosedale St/Skansie Ave Intersection Improvements	2011	$ 275,000	6-Year	Local
~~19~~ 17	Rosedale St Improvements	2010	$3,740,000	6-Year	State/Local
~~20~~ 18	Olympic/Hollycroft Intersection Improvements	2013	$26,000	6-Year	Local
~~21~~ 19	Vernhardson St Improvements	2013	$375,000	6-Year	Local
~~22~~ 20	Point Fosdick Pedestrian Improvements	2010	$1,100,000	6-Year	State/Local
~~23~~ 21	Harborview Dr. Improvements from N. Harborview Dr. to Pioneer Wy	2011	$100,000	6-Year	State/Local
~~24~~ 22	Judson/Stanich/Uddenberg Improvements	2012	$2,090,000	6-Year	State/Local
~~25~~ 23	Donkey Creek Daylighting Street and Bridge Improvements	2009	$2,050,000	6-Year	Federal/State/Local
~~26~~ 24	Wagner Way/Wollochet Drive Traffic Signal	2009	$300,000	6-Year	Developer/Local
~~27~~ 25	Grandview Drive Phase I from Stinson to Pioneer	2010	$500,000	6-Year	Developer/Local
~~28~~ 26	Grandview Drive Phase 2 from Soundview to McDonald	2009	$860,000	6-Year	Local
~~29~~ 27	Pt Fosdick/56th Street Improvements	2010	$4,000,000	6-Year	State/Local
	Subtotal 6-Year:		**~~$74,300,000~~ $72,056,000**		
~~30~~	~~Canterwood Boulevard from SR16 to 54th Ave~~	~~2020~~	~~$ 8,000,000~~	~~20-Year~~	~~State/Local~~
~~31~~	~~Borgen Boulevard from Peacock Hill to Harbor Hill~~	~~2020~~	~~$6,600,000~~	~~20-Year~~	~~Local~~
~~32~~	~~Rosedale Street from Stinson to 58th Ave~~	~~2020~~	~~$5,500,000~~	~~20-Year~~	~~Local~~
~~33~~	~~Peacock Hill from Borgen to 127th Street~~	~~2020~~	~~$4,100,000~~	~~20-Year~~	~~Local~~
~~34~~	~~Bujacich Road from Sehmel to 89th Street~~	~~2020~~	~~$6,900,000~~	~~20-Year~~	~~Local~~
~~35~~	~~Stinson Ave from Rosedale to Harborview~~	~~2020~~	~~$220,000~~	~~20-Year~~	~~Local~~
~~36~~	~~Hunt Street NW from Skansie Ave to 38th Ave~~	~~2020~~	~~$2,300,000~~	~~20-Year~~	~~State/Local~~
~~37~~	~~Soundview Drive from SR16WBRamp to Hunt Street NW~~	~~2020~~	~~$700,000~~	~~20-Year~~	~~State/Local~~
~~38~~	~~New Road from 50th Ave to Harbor Hill Drive~~	~~2020~~	~~$1,100,000~~	~~20-Year~~	~~Developer/Local~~
~~39~~	~~50th Ave from New Road to~~	~~2020~~	~~$2,300,000~~	~~20-Year~~	~~Developer/Local~~

Project No.	Project Name	Projected Start Year	Estimated Cost	Plan	Funding Source
	~~Burnham Drive~~				
~~40~~	~~SR16/Borgen/Burnham Interchange (Long Term Solution)~~	~~2020~~	~~$56,000,000~~	~~20-Year~~	~~State/Local~~
~~41~~	~~Harborveiw Drive at Stinson Ave~~	~~2020~~	~~$660,000~~	~~20-Year~~	~~Local~~
~~42~~	~~Stinson Ave at Pioneer Way~~	~~2020~~	~~$330,000~~	~~20-Year~~	~~State/Local~~
~~43~~	~~38th Ave at 56th Street~~	~~2020~~	~~$150,000~~	~~20-Year~~	~~Local~~
~~44~~	~~SR16/Olympic Drive~~	~~2020~~	~~$440,000~~	~~20-Year~~	~~State/Local~~
	~~**Subtotal 20-Year:**~~		~~**$95,300,000**~~		
45	96th Street SR16 Crossing	2030	$8,000,000	Other	State/Local
46	Briarwood Lane Improvments	2015	$500,000	Other	Local
47	Frankilin Ave Improvements	2015	$500,000	Other	Local
48	Street Connections - Point Fosdick Area	2015	$600,000	Other	Local
49	Crescent Valley Connector	2030	$2,000,000	Other	Local
50	Downtown Parking Lot Design	2009	$60,000	Other	Local
51	Downtown Parking Lot property acquisition	2009	n/a	Other	Local
52	Purchase land for ROW, stormwater improvements, wetland mitigation	2008	n/a	Other	Local
53	Public Works Operations Facility	2010	$1,125,000	Other	Local
	Subtotal Other:		**$12,785,000**		
	~~**TOTAL**~~ **Transportation Total:**		~~**$182,385,000**~~ **$84,841,000**		

Exhibit “H”
Application COMP 09-0011:
Utilities Element

Showing page with amendment.

8.4.1. Upgrade and maintain ~~a~~ municipal water systems which provides a high quality and quantity of potable water to residential, commercial and industrial users.

a) Provide for the upgrade of substandard water systems within the City limits to comply with City Fire Protection Codes.

b) Require new projects and developments and substantial redevelopment of existing developments to participate in the upgrade of existing water systems to meet the latest City Fire Protection Code standards.

c) Encourage water conservation through a variety of programs and incentives for residential and commercial users.

d) Consider alternatives to water-consumptive landscaping and encourage the use of plant stock and irrigation systems which do not have intensive water-use demands.

e) Implement the goals and objectives of the City of Gig Harbor's ~~Comprehensive~~ Water System Plan within the City's Water Service Area.

GOAL 8.5: OPERATE AND MAINTAIN AN EFFICIENT WASTE WATER TREATMENT FACILITY WHICH IS CAPABLE OF PROVIDING THE NEEDED SEWER CAPACITY FOR THE CITY AND ITS URBAN GROWTH AREA.

8.5.1. Increase the capacity and overall efficiency of the City of Gig Harbor waste water treatment facility by planning for phased expansion and improvements consistent with the City's capital facilities plan.

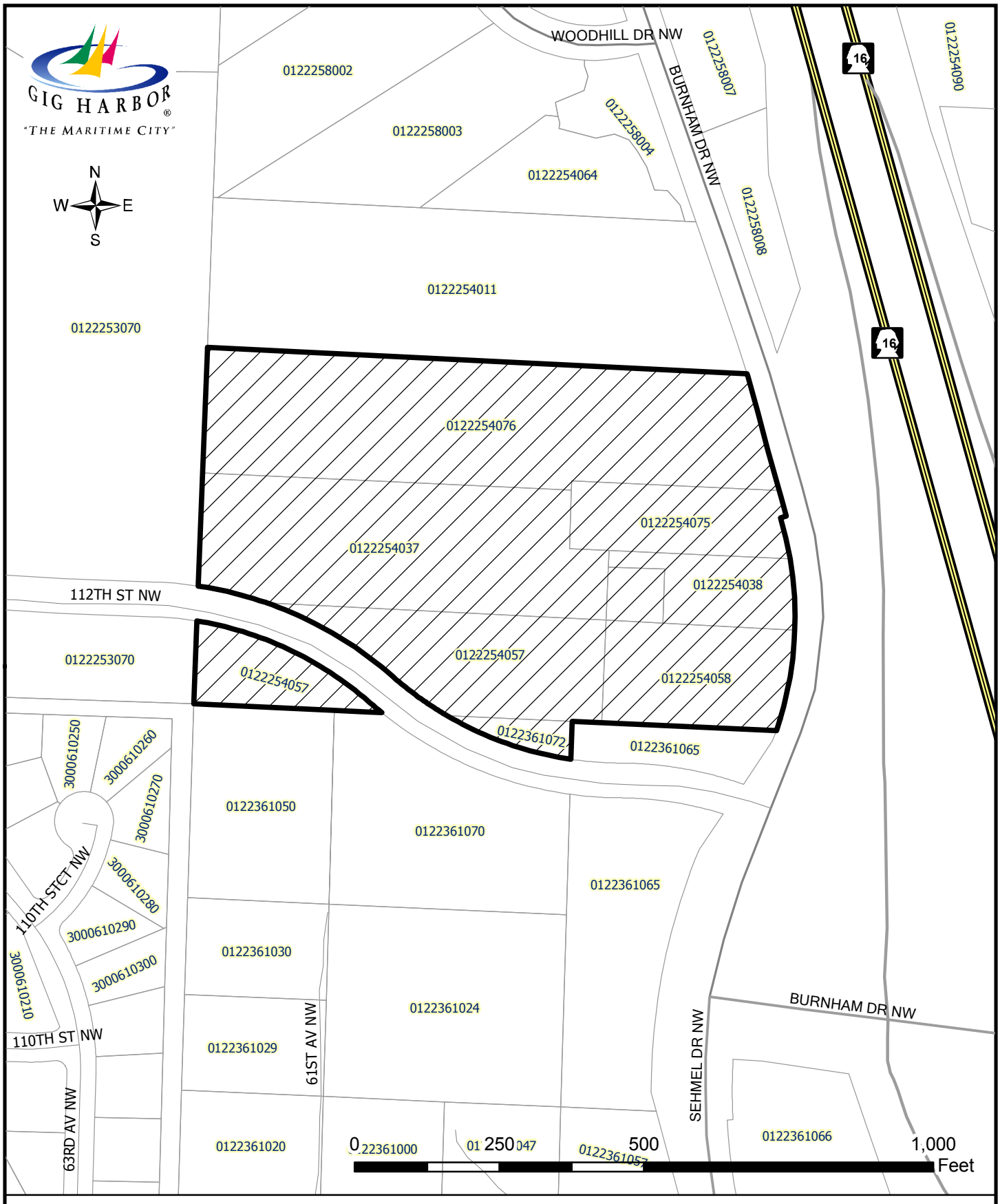
a) Develop and implement the City of Gig Harbor Sewer Comprehensive Plan which provides for capacity and timing of needed sewage infrastructure for a projected twenty-year growth period.

b) Provide sewer service to properties outside of the City limits, but within the urban area, consistent with adopted policies on sewer service extension requests.

c) Require new residential and commercial development within City limits to connect to the City sewer system. Within the unincorporated area served, or to be served by city sewer within six years of the development date, require sewer connection if the development is within 200 feet of the city sewer line.

d) Require existing residential and commercial development within 200 feet of a city sewer line to connect to city sewer if there is failure of on-site septic systems, as documented by the Tacoma-Pierce County Health Department.

Exhibit “I”
Application COMP 09-0004:
Sunrise Enterprises Land Use Map Amendment

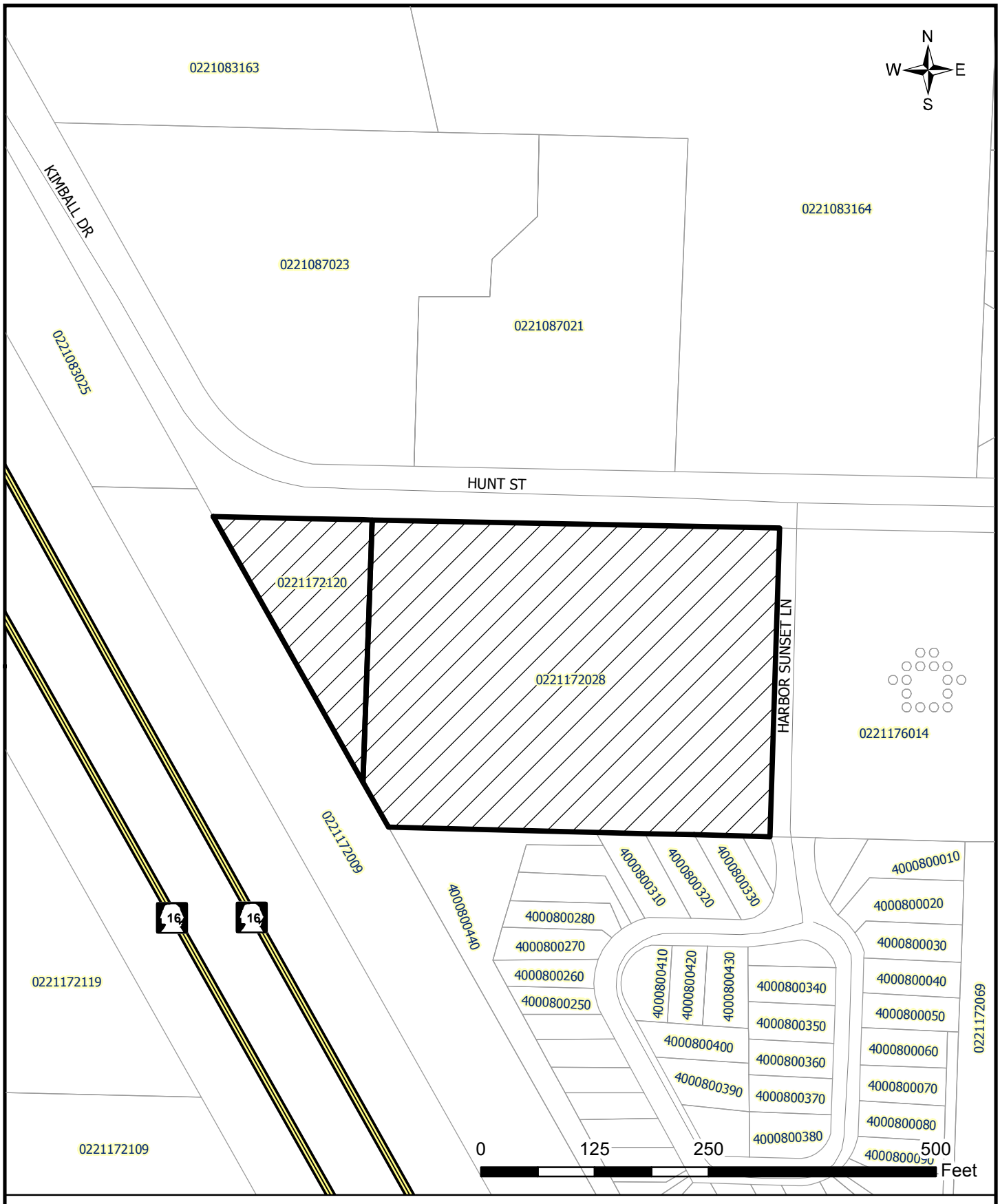


COMP 09-0004 Sunrise Enterprises Land Use Amendment
Employment Center (EC) to Commercial/Business (CB)

