

CITY AND BOROUGH OF SITKA, ALASKA

WATER AND WASTEWATER MASTER PLAN

FINAL

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Prepared for:

City and Borough of Sitka

City and Borough of Sitka, Alaska
Water and Wastewater System Master Plan
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Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AKDOL	Alaska Department of Labor and Workforce Development
ANSI	American National Standards Institute
APDES	Alaska Pollutant Discharge Elimination System
APDES	Alaska Pollutant Discharge Elimination System
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
AWWA	American Waterworks Association
BGS	below ground surface
BIHA	Baranof Island Housing Authority
BLWTP	Blue Lake Water Treatment Plant
BOD_5	Biochemical Oxygen Demand
CBS	City and Borough of Sitka
CCF	Corrosion Control Facility
CCTV	Closed Circuit Television
cfs	cubic feet per second
CFU	Colony Forming Units
CIP	Clean-In-Place
CRW	CRW Engineering Group, LLC
CSW	Critical Secondary Water Supply Project
CT	contact time
CWA	Clean Water Act
DBP	Disinfection Byproduct
DGGS	Alaska Division of Geological & Geophysical Surveys
DI	Ductile Iron
EFM	Enhanced Flux Maintenance
EOR	Engineer of Record
EPA	U.S. Environmental Protection Agency
ERU	Equivalent Residential Unit
ESWTR	Enhanced Surface Water Treatment Rules
˚F	degree Fahrenheit
FC	Fecal Coliform
FERC	Federal Energy Regulatory Commission
FPSF	Frost Protected Shallow Foundation
FRC	Fast Response Cutter
GPIP	Gary Paxon Industrial Park
gpm	gallons per minute
HDPE	high density polyethylene
HI	Hydraulic Institute

HVAC	Heating Ventilation Air Conditioning
IBC	International Building Code
IDSE	Initial Distribution System Evaluation
IESWTR	Interim Enhanced Surface Water Treatment Rule
IFC	International Fire Code
ISO	Insurance Services Office
kW	Kilowatt
LCR	Lead and Copper Rule
LRAA	Locational Running Annual Average
LT1ESWTR	Long Term 1 Enhanced Surface Water Treatment Rule
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
MCL	maximum contaminant level
MFP	Membrane Filter Plant
MG	million gallons
mg/L	milligram per liter
MGD	million gallons per day
MRDL	Maximum Residual Disinfectant Levels
NEC	National Electrical Code
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
NSF	National Sanitation Foundation
NSRAA	Northern Southeast Regional Aquaculture Association
NTU	Nephelometric Turbidity Unit
O&M	operation and maintenance
OSHG	On-Site Hypochlorite Generation
PFAS	per-and polyfluoroalkyl substances
POTW	Publicly Owned Treatment Works
PRV	Pressure Reducing Valve
psf	pounds per square foot
PVC	Polyvinyl Chloride
PWS	Public Water System
RAA	Running Annual Average
S&W	Shannon & Wilson
SCADA	Supervisory Control and Data Acquisition
SEARHC	Southeast Alaska Regional Health Consortium
SMC	Sawmill Creek
SWPPP	Storm Water Pollution Prevention Plan
SWTR	Surface Water Treatment Rule
TCR	Total Coliform Rule
TOC	Total Organic Carbon
TSS	Total Suspended Solids
TTHM	Total Trihalomethane
TUc	Chronic Toxic Units
TWUA	Temporary Water Use Authorization

UPC	Uniform Plumbing Code
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
WEF	Water Environmental Federation
WET	Whole Effluent Toxicity
WST	water storage tank
WTP	water treatment plant
WWTP	Wastewater treatment plant

1. Executive Summary

1.1 Purpose of Master Plan

The City and Borough of Sitka (CBS) water and wastewater systems have components that have been in service for over 60 years, with many upgrades and regulatory driven changes to both systems. A comprehensive review of the existing condition and performance of each system will help ensure the equipment and processes are meeting the needs of CBS and complying with State and Federal regulations for the production of potable water and treatment of municipal wastewater.

To meet these goals, the water and wastewater master plan:

- Updated an inventory of system assets.
- Reviewed the condition of these assets and made recommendations for capital improvements to upgrade the systems as needed.
- Reviewed current and anticipated State and Federal regulations impacting the water and wastewater systems.
- Developed a Capital Improvement Plan (CIP) in coordination with the CBS Finance department to schedule and plan for payment of required improvements.

The plan is presented in sections with descriptions of the water and wastewater systems. Exhibits are shown throughout the document, and large format figures are included at the end of the plan.