Exhibit “J”
Intentionally Omitted

Exhibit “K”
Intentionally Omitted

Exhibit “L”
Application COMP 09-0013:
Stroh’s Water System Service Area Amendment



GIG HARBOR
"THE MARITIME CITY"

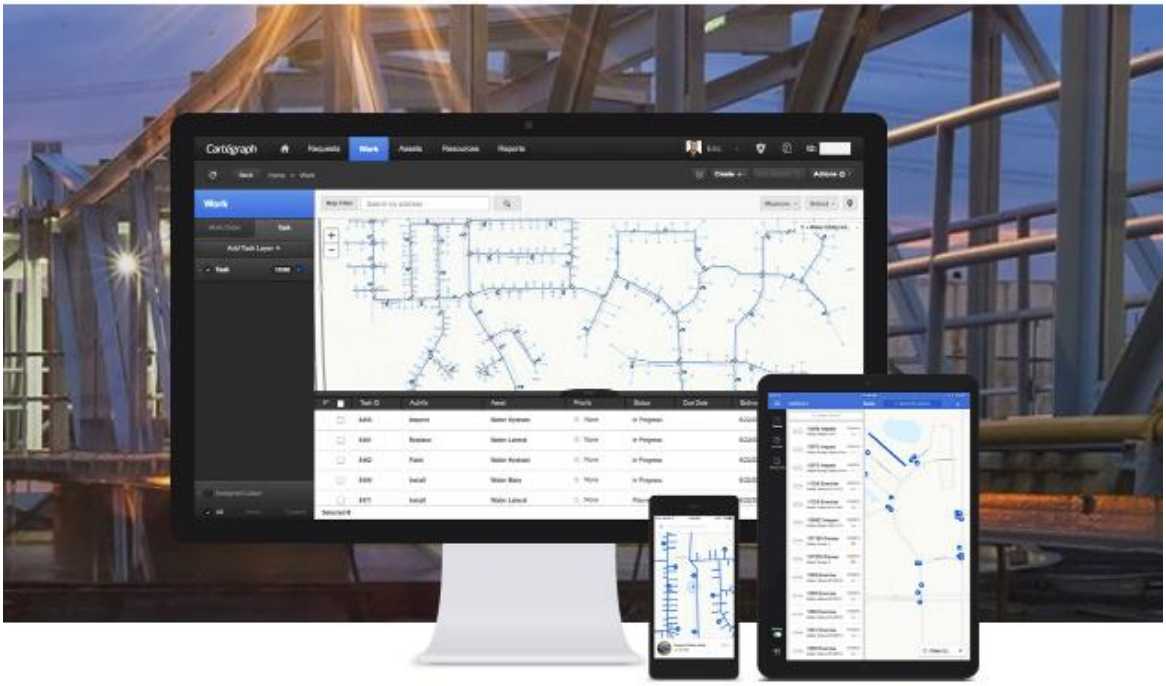
Stroh's Water Service Area Amendment
COMP 09-0013

Appendix N

ASSET MANAGEMENT SYSTEM DASHBOARD

BUILT FOR

WATER UTILITIES



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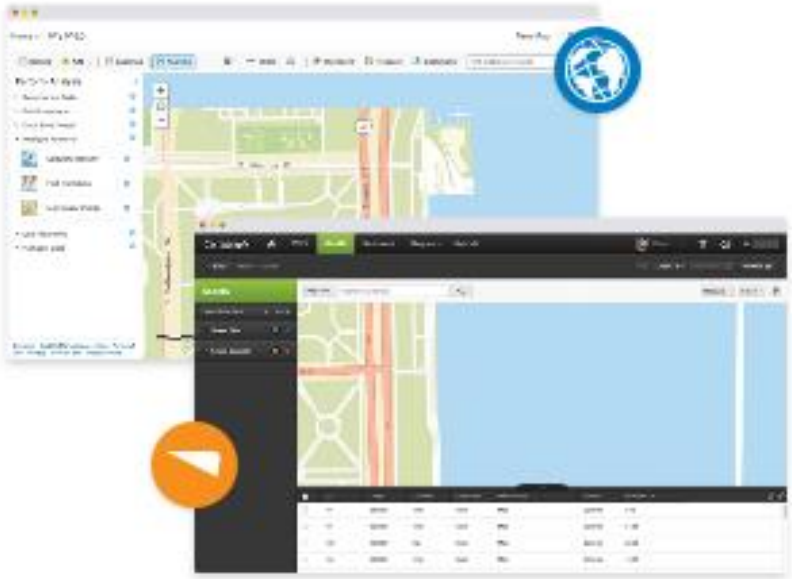


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No more stacks of paper or three-ring binders. With Cartegraph, your water utility operations run efficiently in a web-based system that's updated in real-time by crews using mobile devices.

PUT YOUR GIS DATA TO WORK

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REDUCE OPERATIONS AND MAINTENANCE EXPENSES

With increased regulation and decreased funding, every dollar of your water budget counts. Cartegraph enables workflow efficiencies—like task automation and streamlined communication—to save you time and money.

TRACK ANY WATER UTILITIES ASSET

Every main. Every hydrant. Every pump. Use Cartegraph to inspect and maintain every asset in your water network.

LEARN MORE ABOUT ASSETS

WATER BACKFLOW	WATER FACILITY	WATER HYDRANT	WATER LATERAL
WATER MAIN	WATER METER	WATER PUMP	WATER STORAGE TANK
WATER VALVE			

Cartegraph

Appendix O

ANNUAL SUMMARY / ORDINANCE NO. 1331

Appendix O-1

ANNUAL SUMMARY

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Public Water System Contact Information
Annual Summary Report (ASR) for 2016

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

	Designated CCS/ CCC Program Manager	PWS Manager
Name	Jeff S Olsen	Greg M Foote
Job Title	Public Works Field Supervisor	Public Works Superintendent
Phone	253-851-8406	253-851-8406
Email Address	olsenj@cityofgigharbor.net	footeg@cityofgigharbor.net
Operator Certified?	Yes - 10289	Yes - 4475
CCS Certified?	Yes - 10289	Yes
BAT Certified?	No	
CCS Status	PWS owner or employee	

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Cross-Connection Control Activities (Blue)
Annual Summary Report (ASR) for 2016

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

Part 1: Designated Cross-Connection Control Specialist (CCS) Information

CCS Name	Jeff S Olsen	CCS Phone	253-851-8406	CCS Cert. #	10289	BAT Cert. #	
CCS is: PWS owner or employee							

Part 2: Status of Cross-Connection Control (CCC) Program at End of 2016

Provide information about the status of your CCC Program at the end of the reporting year.

PWS has:		Program Plan Last Updated[3] 06/01/2016
	A written CCC Program Plan[1] ◉ Yes ○ No	
	CCC implementation activities[2] ◉ Yes ○ No	

[1] Enter "Yes" if PWS has **any** type of written CCC Program Plan, policies, or procedures. Written CCC Program Plan must be part of a Water System Plan (WSP) or Small Water System Management Program (SWSMP).
[2] Enter "Yes" if PWS implemented **any** CCC Program activities during the reporting year, such as establishing legal authority, conducting hazard evaluations, requiring installation of backflow assemblies to protect the PWS, requiring assembly testing, maintaining CCC records, or enforcing the PWS's or CCC Program requirements.
[3] PWS can update the CCC Program Plan at any time (independent of WSP or SWSMP update).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is:	
		Included in Written Program Plan	Being Implemented or Is Completed
1	**Legal Authority Established**	◉ Yes ○ No	◉ Yes ○ No
2	**Hazard Evaluation Procedures and Schedules**	○ Yes ◉ No	◉ Yes ○ No
3	**Procedures/Schedules for Ensuring Installation of Backflow Preventers**	○ Yes ◉ No	◉ Yes ○ No
4	**Certified CCS Provided**	◉ Yes ○ No	◉ Yes ○ No
5	**Backflow Preventer Inspection and Testing**	◉ Yes ○ No	◉ Yes ○ No
6	**Assembly Testing Quality Assurance/Quality Control (QA/QC) Program**	○ Yes ◉ No	◉ Yes ○ No
7	**Backflow Incident Response Procedures**	○ Yes ◉ No	◉ Yes ○ No
8	**Public Education Program**	◉ Yes ○ No	◉ Yes ○ No
9	**CCC Records**	◉ Yes ○ No	◉ Yes ○ No
10	**Reclaimed Water Permit**	○ Yes ○ No ◉ N/A	○ Yes ○ No ◉ N/A

Part 3A: PWS Characteristics at End of 2016

Enter the number of connections (new and existing) served by the PWS by type.

Type of Service Connection	Number
Residential (As defined by PWS)	2076
All Other (include dedicated fire lines, dedicated irrigation lines, and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	359
Total Number of Connections	2435

Part 3B: Cross-Connection Control for Severe and High-Hazard Premises and High-Hazard Dedicated Lines Served by the PWS

Answer the following questions carefully. These answers control your access to pages 2 and 3 for data entry.

1. Does your PWS serve any severe or high-hazard premises or any high-hazard dedicated fire or irrigation lines? ◉ Yes ○ No

2. Does PWS serve any high-hazard medical premises? ◉ Yes ○ No

- If you answer Yes to both questions, you must enter data in at least one row on page 2 and one row on page 3.
- If you answer Yes to Question 1 and No to Question 2, you must enter data on page 2 only.
- If you answer No to both questions, pages 2 and 3 will be grayed out to prevent data entry.

- Count only premises PWS serves water to.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information.**

Type of Severe or High-Hazard Premises or Dedicated Lines [WAC 246-290-490(4)(b)]	Number of Connections at end of 2016			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Agricultural (farms and dairies)	0	0	0	0
Beverage bottling plants (including breweries)	2	2	2	0
Car washes	2	2	2	0
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	3	3	3	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	0	0	0	0
Dedicated fire lines with chemical addition or using unapproved auxiliary supplies	0	0	0	0
Food processing plants (including canneries, slaughter houses, rendering plants)	0	0	0	0
Hospitals, medical centers, medical, dental and veterinary clinics, mortuaries, nursing homes, etc., reported on Part 3C page 3 (totals imported from page 3)	15	8	8	0
Dedicated irrigation systems using purveyor's water supply and chemical addition[4]	0	0	0	0
Laboratories	0	0	0	0
Metal plating industries	0	0	0	0
Petroleum processing or storage plants	0	0	0	0
Piers and docks	18	12	12	0
Radioactive material processing plants or nuclear reactors	0	0	0	
Survey access denied or restricted	1	1	1	0
Wastewater lift/pump stations (non-residential only)	2	2	2	0
Wastewater treatment plants	1	1	1	
Unapproved auxiliary water supply interconnected with potable water supply	0	0	0	0
Totals	44	31	31	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections whose premises isolation preventers were inspected (AGs) or tested (RPs) during the reporting year.

[4] For example, dedicated irrigation lines to parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RP), such as aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, for example:"Other manufacturing" or "Other commercial".

Part 3C: Cross-Connection Control for High-Hazard Medical Premises Served by the PWS

- Count only medical premises PWS serves water to.
- Don't count the same premises more than once. If you serve different medical category premises through a single connection, count the connection under the medical category you consider to pose the highest hazard to PWS.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information**

Type of High-Hazard Medical Premises [WAC 246-290-490(4)(b)]	Number of Connections at end of 2016			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	3	3	3	0
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers	2	2	2	0
Out-patient clinics and offices	0	0	0	0
Alternative health out-patient clinics and offices	0	0	0	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors with water-connected X-ray equipment	0	0	0	0
Hospice care centers	0	0	0	0
Childbirth centers	0	0	0	0
Kidney dialysis centers	0	0	0	0
Blood centers	0	0	0	0
Dental clinics and offices	7	2	2	0
Facilities for Housing Patients				
Nursing homes	1	1	1	0
Assisted Living Facilities (formerly Boarding Homes)	0	0	0	0
Residential treatment centers	0	0	0	0
Other Medical-Related Facilities				
Mortuaries with embalming equipment	0	0	0	0
Morgues and autopsy facilities (not in hospitals)	0	0	0	0
Veterinarian offices, clinics and hospitals	2	0	0	0
Totals	15	8	8	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises backflow preventers only or connections with premises isolation DCVAs or DCDAs isolation.

Part 4A: Backflow Preventer Inventory and Testing Information for 2016

- Complete all fields. Enter **zero (0)**, if no backflow preventers in a specific category.
- Count only backflow preventers relied on to protect the PWS.
- Count AVBs on *irrigation systems only*. Select No to AVB question above Table 2 if PWS doesn't track AVBs.
- Count multiple tests (or failures) for the same backflow preventer as one test (or failure) for that backflow preventer.
- For multiple service connections or parallel installations, count each assembly separately.
- Count RPDAs and DCDAs as ***single*** assemblies. Count the tests of the mainline assembly and bypass assembly as ***one test***. Count the failure of either the mainline or bypass assembly (or the failure of both) as ***one failure***. Count an entire detector assembly taken out of service as ***one assembly removed from service***.
- Count assemblies installed on dedicated fire or irrigation lines as **Premises Isolation Assemblies** in Table 1.

	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Table 1: Premises Isolation Preventers (include preventers isolating PWS-owned facilities)									
Existing Premises Isolation Backflow Preventers									
1	In service at beginning of 2016	0	5	0	10	0			
2	Inspected and/or tested in 2016[1]	0	5	0	10	0			
3	Failed inspection or test in 2016	0	0	0	0	0			
New Premises Isolation Backflow Preventers									
4	Installed in 2016[2]	0	1	0	7	0			
5	Inspected and/or tested in 2016[1]	0	1	0	1	0			
6	Failed inspection or test in 2016	0	0	0	1	0			
Premises Isolation Backflow Preventers (existing or new)									
7	Removed from service in 2016[3]	0	0	0	0	0			
Total Premises Isolation Preventers at End of 2016		0	6	0	17	0	0	0	0

Does PWS track AVBs on irrigation systems? ○ Yes ◉ No

	Table 2: In-Premises Preventers (include preventers within PWS-owned facilities)								
Existing In-Premises Backflow Preventers									
8	In service at beginning of 2016	2	254	0	894	47	1	6	unk
9	Inspected and/or tested in 2016[1]	2	245	0	865	47	1	0	unk
10	Failed inspection or test in 2016	0	16	0	56	4	0	0	unk
New In-Premises Backflow Preventers									
11	Installed in 2016[2]	0	17	0	105	7	0	0	unk
12	Inspected and/or tested in 2016[1]	0	17	0	105	7	0	0	unk
13	Failed inspection or test in 2016	0	2	0	17	1	0	0	unk
In-Premises Backflow Preventers (existing or new)									
14	Removed from service in 2016[3]	0	0	0	26	0	0	1	unk
Total In-Premises Preventers at End of 2016[4]		2	271	0	973	54	1	5	0
Grand Totals at End of 2016		2	277	0	990	54	1	5	0

[1] Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only, using DOH-approved USC field test procedures).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of the reporting year. Replacement preventers may be of a different type than the originals.

[3] Existing or new preventers taken out of service, whether or not they were replaced by the same or a different type of preventer.

Part 4B: Other Implementation Activities in 2016

Complete all cells. Enter zero if not applicable.

Water Use Questionnaires	
Did your PWS send any water use questionnaires to customers during 2016?	○ Yes ◉ No

On-site Hazard Surveys				
Did your CCS conduct any on-site hazard surveys during 2016?				○ Yes ◉ No
	Service Connection Type			
	New	**Existing**	**Total**	
1. Number of connections surveyed for cross-connection hazards to PWS.			0	
2. Number of connections requiring backflow prevention to protect PWS.[1,2]			0	

New Exceptions to Premises Isolation	
Did your CCS grant any new premises isolation exceptions in 2016 to high-hazard premises?[3]	○ Yes ◉ No

CCC Enforcement Actions	
Did your PWS take any enforcement actions during 2016?[4]	○ Yes ◉ No

[1] Include services where either premises isolation or in-premises preventers were required to protect the PWS.
[2] Include existing services that need new, additional or higher level backflow prevention.
[3] Submit a completed DOH Exception Form (green) for each new exception granted in the reporting year.
[4] "Enforcement actions" means actions taken by the PWS (such as water shut-off, PWS installation or testing of backflow preventer, assessment of fines, etc.) when the customer fails to comply with the PWS's CCC requirements.

Part 5: Backflow Incidents and "Off-Normal" Events in 2016

	Backflow Incidents, Risk Factors, and Indicators during 2016	Number
Backflow Incidents during 2016		
1	Backflow incidents that contaminated the PWS[5].	0
2	Backflow incidents that contaminated the customer's drinking water system ***only***[5].	0
Risk Factors for Backflow during 2016		
3	Distribution main breaks per 100 miles of pipe.	0.00
4	Low pressure events (<20 psi in PWS distribution system).	0
5	Water outage events.	0
Indicators of Possible Backflow during 2016		
6	Total health-related complaints received by PWS.[6]	0
7	Received during BWA or PN events.[7]	0
8	Received during low pressure or water outage events.	0
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).	33
10	Received during BWA or PN events.[7]	0
11	Number of these complaints received during low pressure or water outage events.	0

[5] Purveyors must submit a Backflow Incident Report form for each backflow incident known to have contaminated the public water system. DOH is also interested in receiving incident report forms for backflow incidents that contaminated the customer's drinking water system only.
[6] Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.
[7] **"BWA"** means **Boil Water Advisory** and **"PN"** means **Public Notification** for water quality reasons.

Part 6: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe challenges faced or accomplishments made in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

No Comments

Part 7: Report Certification and Contact Information

I, [Certified by] , certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	05/23/2017	**All ASR Forms Certified/Submitted**	

Designated CCS/CCC Program Manager[1]

Name	Jeff S Olsen	**Title**	Public Works Field Supervisor	**CCS Cert #**	10289
Email Address	olsenj@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

PWS Manager[2]

Name	Greg M Foote	**Title**	Public Works Superintendent	**Operator Cert #**	4475
Email Address	footeg@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Cross-Connection Control Program Summary (Cream)
Annual Summary Report (ASR) for 2016

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

Describe the characteristics of the PWS's Cross-Connection Control (CCC) Program at the end of 2016.

Part 1: CCC Program Characteristics

A. Type of Program Implemented

Type of Program	Check One
Premises isolation only.	○
Combination program: reliance on both premises isolation and in-premises prevention.	◉
In transition from a combination program to a premises isolation only program.	○

B. Coordination with Authority Having Jurisdiction (AHJ) on CCC Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code at the local level. The AHJ is usually your county or city building department. Don't list DOH as an AHJ.

AHJ #	Name of AHJ (City or County Building Department)[1]	PWS		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	City of Gig Harbor Building Department	Yes ◉ No ○	Yes ○ No ◉	Yes ○ No ○

[1] Do not enter an individual's name.

C. Corrective/Enforcement Actions Available to the Purveyor

Type of Corrective Action/Enforcement Action	Indicate Whether Available	Most Often Used (Check One)
Purveyor denies or discontinues water service.	Yes ◉ No ○	◉
Purveyor installs backflow assembly and bills customer.	Yes ○ No ◉	○
Purveyor assesses fines (in addition to eliminating or controlling cross connection).	Yes ◉ No ○	○
Purveyor tests backflow assembly and bills customer.	Yes ○ No ◉	○

[1] Enter detailed description of other enforcement actions available to PWS. Don't enter "None", "Not Applicable", or "Not Available."

D. CCC Program Responsibilities
Do not include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	○	◉
Backflow preventer (BP) ownership	◉	○
BP installation	◉	○
BP *initial* inspection (for proper installation - all BPs)	○	◉
BP *initial* test (for testable assemblies)	◉	○
BP *annual* inspection (Air Gaps and AVBs)	○	◉
BP *annual* test (for testable assemblies)	◉	○
BP maintenance and repair	◉	○

E. Backflow Prevention for Fire Protection Systems
Please remember to enter number of days allowed if you require retrofitting.

PWS coordinates with *AHJ* on CCC issues for fire sprinkler systems (FSSs)	Yes ◉ No ○ N/A ○
PWS coordinates with *local Fire Marshal* on CCC issues for FSSs.	Yes ◉ No ○ N/A ○
PWS ensures backflow prevention is installed before serving *new* connections with FSSs.	Yes ◉ No ○
PWS requires retrofits to *high*-hazard FSSs.	Yes ◉ No. of days allowed: 60 No ○ N/A ○
PWS requires retrofits to *low*-hazard FSSs.	Yes ◉ No. of days allowed: 60 No ○ N/A ○

F. Backflow Prevention for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems *without* chemical addition.	Not Addressed ○ AVB ○ PV/SVBA ○ DCVA ◉ RPBA ○
PWS currently inspects AVBs upon *initial* installation.	Yes ◉ No ○ N/A ○
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Yes ◉ No ○ N/A ○

G. Used Water

Does PWS prohibit, by ordinance, rules, policy, by-laws or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system?	Yes ◉ No ○
If not prohibited at present, date plan to prohibit use.	N/A
Current number of service connections returning used water to distribution system.	0

H. Backflow Prevention for Unapproved Auxiliary Water Supplies[1] NOT Interconnected with PWS
Show the **minimum** backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies *when they are NOT interconnected to the PWS.*

Existing **service connections.**	None ○ DCVA ○ RPBA ◉ AG ○
Type of protection required.	N/A ○ In-premises prevention ○ Premises isolation ◉
New **service connections.**	None ○ DCVA ○ RPBA ◉ AG ○
Type of protection required.	N/A ○ In-premises prevention ○ Premises isolation ◉

[1] An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.

I. Backflow Prevention for Tanker Trucks and Temporary Water Connections

Minimum **level of backflow prevention (installed on or associated with the truck) required for tanker trucks taking water from PWS.**	AG ◉ DCVA ○ RPBA ○ Not Specified ○ Tanker trucks not allowed ○
PWS requires tanker trucks to obtain water at designated fill sites each equipped with permanently installed backflow preventer(s).	Yes ◉ (Minimum preventer: DCVA ◉ RPBA ○) No ○ N/A ○ No sites provided ○
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Yes ○ No ◉ N/A ○
Minimum **level of backflow prevention required for temporary water connections (e.g., for construction sites).**	AG ○ DCVA ◉ RPBA ○ Not specified ○ Temp. connections not allowed ○
PWS provides approved backflow preventer for temporary connections.	Yes ◉ No ○ N/A ○ (Temp. connections not allowed)
PWS requires testing each time the temporary connection backflow preventer is relocated.	Yes ○ No ◉ N/A ○ (Temp. connections not allowed)

J. Backflow Prevention for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow prevention required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Prevention Required
Commercial	Yes ◉ No ○	Not Required ○ DCVA ◉ RPBA ○
Industrial	Yes ○ No ◉	Not Required ○ DCVA ◉ RPBA ○
Institutional	Yes ◉ No ○	Not Required ○ DCVA ○ RPBA ◉

K. Backflow Prevention for Wholesale Customers

Indicate whether the PWS requires backflow prevention at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has Customers of this Type	Minimum Backflow Prevention Required (if prevention is required, indicate minimum level).	
Existing	Yes ◉ No ○	Not specified / Not required ○ Always required ○ Required only if purchaser's CCC program is inadequate ◉	Minimum required (if applicable): DCVA ◉ RPBA ○
New	Yes ○ No ◉	Not specified / Not required ○ Always required ◉ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ◉ RPBA ○

L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan *allows* system to grant exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii)	Yes ○ No ○ Doesn't Address ◉
PWS currently grants new Exceptions.	Yes ○ No ◉
PWS granted Exceptions in past reporting years.	Yes ○ No ◉

Part 2: CCC Program Record-Keeping Software

Indicate the type or name of computer software the PWS uses to track CCC records.

BPMS ◉	**Cross-Track (BMI)** ○	**Tokay** ○	**XC2** ○	**Custom developed for or by PWS**[1] ○
Other non-CCC software (e.g. Excel) ○	**Other commercial CCC software (specify)** ○	**None Used** ○		

[1] Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

Part 3: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe accomplishments made in this reporting year.
  - Identify challenges faced in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

Part #	Date Added	Comment
General	05-23-2017	Site survey inspection program in place for 2017. Also, CCS is reviewing all building permits in 2017.