1.2 Summary of Capital Improvement Projects

To protect and maintain the existing system and allow for growth and development, it is essential that CBS develop a logical and feasible plan for addressing water and wastewater system needs. The most significant water system project in the near future is developing additional water storage through a tank siting study and tank construction. On the wastewater side, improvements to the Thomsen Harbor and Lake-Lincoln lift stations are vitally important as is replacement of process equipment at the Wastewater Treatment Plant. CBS is already planning for the Thomsen Harbor lift station project, which should begin in Fall 2022.

2. Water & Wastewater System Inventories

The purpose of this chapter is to briefly identify and characterize the main features of the Sitka Water and Wastewater Systems. This information will be used to make recommendations for improvements to the existing facilities and to make recommendations for additional improvements that may be necessary for the system to adequately serve its consumers.

2.1 Water System Inventory

There are four major components to the Sitka water system, water sources, water treatment systems, water storage, and water distribution. Details of each are in the following sections. Figure 1 shows an overview of the entire water system.

2.1.1 Water Source

CBS has two active water sources. CBS staff select between the two sources based on the water quality in Blue Lake.

2.1.1.1 Blue Lake

Blue Lake is the primary water source for Sitka. It is located above Sawmill Cove (Latitude 57.053N Longitude 135.330W). The lake is fed by glacier, snowmelt and rain precipitation and generally has very high quality water. Water quality is monitored daily for turbidity, pH, and temperature. Historically, the water quality in Blue Lake was so good that filtration is not required under a filtration avoidance waiver which has strict turbidity requirements. Exceeding the maximum turbidity levels more than two times in a 12 month period or five times in a 120 month (ten-year) period would trigger a regulatory requirement for providing filtration. Since the Blue Lake Dam was raised 83 ft in 2014 to a maximum water surface elevation of 425 ft, Blue Lake has experienced turbidity events greater than 5 NTU nearly every year. CBS has experienced 4 turbidity events in the past 4 years, with the most recent in the fall of 2018. These turbidity events have put the filtration avoidance wavier at risk.

The water flow by gravity from an intake structure in blue lake through rock tunnel and a 96” diameter penstock which provides water to the Blue Lake Hydroelectric facility. A 24” diameter tap and shutoff valve is attached to the penstock to allow the City to withdraw water from the penstock for use in its potable water system. The 24” piping leads into the BLWTP for pressure reduction and control.

The intake, rock tunnels, penstocks and associated infrastructure are operated by the CBS Electric Department as part of the Blue Lake Hydroelectric Project (Blue Lake Hydro). Blue Lake Hydro is regulated by the Federal Energy Regulatory Commission (FERC), which requires periodic inspection and maintenance of regulated infrastructure to ensure continued safe operation. Routine inspection and maintenance of the intake gate, rock tunnels, penstocks and associated infrastructure require dewatering of these areas and outages of the penstock that supplies raw water to BLWTP.

2.1.1.2 Sawmill Creek

In 2022 CBS completed construction of a new raw water intake in Sawmill Creek, downstream of the Blue Lake Dam. The intake consists of a cylindrical screen mounted on a rail system so that it can be raised out of the creek when not in service. Water flows from the creek through the screen and into a wetwell where it is pumped to the membrane filtration plant. Flows in Sawmill Creek are largely controlled by the hydroelectric facility’s release of water from a side line connected to the penstock (commonly referred to as the “fish valve”). The fish valve release provides the minimum in-stream flow requirement of 70 cfs (approximately 31,400 gpm) April 15-June 30 and 50 cfs (approximately 22,000 gpm) the rest of the year for the fishery, which thereby stabilizes the river from large variations in turbidity or flow. The fish valve is sized to provide 70 cfs into Sawmill Creek at low levels in Blue Lake. During the high release periods, the valve does not have the capacity to meet both the fish flow requirements and municipal needs.

During penstock outages, the fish valve is also out of service for inspection and maintenance. In this case, the electric utility will open the Howell Bunger valve at the bottom of the dam to provide in stream flows. The valve has not been used in some time, and should be tested prior to relying fully on this option.

When Sawmill Creek is used as a source, the hydroelectric facility would utilize the fish valve and Howell-Bunger valve to allow additional water to flow in the river to meet fishery-required in-stream flows and municipal needs. Flow and water quality in Sawmill Creek can also be impacted by storm events in the watershed, water spilling over the top of the dam, or water released from the Howell-Bunger valve in the bottom of the dam.