Part 4: Report Certification and Contact Information

I,[Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	05/23/2017	**All ASR Forms Certified/Submitted**	

Designated CCS/CCC Program Manager[1]

Name	Jeff S Olsen	**Title**	Public Works Field Supervisor	**CCS Cert #**	10289
Email Address	olsenj@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

PWS Manager[2]

Name	Greg M Foote	**Title**	Public Works Superintendent	**Operator Cert #**	4475
Email Address	footeg@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Backflow Prevention for Severe Health Hazard Facilities (Gray)
Annual Summary Report (ASR) for 2016

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

Part 1: Backflow Prevention Status

- Describe the backflow prevention status at the end of the reporting year for each wastewater treatment plant and nuclear facility your system serves.
- If you serve more than one severe health hazard facility, click the "Add Facility" button to display another facility data entry box.
- If you serve more than one connection to the same facility, click the "Add Connection" button to display another connection row for that facility.
- You may add as many facilities and connections as needed.
- To update this form, you may delete facilities and connections which are no longer served.

Facility 1 of 1

Facility Name	City of Gig Harbor Wastewater Treatment
Physical Address	4212 Harborview Drive
City	Gig Harbor
Zip	98335
NPDES Permit#	WA0023957
Facility Type	Wastewater Treatment Plant (WWTP)
Facility Comments	

Facility 1 Connection 1 of 1

Connection Name	City of Gig Harbor WWTP
Backflow Prevention Status	Premises Isolation RP but No In-Plant Air Gap
Connection Comments	

Part 2: Report Certification and Contact Information

I,[Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	05/25/2017	**All ASR Forms Certified/Submitted**	

Designated CCS/CCC Program Manager[1]

Name	Jeff S Olsen	**Title**	Public Works Field Supervisor	**CCS Cert #**	10289
Email Address	olsenj@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

PWS Manager[2]

Name	Greg M Foote	**Title**	Public Works Superintendent	**Operator Cert #**	4475
Email Address	footeg@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

ASR Forms Package Submission Confirmation Screen
Annual Summary Report (ASR) for 2016

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE** Logout

For security reasons, your session will expire in about 29 minutes.

ASR Forms Package Submission Confirmation Screen

Drinking Water Home
CCC Navigation Screen
PWS Contact Info
Start a New Form
New/Edit/Print Screen
Quick Reference Guide
Contact DOH
Downloads
Exit

CURRENT YEAR: **2016**

View/Print Forms from Past Years

Congratulations! You've successfully certified and submitted your ASR Forms Package for this reporting year.

- Save (or print) copies of your final certified ASR forms for your water system files using the **Print** buttons on the **New/Edit/Print Screen**.
- If you need to change one or more of your submitted ASR forms:
  - Click the **Unsubmit All ASR Forms** button on the **New/Edit/Print Screen**.
  - Use the **Edit** buttons to access the form(s) you need to change.
  - When you're finished editing each form, click **Ready to Submit**.
  - When you've finished editing all your form(s), click the **Ready to Submit All ASR Forms** button to complete the certification and submission process.

New/Edit/Print Screen | CCC Navigation Screen

Washington State Department of Health
Office of Drinking Water
243 Israel Rd SE
Box 47890
Olympia, Washington, 98504-7890

Last Update: 02/13/2016

Send comments or questions about DOH and its programs to the Center for Public Affairs.
Email comments or questions about this website to DOH EPH CCC Program.

8:22:47 AM

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Public Water System Contact Information
Annual Summary Report (ASR) for 2017

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

	Designated CCS/ CCC Program Manager	PWS Manager
Name	Jeff S Olsen	Ken R Andrews
Job Title	Public Works Field Supervisor	Public Works Superintendent
Phone	253-851-8406	253-851-8406
Email Address	olsenj@cityofgigharbor.net	andrewsk@cityofgigharbor.net
Operator Certified?	Yes - 10289	Yes - 13978
CCS Certified?	Yes - 10289	Yes
BAT Certified?	No	
CCS Status	PWS owner or employee	

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Cross-Connection Control Activities (Blue)
Annual Summary Report (ASR) for 2017

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

Part 1: Designated Cross-Connection Control Specialist (CCS) Information

CCS Name	Jeff S Olsen	CCS Phone	253-851-8406	CCS Cert. #	10289	BAT Cert. #
CCS is: PWS owner or employee						

Part 2: Status of Cross-Connection Control (CCC) Program at End of 2017

Provide information about the status of your CCC Program at the end of the reporting year.

PWS has:		Program Plan Last Updated[3] 06/01/2016
	A written CCC Program Plan[1] ◉ Yes ○ No	
	CCC implementation activities[2] ◉ Yes ○ No	

[1] Enter "Yes" if PWS has **any** type of written CCC Program Plan, policies, or procedures. Written CCC Program Plan must be part of a Water System Plan (WSP) or Small Water System Management Program (SWSMP).
[2] Enter "Yes" if PWS implemented **any** CCC Program activities during the reporting year, such as establishing legal authority, conducting hazard evaluations, requiring installation of backflow assemblies to protect the PWS, requiring assembly testing, maintaining CCC records, or enforcing the PWS's or CCC Program requirements.
[3] PWS can update the CCC Program Plan at any time (independent of WSP or SWSMP update).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is:	
		Included in Written Program Plan	Being Implemented or Is Completed
1	**Legal Authority Established**	◉ Yes ○ No	◉ Yes ○ No
2	**Hazard Evaluation Procedures and Schedules**	○ Yes ◉ No	◉ Yes ○ No
3	**Procedures/Schedules for Ensuring Installation of Backflow Preventers**	○ Yes ◉ No	◉ Yes ○ No
4	**Certified CCS Provided**	◉ Yes ○ No	◉ Yes ○ No
5	**Backflow Preventer Inspection and Testing**	◉ Yes ○ No	◉ Yes ○ No
6	**Assembly Testing Quality Assurance/Quality Control (QA/QC) Program**	○ Yes ◉ No	◉ Yes ○ No
7	**Backflow Incident Response Procedures**	○ Yes ◉ No	◉ Yes ○ No
8	**Public Education Program**	◉ Yes ○ No	◉ Yes ○ No
9	**CCC Records**	◉ Yes ○ No	◉ Yes ○ No
10	**Reclaimed Water Permit**	○ Yes ○ No ◉ N/A	○ Yes ○ No ◉ N/A

Part 3A: PWS Characteristics at End of 2017

Enter the number of connections (new and existing) served by the PWS by type.

Type of Service Connection	Number
Residential (As defined by PWS)	2375
All Other (include dedicated fire lines, dedicated irrigation lines, and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	367
Total Number of Connections	2742

Part 3B: Cross-Connection Control for Severe and High-Hazard Premises and High-Hazard Dedicated Lines Served by the PWS

Answer the following questions carefully. These answers control your access to pages 2 and 3 for data entry.

1. Does your PWS serve any severe or high-hazard premises or any high-hazard dedicated fire or irrigation lines? ◉ Yes ○ No

2. Does PWS serve any high-hazard medical premises? ◉ Yes ○ No

- If you answer Yes to both questions, you must enter data in at least one row on page 2 and one row on page 3.
- If you answer Yes to Question 1 and No to Question 2, you must enter data on page 2 only.
- If you answer No to both questions, pages 2 and 3 will be grayed out to prevent data entry.

- Count only premises PWS serves water to.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information.**

Type of Severe or High-Hazard Premises or Dedicated Lines [WAC 246-290-490(4)(b)]	Number of Connections at end of 2017			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Agricultural (farms and dairies)	0	0	0	0
Beverage bottling plants (including breweries)	2	2	2	0
Car washes	2	2	2	0
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	3	3	3	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	1	1	1	0
Dedicated fire lines with chemical addition or using unapproved auxiliary supplies	0	0	0	0
Food processing plants (including canneries, slaughter houses, rendering plants)	0	0	0	0
Hospitals, medical centers, medical, dental and veterinary clinics, mortuaries, nursing homes, etc., reported on Part 3C page 3 (totals imported from page 3)	18	16	15	0
Dedicated irrigation systems using purveyor's water supply and chemical addition[4]	0	0	0	0
Laboratories	0	0	0	0
Metal plating industries	0	0	0	0
Petroleum processing or storage plants	0	0	0	0
Piers and docks	18	12	12	0
Radioactive material processing plants or nuclear reactors	0	0	0	
Survey access denied or restricted	0	0	0	0
Wastewater lift/pump stations (non-residential only)	5	4	4	0
Wastewater treatment plants	1	1	1	
Unapproved auxiliary water supply interconnected with potable water supply	0	0	0	0
Totals	50	41	40	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections whose premises isolation preventers were inspected (AGs) or tested (RPs) during the reporting year.

[4] For example, dedicated irrigation lines to parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RP), such as aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, for example:"Other manufacturing" or "Other commercial".

Part 3C: Cross-Connection Control for High-Hazard Medical Premises Served by the PWS

- Count only medical premises PWS serves water to.
- Don't count the same premises more than once. If you serve different medical category premises through a single connection, count the connection under the medical category you consider to pose the highest hazard to PWS.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information**

Type of High-Hazard Medical Premises [WAC 246-290-490(4)(b)]	Number of Connections at end of 2017			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	2	2	1	0
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers	2	2	2	0
Out-patient clinics and offices	4	4	4	0
Alternative health out-patient clinics and offices	0	0	0	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors with water-connected X-ray equipment	0	0	0	0
Hospice care centers	0	0	0	0
Childbirth centers	0	0	0	0
Kidney dialysis centers	0	0	0	0
Blood centers	0	0	0	0
Dental clinics and offices	6	5	5	0
Facilities for Housing Patients				
Nursing homes	1	1	1	0
Assisted Living Facilities (formerly Boarding Homes)	2	2	2	0
Residential treatment centers	0	0	0	0
Other Medical-Related Facilities				
Mortuaries with embalming equipment	0	0	0	0
Morgues and autopsy facilities (not in hospitals)	0	0	0	0
Veterinarian offices, clinics and hospitals	1	0	0	0
Totals	18	16	15	0

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises backflow preventers only or connections with premises isolation DCVAs or DCDAs isolation.

Part 4A: Backflow Preventer Inventory and Testing Information for 2017

- Complete all fields. Enter **zero (0)**, if no backflow preventers in a specific category.
- Count only backflow preventers relied on to protect the PWS.
- Count AVBs on *irrigation systems only*. Select No to AVB question above Table 2 if PWS doesn't track AVBs.
- Count multiple tests (or failures) for the same backflow preventer as one test (or failure) for that backflow preventer.
- For multiple service connections or parallel installations, count each assembly separately.
- Count RPDAs and DCDAs as ***single*** assemblies. Count the tests of the mainline assembly and bypass assembly as ***one test***. Count the failure of either the mainline or bypass assembly (or the failure of both) as ***one failure***. Count an entire detector assembly taken out of service as ***one assembly removed from service***.
- Count assemblies installed on dedicated fire or irrigation lines as **Premises Isolation Assemblies** in Table 1.

	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Table 1: Premises Isolation Preventers (include preventers isolating PWS-owned facilities)									
Existing Premises Isolation Backflow Preventers									
1	In service at beginning of 2017	0	6	0	17	0			
2	Inspected and/or tested in 2017[1]	0	6	0	17	0			
3	Failed inspection or test in 2017	0	0	0	0	0			
New Premises Isolation Backflow Preventers									
4	Installed in 2017[2]	0	0	0	1	0			
5	Inspected and/or tested in 2017[1]	0	0	0	1	0			
6	Failed inspection or test in 2017	0	0	0	0	0			
Premises Isolation Backflow Preventers (existing or new)									
7	Removed from service in 2017[3]	0	0	0	0	0			
Total Premises Isolation Preventers at End of 2017		0	6	0	18	0	0	0	0

Does PWS track AVBs on irrigation systems? ○ Yes ◉ No

	Table 2: In-Premises Preventers (include preventers within PWS-owned facilities)								
Existing In-Premises Backflow Preventers									
8	In service at beginning of 2017	2	271	0	973	54	1	5	unk
9	Inspected and/or tested in 2017[1]	2	258	0	937	46	0	0	unk
10	Failed inspection or test in 2017	0	21	0	36	3	0	0	unk
New In-Premises Backflow Preventers									
11	Installed in 2017[2]	0	21	0	151	0	1	0	unk
12	Inspected and/or tested in 2017[1]	0	21	0	151	0	1	0	unk
13	Failed inspection or test in 2017	0	0	0	15	0	0	0	unk
In-Premises Backflow Preventers (existing or new)									
14	Removed from service in 2017[3]	0	0	0	0	3	0	0	unk
Total In-Premises Preventers at End of 2017[4]		2	292	0	1124	51	2	5	0
Grand Totals at End of 2017		2	298	0	1142	51	2	5	0

[1] Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only, using DOH-approved USC field test procedures).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of the reporting year. Replacement preventers may be of a different type than the originals.

[3] Existing or new preventers taken out of service, whether or not they were replaced by the same or a different type of preventer.

Part 4B: Other Implementation Activities in 2017

Complete all cells. Enter zero if not applicable.

Water Use Questionnaires	
Did your PWS send any water use questionnaires to customers during 2017?	○ Yes ◉ No

On-site Hazard Surveys			
Did your CCS conduct any on-site hazard surveys during 2017?			◉ Yes ○ No
	Service Connection Type		
	New	**Existing**	**Total**
1. Number of connections surveyed for cross-connection hazards to PWS.	1	1	2
2. Number of connections requiring backflow prevention to protect PWS.[1,2]	1	1	2

New Exceptions to Premises Isolation	
Did your CCS grant any new premises isolation exceptions in 2017 to high-hazard premises?[3]	○ Yes ◉ No

CCC Enforcement Actions	
Did your PWS take any enforcement actions during 2017?[4]	○ Yes ◉ No

[1] Include services where either premises isolation or in-premises preventers were required to protect the PWS.
[2] Include existing services that need new, additional or higher level backflow prevention.
[3] Submit a completed DOH Exception Form (green) for each new exception granted in the reporting year.
[4] "Enforcement actions" means actions taken by the PWS (such as water shut-off, PWS installation or testing of backflow preventer, assessment of fines, etc.) when the customer fails to comply with the PWS's CCC requirements.

Part 5: Backflow Incidents and "Off-Normal" Events in 2017

	Backflow Incidents, Risk Factors, and Indicators during 2017	Number
Backflow Incidents during 2017		
1	Backflow incidents that contaminated the PWS[5].	0
2	Backflow incidents that contaminated the customer's drinking water system ***only***[5].	0
Risk Factors for Backflow during 2017		
3	Distribution main breaks per 100 miles of pipe.	0.00
4	Low pressure events (<20 psi in PWS distribution system).	0
5	Water outage events.	0
Indicators of Possible Backflow during 2017		
6	Total health-related complaints received by PWS.[6]	0
7	Received during BWA or PN events.[7]	0
8	Received during low pressure or water outage events.	0
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).	28
10	Received during BWA or PN events.[7]	0
11	Number of these complaints received during low pressure or water outage events.	0

[5] Purveyors must submit a Backflow Incident Report form for each backflow incident known to have contaminated the public water system. DOH is also interested in receiving incident report forms for backflow incidents that contaminated the customer's drinking water system only.
[6] Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.
[7] **"BWA"** means **Boil Water Advisory** and **"PN"** means **Public Notification** for water quality reasons.

Part 6: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe challenges faced or accomplishments made in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

Part No.	Date Added	Comments
Pt 1	04-19-2018	Meter readers received training to identify potential cross connection hazards during site visits.
Pt 1	04-23-2018	Continue to work to ensure high hazard facilities are identified and in compliance.

Part 7: Report Certification and Contact Information

I, Ken Andrews , certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/23/2018	**All ASR Forms Certified/Submitted**	04/23/2018

Designated CCS/CCC Program Manager[1]

Name	Jeff S Olsen	**Title**	Public Works Field Supervisor	**CCS Cert #**	10289
Email Address	olsenj@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

PWS Manager[2]

Name	Ken R Andrews	**Title**	Public Works Superintendent	**Operator Cert #**	13978
Email Address	andrewsk@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Cross-Connection Control Program Summary (Cream)
Annual Summary Report (ASR) for 2017

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

Describe the characteristics of the PWS's Cross-Connection Control (CCC) Program at the end of 2017.

Part 1: CCC Program Characteristics

A. Type of Program Implemented

Type of Program	Check One
Premises isolation only.	○
Combination program: reliance on both premises isolation and in-premises prevention.	◉
In transition from a combination program to a premises isolation only program.	○

B. Coordination with Authority Having Jurisdiction (AHJ) on CCC Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code at the local level. The AHJ is usually your county or city building department. Don't list DOH as an AHJ.

AHJ #	Name of AHJ (City or County Building Department)[1]	PWS		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	City of Gig Harbor Building Department	Yes ◉ No ○	Yes ○ No ◉	Yes ○ No ○

[1] Do not enter an individual's name.

C. Corrective/Enforcement Actions Available to the Purveyor

Type of Corrective Action/Enforcement Action	Indicate Whether Available	Most Often Used (Check One)
Purveyor denies or discontinues water service.	Yes ◉ No ○	◉
Purveyor installs backflow assembly and bills customer.	Yes ○ No ◉	○
Purveyor assesses fines (in addition to eliminating or controlling cross connection).	Yes ◉ No ○	○
Purveyor tests backflow assembly and bills customer.	Yes ○ No ◉	○

[1] Enter detailed description of other enforcement actions available to PWS. Don't enter "None", "Not Applicable", or "Not Available."

D. CCC Program Responsibilities
Do not include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	○	◉
Backflow preventer (BP) ownership	◉	○
BP installation	◉	○
BP *initial* inspection (for proper installation - all BPs)	○	◉
BP *initial* test (for testable assemblies)	◉	○
BP *annual* inspection (Air Gaps and AVBs)	○	◉
BP *annual* test (for testable assemblies)	◉	○
BP maintenance and repair	◉	○

E. Backflow Prevention for Fire Protection Systems
Please remember to enter number of days allowed if you require retrofitting.

PWS coordinates with *AHJ* on CCC issues for fire sprinkler systems (FSSs)	Yes ◉ No ○ N/A ○
PWS coordinates with *local Fire Marshal* on CCC issues for FSSs.	Yes ◉ No ○ N/A ○
PWS ensures backflow prevention is installed before serving *new* connections with FSSs.	Yes ◉ No ○
PWS requires retrofits to *high*-hazard FSSs.	Yes ◉ No. of days allowed: 60 No ○ N/A ○
PWS requires retrofits to *low*-hazard FSSs.	Yes ◉ No. of days allowed: 60 No ○ N/A ○

F. Backflow Prevention for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems *without* chemical addition.	Not Addressed ○ AVB ○ PV/SVBA ○ DCVA ◉ RPBA ○
PWS currently inspects AVBs upon *initial* installation.	Yes ◉ No ○ N/A ○
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Yes ◉ No ○ N/A ○

G. Used Water

Does PWS prohibit, by ordinance, rules, policy, by-laws or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system?	Yes ◉ No ○
If not prohibited at present, date plan to prohibit use.	N/A
Current number of service connections returning used water to distribution system.	0

H. Backflow Prevention for Unapproved Auxiliary Water Supplies[1] NOT Interconnected with PWS
Show the **minimum** backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies *when they are NOT interconnected to the PWS.*

Existing **service connections.**	None ○ DCVA ○ RPBA ◉ AG ○
Type of protection required.	N/A ○ In-premises prevention ○ Premises isolation ◉
New **service connections.**	None ○ DCVA ○ RPBA ◉ AG ○
Type of protection required.	N/A ○ In-premises prevention ○ Premises isolation ◉

[1] An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.

I. Backflow Prevention for Tanker Trucks and Temporary Water Connections

Minimum **level of backflow prevention (installed on or associated with the truck) required for tanker trucks taking water from PWS.**	AG ◉ DCVA ○ RPBA ○ Not Specified ○ Tanker trucks not allowed ○
PWS requires tanker trucks to obtain water at designated fill sites each equipped with permanently installed backflow preventer(s).	Yes ◉ (Minimum preventer: DCVA ◉ RPBA ○) No ○ N/A ○ No sites provided ○
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Yes ○ No ◉ N/A ○
Minimum **level of backflow prevention required for temporary water connections (e.g., for construction sites).**	AG ○ DCVA ◉ RPBA ○ Not specified ○ Temp. connections not allowed ○
PWS provides approved backflow preventer for temporary connections.	Yes ◉ No ○ N/A ○ (Temp. connections not allowed)
PWS requires testing each time the temporary connection backflow preventer is relocated.	Yes ○ No ◉ N/A ○ (Temp. connections not allowed)

J. Backflow Prevention for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow prevention required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Prevention Required
Commercial	Yes ◉ No ○	Not Required ○ DCVA ◉ RPBA ○
Industrial	Yes ○ No ◉	Not Required ○ DCVA ◉ RPBA ○
Institutional	Yes ◉ No ○	Not Required ○ DCVA ○ RPBA ◉

K. Backflow Prevention for Wholesale Customers

Indicate whether the PWS requires backflow prevention at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has Customers of this Type	Minimum Backflow Prevention Required (if prevention is required, indicate minimum level).	
Existing	Yes ◉ No ○	Not specified / Not required ○ Always required ○ Required only if purchaser's CCC program is inadequate ◉	Minimum required (if applicable): DCVA ◉ RPBA ○
New	Yes ○ No ◉	Not specified / Not required ○ Always required ◉ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ◉ RPBA ○

L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan *allows* system to grant exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii)	Yes ○ No ○ Doesn't Address ◉
PWS currently grants new Exceptions.	Yes ○ No ◉
PWS granted Exceptions in past reporting years.	Yes ○ No ◉

Part 2: CCC Program Record-Keeping Software

Indicate the type or name of computer software the PWS uses to track CCC records.

BPMS ◉	**Cross-Track (BMI)** ○	**Tokay** ○	**XC2** ○	**Custom developed for or by PWS**[1] ○
Other non-CCC software (e.g. Excel) ○	**Other commercial CCC software (specify)** ○	**None Used** ○		

[1] Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

Part 3: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe accomplishments made in this reporting year.
  - Identify challenges faced in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

Part #	Date Added	Comment
General	05-23-2017	Site survey inspection program in place for 2017. Also, CCS is reviewing all building permits in 2017.

Part 4: Report Certification and Contact Information

I,Ken Andrews, certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/23/2018	**All ASR Forms Certified/Submitted**	04/23/2018

Designated CCS/CCC Program Manager[1]

Name	Jeff S Olsen	**Title**	Public Works Field Supervisor	**CCS Cert #**	10289
Email Address	olsenj@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

PWS Manager[2]

Name	Ken R Andrews	**Title**	Public Works Superintendent	**Operator Cert #**	13978
Email Address	andrewsk@cityofgigharbor.net	**Phone**	253-851-8406	**Phone Ext**	

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Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Backflow Prevention for Severe Health Hazard Facilities (Gray)
Annual Summary Report (ASR) for 2017

PWS ID: **276009** PWS Name: **GIG HARBOR WATER DEPT** County: **PIERCE**

Part 1: Backflow Prevention Status

- Describe the backflow prevention status at the end of the reporting year for each wastewater treatment plant and nuclear facility your system serves.
- If you serve more than one severe health hazard facility, click the "Add Facility" button to display another facility data entry box.
- If you serve more than one connection to the same facility, click the "Add Connection" button to display another connection row for that facility.
- You may add as many facilities and connections as needed.
- To update this form, you may delete facilities and connections which are no longer served.

Facility 1 of 1

Facility Name	City of Gig Harbor Wastewater Treatment
Physical Address	4212 Harborview Drive
City	Gig Harbor
Zip	98335
NPDES Permit#	WA0023957
Facility Type	Wastewater Treatment Plant (WWTP)
Facility Comments	

Facility 1 Connection 1 of 1

Connection Name	City of Gig Harbor WWTP
Backflow Prevention Status	Premises Isolation RP but No In-Plant Air Gap
Connection Comments	

Part 2: Report Certification and Contact Information

I,Ken Andrews, certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/23/2018	**All ASR Forms Certified/Submitted**	04/23/2018

Designated CCS/CCC Program Manager[1]

Name	Jeff S Olsen	**Title**	Public Works Field Supervisor	**CCS Cert #**	10289
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Appendix O-2

ORDINANCE NO. 1331

ORDINANCE NO. 1331

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF GIG HARBOR, WASHINGTON, RELATING TO THE CITY'S WATER SYSTEM; REPEALING SECTION 13.02.300 OF THE GIG HARBOR MUNICIPAL CODE AND ADOPTING A NEW CHAPTER 13.06 CREATION AND IMPLEMENTATION OF CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION; PROVIDING FOR SEVERABILITY AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, the City of Gig Harbor (City) has multiple water purveyors located within the corporate limits; and

WHEREAS, the City of Gig Harbor Water Department (Department) is the largest of those water purveyors; and

WHEREAS, the Department is required by Washington Administrative Code (WAC) 246-290-490 through the Washington State Department of Health to adopt by ordinance and implement a cross connection control program; and

WHEREAS, Section 13.02.300 of the Gig Harbor Municipal Code (GHMC) prohibits cross-connections but does not meet the requirements of WAC 246-290-490; and

WHEREAS, the Department currently employs six cross connection control specialists who receive specialty training for the implementation of the Cross Connection Control Program and follow the sixth edition of the Pacific Northwest Section of the American Water Works Association Cross Connection Control Manual; and

WHEREAS, this ordinance applies only to the retail water service area associated with the Department; and

WHEREAS, the proposed regulations were forwarded to the Washington State Department of Commerce pursuant to RCW 36.70A.106 and approved on December 9, 2015; and

WHEREAS, the City's SEPA Responsible Official issued a Determination of Nonsignificance for this Ordinance on January 6, 2016; and

WHEREAS, the Gig Harbor City Council considered the Ordinance at first reading and public hearing on February 8, 2016; Now, therefore,

THE CITY COUNCIL OF THE CITY OF GIG HARBOR, WASHINGTON, ORDAINS AS FOLLOWS:

Section 1. Section 13.02.300 of the Gig Harbor Municipal Code is hereby repealed.

Section 2. A new Chapter 13.06 is hereby added to the Gig Harbor Municipal Code as follows:

13.06.010 Declaration of Title.
This code shall be known as the cross connection control and backflow prevention code.

13.06.020 Definitions.
The definitions used in this Chapter are established in Chapter 1 of the *Manual of Cross-Connection Control, Tenth Edition* by University of Southern California with the following amendment:

1.72 "Water Supplier" shall mean the City of Gig Harbor Water Department.

13.06.030 Purpose.
The purpose of this code is to:

A. To protect the Water Supplier's public potable water supply of from the possibility of contamination or pollution by isolating within the consumer's internal distribution system(s) or the consumer's private water system(s) such contaminants or pollutants which could backflow into the public water systems; and
B. To promote the elimination or control of existing cross-connections, actual or potential, between the Water Supplier's public water system and the consumer's on-premise water system; and
C. To provide for the maintenance of a continuing Program of Cross-Connection Control which will systematically and effectively prevent the contamination or pollution of the Water Supplier's water system; and
D. To meet the Water Supplier's requirements mandated by WAC 246-290-490(3).

13.06.040 Authority.
The authority shall be the City of Gig Harbor Water Department Superintendent (Superintendent) or his or her designee and shall be certified as a Water Distribution Manager (WDM) – 2 and a Cross Connection Control Specialist. The Superintendent shall be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow of contaminants or pollutants through the service connection.

13.06.050 Adoption of technical manuals.
The manuals noted below are hereby adopted as the city's manual for protecting the Water Supplier from cross connections. Where conflicts exist the most stringent requirement shall apply.

1. *Manual of Cross-Connection Control, Tenth Edition* by University of Southern California (USC Manual)
2. *Cross-Connection Control Manual Accepted Procedures and Practice, Seventh Edition, November 2012* by Pacific Northwest Section American Water Works Association (PNS-AWWA Manual)
3. *Cross-Connection Control Manual, February 2003* by the United States Environmental Protection Agency
4. *Public Works Standards 2014* by the City of Gig Harbor.

13.06.060 Water system framework.
The jurisdictions of water systems shall be comprised of two parts: The Water Supplier's system and the consumer's system.

A. Water Supplier's water system shall consist of the source facilities and the distribution system, and shall include all those facilities of the water system under the complete control of the Water Supplier, up to and including the water meter.
    1. The source facilities shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system.
    2. The distribution system shall include the network of conduits used for the delivery of water from the source to the consumer's system.
B. The consumer's system shall include those facilities beyond the water meter conveying water from the Water Supplier's water system to points of use.

13.06.100 Review of new and existing service connections.
All City of Gig Harbor plumbing permit applications requiring or having a service connection to the Water Supplier's water system will be reviewed by the Superintendent in accordance with the subsections below and as applicable in accordance with Chapter 15.06.

A. Each new or existing single family residential service connection shall be reviewed using the technical manuals for possible cross connections and may require an approved backflow prevention assembly per Section 13.06.130 adjacent to the water meter on the consumer's side of the service connection. If a single family residential service connection includes an irrigation system, a double check valve backflow prevention assembly shall be installed adjacent to the water meter on the consumer's side of the irrigation system service connection.
B. Each new non-single family residential service connection shall install an approved backflow prevention assembly per Section 13.06.130 adjacent to the water meter on the consumer's side of the service connection. If the use for all inhabitable spaces within a non-single family residential structure is not known at the time of plumbing permit application, a reduced pressure backflow prevention assembly shall be installed adjacent to the water meter on the consumer's side of the service connection.

13.06.110 Existing service connection review program.
Each existing service connection will be reviewed by the Superintendent in the manner and frequency described in the Water Supplier's Water System Plan. If a cross connection or potential cross connection is found, the consumer shall install an approved backflow prevention assembly in accordance with this chapter and/or Chapter 15.06 at the consumer's expense immediately.

13.06.120 Backflow assembly specifications.
On the date of their installation, all backflow prevention assemblies shall be included on the Washington State Department of Health's approved backflow prevention assembly list. This list is available from the City Clerk or from the Washington State Department of Health.

13.06.130 Backflow assembly types.
The type of backflow prevention assembly required for installation shall depend upon the degree of hazard which exists. The actual backflow assembly type shall be determined by the Superintendent based on elements of the technical manuals.

13.06.140 Recordkeeping of installed backflow prevention assemblies.
The Water Supplier will maintain records of all installed backflow prevention assemblies.

13.06.150 Qualifications of commercial testing companies
Commercial companies that test backflow prevention assemblies for compliance with this chapter shall be certified by the Washington State Department of Health. The Water Supplier maintains a list of these commercial testing companies approved to perform testing of backflow prevention assemblies. If a desired commercial testing company is not on the approved list, the company may submit qualifications to the Water Supplier and request authorization to perform backflow prevention testing.

13.06.160 Testing of backflow prevention assemblies prior to initial operation.
Each backflow prevention assembly shall be tested by a commercial testing company prior to initial operation. However, new backflow preventers that have been granted a Certificate of Compliance and have been approved by the Superintendent may be installed and put into service without further test or qualification.

13.06.170 Testing and repairing backflow prevention assemblies after initial operation.

A. Each backflow prevention assembly after initial testing shall be field tested on an annual basis by a commercial testing company selected and coordinated by the consumer. The field test shall occur no later than the annual date of installation. In those instances where the Superintendent deems the hazard to be great enough, the Superintendent may require field tests at more frequent intervals.
B. If repair or relocation of a backflow prevention assembly is required, each backflow prevention assembly shall be field tested after being repaired or relocated and prior to being placed back into service.

C. A representative from the Water Supplier may witness the field tests at the discretion of the Water Supplier. Records of the field tests and all repairs shall be submitted to the Water Supplier.
D. All expenses related to testing, repairs, relocation, or replacement shall be at the expense of the consumer.
E. In cases where ownership of a backflow preventer is unclear, the Water Supplier will perform the testing or repairs and shall proportionately charge all customers receiving service through the backflow prevention assembly.

13.06.180 Backflow prevention assembly quality control assurance.
Qualifications of each backflow assembly tester performing backflow assembly testing within the Water Supplier's water service area will be reviewed by the Superintendent in the manner and frequency described in the Water Supplier's Water System Plan.

13.06.190 Inspections.
The consumer must allow for inspections at reasonable times to authorized representatives of the Superintendent to determine compliance with this code.

13.06.200 Backflow prevention assembly incidents.
The Water Supplier will respond to backflow prevention incidents as described in the Water Supplier's Water System Plan.

13.06.210 Operation and Maintenance of protected connections.
Operation and maintenance of the consumer's system by the consumer shall be continuous. Service of water to any premises shall be discontinued by the Water Supplier if any of the following conditions exist:

A. Required backflow prevention assembly is not installed, tested, or maintained; or
B. Backflow prevention assembly has been removed or bypassed; or
C. Unprotected cross-connection exists on the premises.

Service will not be restored until such conditions or defects are corrected and approved by the Water Supplier.

13.06.220 Variances.
The Superintendent may grant a variance from the provisions of this code in accordance with the variance process outlined in the City of Gig Harbor Public Works Standards in lieu of the City Engineer.

13.06.230 Violations – Delinquencies.
The lack of use, improper placement, uncompleted repairs, untimely field testing, unpermitted connection to the public water system or any activity which violates the provisions of this code shall be unlawful and a violation of this code.

A. Field testing as required by this code shall be deemed delinquent if the field test results are not presented to the Water Supplier within 20 days following the annual date of installation. For each delinquent field test the Water Supplier will

provide a delinquency notice by certified mail to the property owner and, if the record owner does not reside at the premises, the occupant. In the event field testing remains delinquent 45 days following the annual date of installation, the Water Supplier will mail and hand deliver a shut-off notice to the property owner and, if the record owner does not reside at the premises, the occupant. The shut-off notice will provide the following: (1) water service will be shut off unless field test results are presented to the Water Supplier within 10 days of the date of the shut-off notice; (2) address and telephone number of the Water Supplier, stating that the owner or occupant may contact the department if a dispute exists as to the required filed testing; and (3) a $40.00 fee will be charged for the shut-off notice. If the property owner has not corrected the delinquency within the time provided under the shut-off notice, the Water Supplier will shut off water service. Once the delinquency is corrected the Water Supplier will turn on water service.

B. For all other violations of this code the Superintendent will issue a correction notice or a stop work order, depending on the severity of the violation.
    1. If a correction notice is issued, the Water Supplier will mail a correction notice to the property owner and, if the record owner does not reside at the premises, the occupant. All corrections deemed necessary by the Superintendent shall be corrected within 20 days following the date of issuance of the correction notice. If corrections are not completed within 45 days following the date of issuance of the correction notice, the Water Supplier may shut off water service until all corrections are completed. The Water Supplier will charge a $40.00 fee to shut off the water.
    2. If a stop work order is issued, the Superintendent may at their discretion, shut off water service immediately. All violations shall be corrected and accepted by the Superintendent prior to lifting of the stop work order and, if water service was shut off, turning water service back on. The Water Supplier will charge a $40.00 fee to shut off the water.

13.06.240 Remedies not exclusive

The remedies set forth in this chapter are not exclusive. The city council may authorize the city attorney to take any legally authorized actions against a noncompliant permittee or consumer, including, but not limited to, all applicable remedies enumerated in this chapter and available under applicable law.

Section 3. Severability. If any section, sentence, clause or phrase of this Ordinance should be held to be unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity or constitutionality of any other section, sentence, clause or phrase of this Ordinance.

Section 4. Effective Date. This Ordinance shall take effect and be in full force on June 1, 2016 after passage and publication of an approved summary consisting of the title.

PASSED by the Council and approved by the Mayor of the City of Gig Harbor, this 22nd day of February, 2016.

CITY OF GIG HARBOR

Mayor Jill Guernsey

ATTEST/AUTHENTICATED:

Molly M. Towslee, City Clerk

APPROVED AS TO FORM:
Office of the City Attorney

Angela G. Summerfield

FILED WITH THE CITY CLERK: 02/03/16
PASSED BY THE CITY COUNCIL: 02/22/16
PUBLISHED: 02/24/16
EFFECTIVE DATE: 06/01/16
ORDINANCE NO: 1331

Appendix P

CAPITAL IMPROVEMENT PROGRAM TABLE (FUTURE DOLLARS)

City of Gig Harbor
Comprehensive Water System Plan Update
Capital Improvement Program

Unprotect password: CIP

Capital Improvements Program Summary (Future Dollars)

CIP Phasing (Future Dollars)

Project	Total CIP Cost Estimate			Short-Term 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Long-Term 2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	Short-term (2018-2027)	Long-term (2028-2037)
New Water Main	$ 3,110,000	Pressure Zone	Description/Location	$ -	$ -	$ 63,000	$ -	$ 601,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,078,000	$ 368,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 664,000	$ 2,446,000
N-01	$ 368,000	450	Canterwood Blvd NW and Bering St NW	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 368,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 368,000
N-02	$ 2,078,000	450	Sehmel Dr NW and Burnham Dr NW	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,078,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,078,000
N-03	$ 601,000	450	Vernhardson St and Burnham Dr NW	$ -	$ -	$ -	$ -	$ 601,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 601,000	$ -
N-04	$ 63,000	450	Olympic Dr NW and Hollycroft Street	$ -	$ -	$ 63,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 63,000	$ -
	$ -																							$ -	$ -
Pipe Upsize	$ 2,897,000	Pressure Zone	Description/Location	$ -	$ 1,980,000	$ -	$ -	$ -	$ 469,000	$ 335,000	$ -	$ -	$ -	$ 113,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,784,000	$ 113,000
U-01	$ 480,000	440	Grandview St between Stinson Ave and Pioneer Way	$ -	$ 480,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 480,000	$ -
U-02	$ 66,000	440	Shore Acres	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 66,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 66,000
U-03	$ 47,000	440	Shore Acres	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 47,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 47,000
U-04	$ 104,000	440	Shurgard Tank to Soundview Drive	$ -	$ -	$ -	$ -	$ -	$ 104,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 104,000	$ -
U-05	$ 190,000	440	Shurgard East Tee	$ -	$ -	$ -	$ -	$ -	$ 190,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 190,000	$ -
U-06	$ 272,000	440	Olympic Village Loop	$ -	$ -	$ -	$ -	$ -	$ -	$ 272,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 272,000	$ -
U-07	$ 175,000	440	Reid Drive NW between 56th Street NW and 55th Street NW	$ -	$ -	$ -	$ -	$ -	$ 175,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 175,000	$ -
U-08	$ 63,000	440	Deer Creek Lane	$ -	$ -	$ -	$ -	$ -	$ -	$ 63,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 63,000	$ -
U-09	$ 1,500,000	320/440	Stinson Ave from Rosedale St NW to Pioneer Way	$ -	$ 1,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,500,000	$ -
Storage	$ 1,800,000	Pressure Zone	Description/Location	$ -	$ -	$ 800,000	$ -	$ -	$ -	$ -	$ -	$ 1,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,800,000	$ -
ST-01	$ 1,799,900	440/450	Tank Recoating	$ -	$ -	$ 799,900	$ -	$ -	$ -	$ -	$ -	$ 1,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,799,900	$ -
Supply	$ 12,012,000	Pressure Zone	Description/Location	$ 3,000,000	$ 650,000	$ -	$ -	$ -	$ 175,000	$ 200,000	$ 4,458,000	$ -	$ -	$ -	$ -	$ 254,000	$ 3,275,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,483,000	$ 3,529,000
S-01	$ 4,633,000		Well 9 and PRV Station	$ -	$ -	$ -	$ -	$ -	$ 75,000	$ 100,000	$ 4,458,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,633,000	$ -
S-02	$ 250,000		Clean and Inspect Well 3 Casing (Well 3)	$ -	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 250,000	$ -
S-03	$ 3,529,000		Well 6 Treatment System	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 254,000	$ 3,275,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,529,000
S-04	$ 200,000		Conjunctive Supply Strategy	$ -	$ -	$ -	$ -	$ -	$ 99,700	$ 100,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 200,000	$ -
S-05	$ 400,000		Emergency Intertie (Caterwood Water System)	$ -	$ 400,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 400,000	$ -
S-06	$ 3,000,000		Well 11	$ 3,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,000,000	$ -
AC Replacement	$ 5,445,000	Pressure Zone	Description/Location	$ -	$ -	$ -	$ 250,000	$ 258,000	$ 266,000	$ 273,000	$ 282,000	$ 290,000	$ 299,000	$ 308,000	$ 317,000	$ 326,000	$ 336,000	$ 346,000	$ 357,000	$ 367,000	$ 379,000	$ 390,000	$ 402,000	$ 1,918,000	$ 3,528,000
R-01	$ 5,445,200		Asbestos Cement Water Line Replacement Program			$ -	$ 250,000	$ 257,700	$ 265,500	$ 273,000	$ 282,000	$ 290,000	$ 299,000	$ 308,000	$ 317,000	$ 326,000	$ 336,000	$ 346,000	$ 357,000	$ 367,000	$ 379,000	$ 390,000	$ 402,000	$ 1,917,200	$ 3,528,000
General	$ 9,101,000	Pressure Zone	Description/Location	$ 250,000	$ 1,023,000	$ 694,000	$ 27,000	$ -	$ -	$ -	$ -	$ -	$ 326,000	$ 806,000	$ 5,537,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 438,000	$ 2,320,000	$ 6,781,000
G-01	$ 1,014,000		Water System Plan Update	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 326,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 438,000	$ 576,000	$ 438,000
G-02	$ 53,800		Reuse and Reclaimed Water Study Phase Two	$ -	$ -	$ 26,500	$ 27,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 53,800	$ -
G-03	$ 300,300		Water Share of Public Works Operations Building	$ -	$ 33,000	$ 267,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 300,300	$ -
G-04	$ 400,000		Water Share of Public Works Decant Facility	$ -	$ -	$ 400,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 400,000	$ -
G-05	$ 990,000		Water Share of Public Works Operations - Site Development	$ -	$ 990,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 990,000	$ -
G-06	$ 6,343,000		Water Share of Satellite Reuse Plant in Waste Water Basin 12	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 806,000	$ 5,537,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,343,000
CIP Total (Future Dollars)	$ 34,365,000			$ 3,250,000	$ 3,653,000	$ 1,556,850	$ 277,150	$ 858,850	$ 909,600	$ 808,150	$ 4,740,000	$ 1,290,000	$ 625,000	$ 1,227,000	$ 7,932,000	$ 948,000	$ 3,611,000	$ 346,000	$ 357,000	$ 367,000	$ 379,000	$ 390,000	$ 840,000	$ 17,969,000	$ 16,397,000
Annual Cost (Future Dollars)	$ 1,718,000			$ 3,250,000	$ 3,653,000	$ 1,556,850	$ 277,150	$ 858,850	$ 909,600	$ 808,150	$ 4,740,000	$ 1,290,000	$ 625,000	$ 1,227,000	$ 7,932,000	$ 948,000	$ 3,611,000	$ 346,000	$ 357,000	$ 367,000	$ 379,000	$ 390,000	$ 840,000	$ 1,797,000	$ 1,640,000

Appendix Q

EPS CALIBRATION

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PROJECT MEMORANDUM

Project Name:	Well No. 11 Final Design	Date:	June 18, 2014
Client:	City of Gig Harbor	Project Number:	8417D10
Prepared By:	Ed Wicklein		
Reviewed By:			
Subject:	Well No. 11 System Hydraulic Analysis		

1.0 WELL NO. 11 HYDRAULIC SCENARIOS

The City of Gig Harbor has drilled and tested a new Well No. 11. The well infrastructure is now being designed to connect the well to the City's distribution system. Figure 1 shows the system split into two pressure zones. The lower zone is at a hydraulic grade of approximately 320 feet on the east side of the system following the shore of Puget Sound, while the upper zone is at a hydraulic grade of approximately 450 feet and covers most of the service area running north and south. As shown in Figure 1, the new Well No. 11 is physically located within the 450 Zone. Well No. 11 is anticipated to be the largest system source. Three scenarios were proposed for connecting the new well to the distribution system:

Scenario 1. Distribution to only the 320 Zone.

Scenario 2. Distribution to only the 450 Zone.

Scenario 3. Distribution to both the 320 and 450 Zones.

The City's hydraulic model, developed in WaterCAD, was provided for evaluation of the three options. The model included the system demands used for steady-state hydraulic analysis as part of the City's last water system plan update in 2009. The steady-state model was updated, calibrated to hydrant test data, and used for steady-state hydraulic analysis as part of planning and siting of Well No. 11 in 2010[1]. Following that effort, the City continued to maintain and update the model as system conditions changed.

2.0 MODEL UPDATES

The model, as provided by the City, was updated to run in an extended period simulation (EPS) mode to better evaluate the range of operating points for the new Well No. 11.

2.1 Assumptions

The following assumptions were made as part of this hydraulic analysis:

- Recently completed system projects had been incorporated into the model by the City.

[1] City of Gig Harbor Source of Supply Preliminary Evaluation, Carollo Engineers, 2010

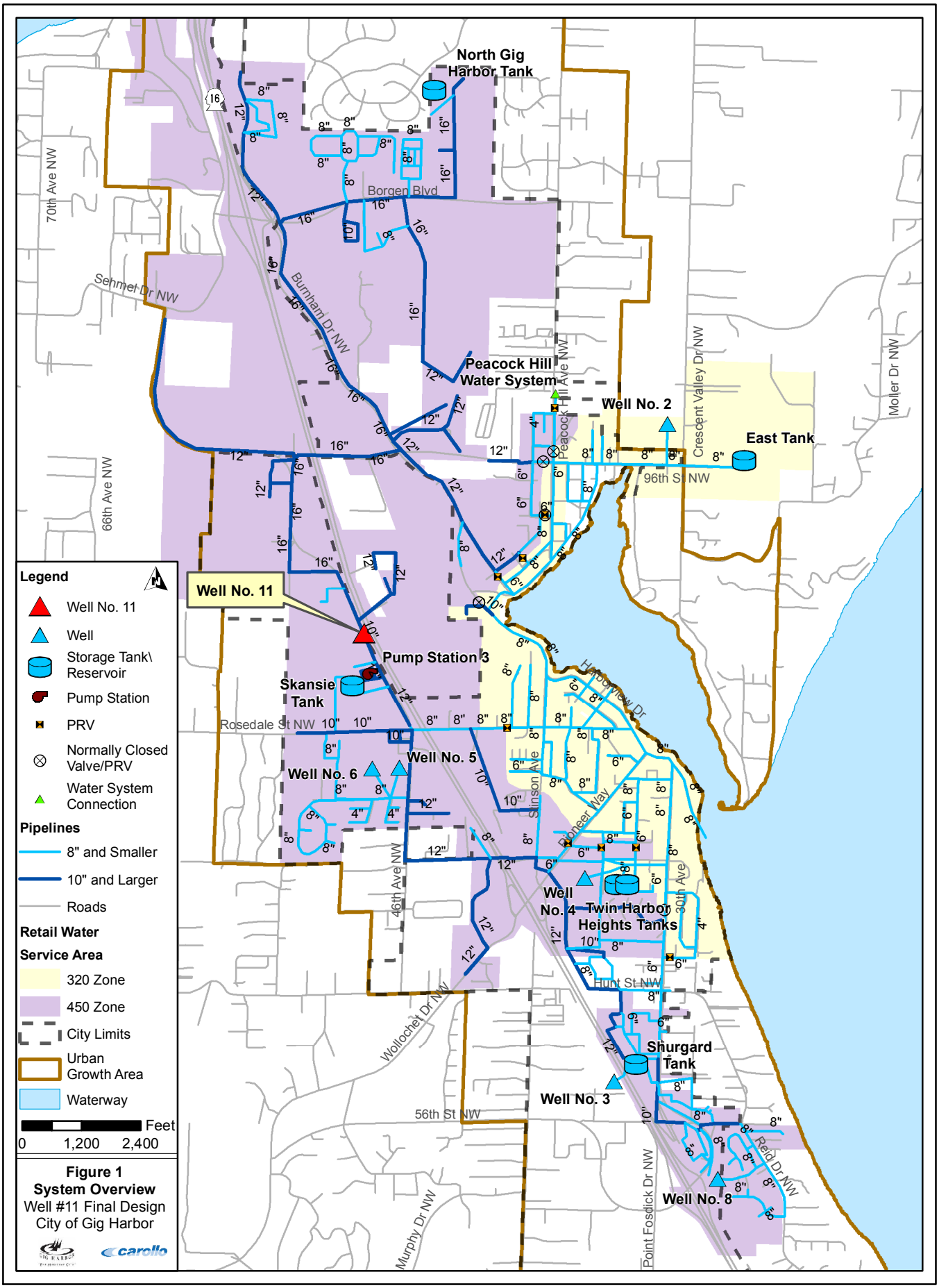


Figure 1
System Overview
Well #11 Final Design
City of Gig Harbor

- The demands included in the model for 2008, 2014 and 2028 planning years are still valid.
- Existing wells can maintain their current production levels in the future.
- The wells all supply constant flow at their rated capacity when in operation.

2.2 Diurnal Fluctuations

A generic diurnal curve was added to the model to run in EPS mode. The diurnal curve simulates daily demand fluctuations to capture the range of operating pressures in the system. As a diurnal curve has not been created for the system, an idealized curve was used from the AWWA M32[2]. The AWWA curve peak was increased to 1.59 to reflect the maximum peak hour demand (PHD) multiplier from the water system plan calculated for the City based on Department of Health Criteria[3]. Figure 2 shows the idealized diurnal curve.

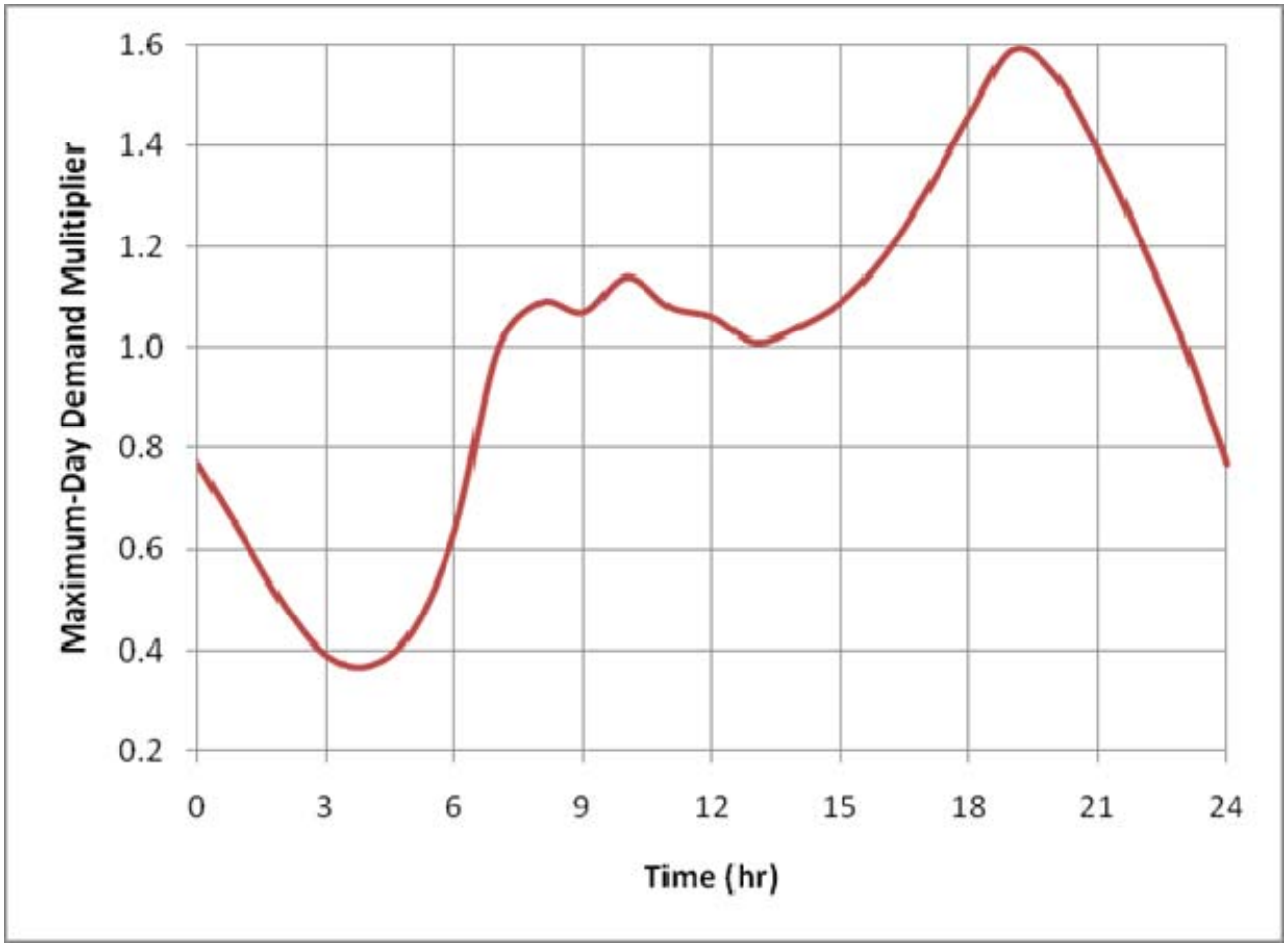
2.3 Operational Controls

The operational controls were added to the model to reflect current operations. These include well controls, a flow control valve (FCV), and the booster pump station (BPS), as shown in Table 1. The 450 Zone sources are all in the southern portion of the zone, helping turn over water stored in the Skansie and Shurgard Tanks. However, much less turnover of the North Tank occurs due to system hydraulics. The BPS was initially installed to provide additional fire capabilities in the north part of the 450 pressure zone; however, the BPS is also now used in regular system operation to turn over the North Tank. When the BPS is operational, the 450 Zone is split into a North and South Zone, and returns to one large 450 zone once the pump station turns off. The BPS fills the North tank, raising the level by approximately 3 feet. When the pumps turn off, water in the North tank drains back to the zone.

2.4 EPS Calibration

Preliminary EPS runs showed the prior static calibration did not completely capture the dynamic system operations. Initially, the East Tank operating level was several feet lower than expected due to higher losses in the southern part of the 320 Zone. The pipe C factor was lowered in the northern part of the 320 Zone, and increased in the southern part of the 320 Zone resulting in a higher tank operating level in the East Tank. Similarly, the losses appeared too low in the northern part of the 450 Zone. The C factor was then lowered in the north to better replicate the system operations. The model was checked with prior calibration data and found to still be in agreement. Overall, the hydraulic grade line (HGL) was only changed by a few feet, but has resulted in a much more normal HGL distribution.

[2] M32: Computer Modeling of Water Distribution Systems, AWWA, 2012
[3] Source of Supply Preliminary Evaluations, Carollo Engineers, 2010



IDEALIZED MAXIMUM DATA DIURNAL CURVE

FIGURE 2

CITY OF GIG HARBOR
WELL 11 FINAL DESIGN

carollo

Table 1 System Controls
Well No. 11 Final Design
City of Gig Harbor

Facility	Zone	Q (gpm)	Control Tank	Tank Base (ft)	On (ft)	Off (ft)
Well 2	320	276	East	304	13.2	14.2
Well 3	450	625	Shurgard	339	91.5	98.0
Well 4[1]	320	200	Grandview	290	26.8	28.0
Well 5[2]	450	500	Skansie	338	95	98.9
Well 6[2]	450	982	Skansie	338	95	98.9
Well 8[3]	450	15				
Grandview FCV[1]	320	200	Grandview	290	26.8	28
BPS[4]	450	2,050	North	312	130	133

Notes:
1) Normal operation is for Well 4 and Grandview FCV to work in conjunction, but they can be operated separately.
2) Well Nos. 5 and 6 normally operate together, and are controlled based on set levels in the Skansie Tank. They can be operated together during high demand periods, or set to the North Tank when the Skansie Tank is out of service.
3) Controls are unknown, the flow is very low relative to the other wells.
4) When the BPS turns on, a valve separates the 450 zone into two parts. The pump normally is used to turn over the North Tank, but also has settings to turn on in the event of low pressure at a site in the north to assist with fire flows. The discharge pressure is regulated to 53 psi by the SCADA system, which is adjustable for flow rates.

3.0 SYSTEM ANALYSIS

3.1 Demands

The system daily demands are summarized in Table 2 for average day demands (ADD) and maximum day demands (MDD) for the planning years, as provided within the model received from the City. The 450 Zone demands are divided into the North and South areas as defined by the BPS control valve. The majority of future growth will occur in the 450 Zone. The demands are met with a combination of equalizing storage in the tanks and well sources. During high demand periods of the day, the system is supplied by the tanks and wells. During low demand periods of the day, the system is supplied by the wells with the balance of inflow being stored in the tanks.

Table 2 System Demands From City-Supplied Model Well No. 11 Final Design City of Gig Harbor				
Planning Year	**320 (gpm)**	**450 North (gpm)**	**450 South (gpm)**	**Total (gpm)**
2008 ADD	299	139	245	683
2008 MDD	740	474	692	1905
2014 ADD	324	284	320	928
2014 MDD	809	717	727	2253
2028 ADD	379	544	488	1410
2028 MDD	947	1511	985	3443

Well No. 11 is anticipated to be the largest water source within the system. Table 3 summarizes the system supply requirements, assuming Well No. 11 provides the maximum supply of 1000 gpm. Well No. 11 is capable of supplying all of the ADD system requirements for 2008 and 2014 planning conditions. The new Well No. 11 could be connected to the system several ways as it is centrally located and has a large available supply.

Table 3 System Supply Scenarios Well No. 11 Final Design City of Gig Harbor			
Year	**Total System Demand (gpm)**	**Well 11 (gpm)**	**Additional System Supply Required (gpm)**
2008 ADD	683	1000	
2008 MDD	1905	1000	905
2014 ADD	928	1000	
2014 MDD	2253	1000	1253
2028 ADD	1410	1000	410
2028 MDD	3443	1000	2443

3.2 Proposed Well No. 11 Connection Scenarios

The three scenarios proposed for connecting the new well to the distribution system are evaluated in the following sections.

3.2.1 Scenario 1 – Distribution to Only the 320 Zone

The new Well No. 11 is located approximately one half mile from the 320 Zone, and the well flows are up to 1,000 gpm. Therefore, a 10-inch transmission line would be required to connect the well to the 320 Zone. Demands in the 320 Zone are currently supplied by Well No. 2 and Well No. 4, with additional demand supplied via the Grandview FCV. If Well No. 11 were

connected exclusively to the 320 zone, a new booster pump station would be required to move some of the supply up to the 450 Zone. This option is not practical given the length of required transmission line and need for a new booster pump station.

3.2.2 Scenario 2 – Distribution to Only the 450 Zone

The distribution system adjacent to the new Well No. 11 is in the North 450 Zone, therefore the well could be connected directly to the existing 450 Zone 12-inch transmission line along Skansie Ave. Most of the projected demand growth is in the 450 Zone. This option requires minimal new infrastructure, and therefore is recommended for further evaluation.

3.2.3 Scenario 3 – Distribution to Both the 320 and 450 Zones

The new well could be directly connected to both the 320 and 450 Zones. The well discharge could be divided between the zones using a flow control or pressure reducing valve. A short connection could be made directly to a 450 zone 12-inch transmission line along Skansie Ave and a half mile 8-inch transmission line could connect the well to the nearest 320 Zone connection point. This option requires long transmission line that is redundant to existing connections from the 450 zone to the 320 zone. Therefore this option is not recommended as it requires construction of a new redundant transmission line.

3.2.4 Summary

Connecting the new Well No. 11 directly to the 450 Zone (Scenario 2) is the most practical scenario as the distribution system adjacent to the new well is in the 450 Zone, and there are existing means to supplement 320 Zone demands using gravity supply from the 450 Zone. Demand growth projections are currently low in the 320 Zone. The Grandview FCV is used to supply 320 Zone needs beyond the capacity of Well Nos. 2 and 4. In addition, there are seven PRV stations available to automatically supply water from the 450 Zone to the 320 Zone in the event of a fire or other emergency. The Grandview FCV is linked to the Well No. 11 site via 12-inch diameter transmission mains. Future 320 Zone demands can be met through increasing the flow settings at the Grandview FCV, use of the PRVs, or a second FCV in the northern part of the system. New transmission capacity is not recommended at this time.

3.3 Detailed Analysis of Scenario 2 – Distribution to the only the 450

The nearest connection site for Well No. 11 to the 450 Zone is approximately 500 feet north of the BPS and Skansie Tank Site. The well pump could be used to turn over the North Tank instead of BPS; however, it is recommended that the BPS be maintained as a backup system for the original fire protection needs and turning over the North Tank when Well No. 11 is offline.

The following subsections summarize the system operations and results of the analysis with Well No. 11 at 1,000 gpm, and the BPS placed in standby mode. Well No. 11 was set to turn on and off based on the North Tank levels, similar the current BPS settings, and used the existing Automatic Control Valve (ACV) in the 8000 block of Skansie Ave to promote turnover in the North Tank.

3.3.1 2008 ADD Operations

Well No. 11 is capable of supplying all of the 2008 ADD system demands in both the 450 and 320 Zones. The analysis showed that East Tank Levels could not be maintained due to system

losses from the Grandview FCV. The analysis also showed that the ACV was not opened long enough to completely refill the Shurgard and Skansie Tanks. Well No. 2 should be used to maintain water levels in the East Tank and Well No. 3 should be operated to maintain tank levels in Shurgard and Skansie Tanks.

3.3.2 2008 MDD Operations

An additional 905 gpm is needed for the system beyond the Well No. 11 supply when operating at 1,000 gpm. The analysis assumed Well Nos. 2 and 4 are operating, as Grandview FCV is undersized to meet the complete 320 Zone MDD. The Grandview FCV was set at 264 gpm. System analysis showed that Well Nos. 3 and 8 should be used in conjunction with Well No. 11 to support the southern part of the pressure zone.

3.3.3 2014 ADD Operations

Well No. 11 is capable of supplying all of the 2014 ADD system demands in both the 450 and 320 Zones. As observed with the 2008 ADD demands, the model showed that levels cannot be maintained in the East, Shurgard and Skansie Tanks with only Well No. 11 supplying the system as it is currently configured. As with 2008 ADD, Well No. 2 and Well No. 3 should be operated to maintain system tank levels.

3.3.4 2014 MDD Operations

The total projected MDD for the 2014 planning year is 2,253 gpm. System analysis assumed Well Nos. 2 and 4 are operating, and that the Grandview FCV supplies an additional 333 gpm to the 320 Zone. The hydraulic analysis shows that Well No. 3 needs to be operated to maintain levels in the Shurgard Tank. The balance of flow can be provided by a combination of Well Nos. 5, 6, and 8.

3.3.5 2028 ADD Operations

Well No. 11 is capable of supplying approximately two thirds of the projected 2028 ADD system demands. It is assumed that Well Nos. 2 and 4 will supply the demands in the 320 Zone. System analysis showed that Well No. 3 is needed to run continuously to maintain the Shurgard Tank level, with Well No. 11 cycling on and off based on levels in the North Tank.

3.3.6 2028 MDD Operations

To meet 2028 MDD demands, Well No. 11 and all other wells need to be operational. The North portion of the 450 Zone is projected to have demands of 1,511 gpm, exceeding the capacity of Well No. 11. Analysis showed that the 450 Zone needed to be completely split into the North and South sections to maintain water levels in the North Tank, with the BPS active to supplement flows in the North 450 Zone. The Shurgard Tank showed daily fluctuations of 25 feet, returning to full once per 24-hour cycle. The Skansie Tank level fluctuates between an HGL of 413 and 430 feet.

The model shows that system hydraulic losses in the 320 Zone led to an HGL below the East Tank invert elevation. PRV-9 is opening to augment supply in the northern area of the 320 Zone when the tank is empty. The PRV-9 settings were raised in the Model so the PRV would operate to maintain tank water levels.

4.0 RECOMMENDATIONS

After performing a hydraulic analysis, it is recommended that the new Well No. 11 be connected to the 450 pressure zone. In the short-term, Well No. 11 should be operated at 1,000 gpm to mimic the current BPS operation to turn over the North Tank, while maintaining the BPW in standby mode for low pressure conditions in the North 450 Zone and future conditions when Well No. 11 cannot supply the demands. The City should also keep the ACV for splitting the 450 pressure zone into north and south systems.

Well No. 2 and Well No. 3 need to be operated in conjunction with the new Well No. 11 to maintain water levels in the East and Shurgard Tanks. It is recommended that the City add a normal supply PRV to either PRV Station 8 at Prentice and Burnham or PRV Station 9 at Prentice and Fuller, or change the operating settings of one of these PRVs. The PRV will maintain pressures and increase options to supply flow to the northern part of the 320 Zone and maintain levels in the East Tank for Future conditions. The PRV can serve as a backup to Well No. 2 if the well production decreases in the future, or the city wants to rest the well in the near term.

Prepared By:

Ed Wicklein