2.1.1.3 Water Rights

CBS holds adequate water rights in Blue Lake to meet its current and future water system needs. The Sawmill Creek intake does not require modifications to the overall water right, merely an adjustment of the withdrawal point with the Alaska Department of Natural Resources (ADNR).

2.1.2 Water Treatment

The water treatment system consists of two treatment plants, followed by a chlorine contact pipeline and pH control:

- Blue Lake WTP for pressure reduction, UV and chlorine disinfection
- Membrane filter plant, chlorine disinfection

Operations staff determine which water source and treatment process to use based on if the water quality in Blue Lake meets the filtration avoidance criteria and the availability of the penstock to convey water. Exhibit 1 illustrates a flow chart to determine which source and treatment plant will be used under the anticipated operating scenarios.

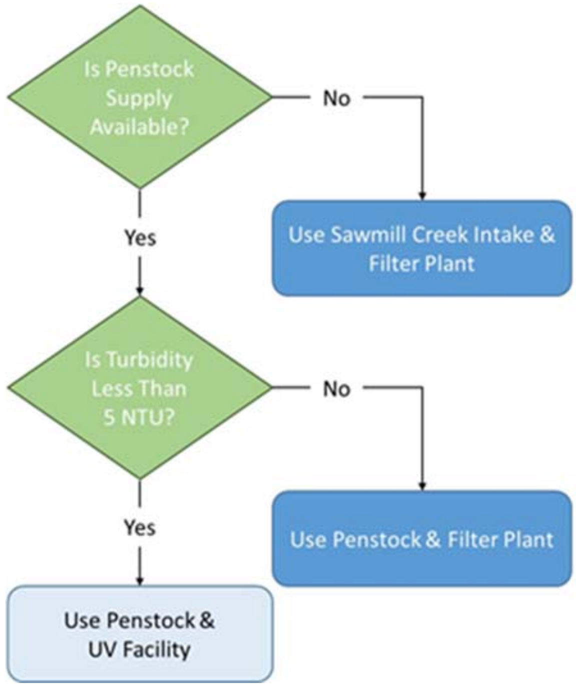


Exhibit 1 - Water Source and Treatment Selection Flow Chart

2.1.2.1 Blue Lake Water Treatment Plant

Inside the BLWTP the 24" piping splits into two parallel 12" lines. Each of these lines has a pressure reducing valve that controls the pressure entering the rest of the treatment system and a strainer with a 0.032 inch slot size to remove pine needles or other debris from the water. The water pressure from the penstock into the BLWTP ranges from 120 to 150 psi and it is reduced to approximately 86 psi. The floor of the BLWTP is at elevation 80'. The pressure reducing valves and strainers are in good condition with no identified project needs, and are shown in Exhibit 2.

Exhibit 2 - Blue Lake WTP Strainers and Pressure Reducing Valves

Gas chlorine was injected at the BLWTP from its construction until the completion of the Critical Secondary Water Supply project in 2022. The gas chlorine injection equipment remains in place, and can be used in an emergency as long as the water supply is coming from the penstock.

2.1.2.2 UV Disinfection Facility

The UV disinfection facility was completed in 2015 to provide a second disinfectant to the Blue Lake water to meet requirements for *Cryptosporidium* removal and inactivation. Water flows into the UV Facility basement through a duty/standby flow control valve. The water flows through UV reactors for treatment. Fluoride is injected downstream of the UV reactors, shown in Exhibit 3.

The Critical Secondary Water Supply Project added on-site sodium hypochlorite generation equipment to the UV Facility in 2022. The equipment uses salt and electricity to generate a dilute sodium hypochlorite (0.8%) solution for use as a disinfectant. The liquid chlorine is injected downstream of the fluoride injection point and provides Giardia inactivation and a chlorine residual in the distribution system.

UV Facility is in good condition with no reported improvement needs.

Exhibit 3 – UV Disinfection Facility

2.1.2.3 Membrane Filter Plant

The Membrane Filter Plant (MFP) was constructed in 2021 and 2022 to provide filtration during high turbidity events in Blue Lake or to filter the water when the Sawmill Creek intake is in service. Water flows into the MFP where pressure control valves reduce the pressure prior to 300 micron strainers and the microfiltration system. After filtration water is pumped into the UV building basement for chlorine and fluoride injection and into the distribution system.

2.1.2.4 Transmission Main/Chlorine Contact Chamber

Sitka uses the volume in the water transmission line between the UV Facility and the first water consumers beyond Jarvis Street to achieve the required chlorine contact time for *Giardia* inactivation. The water transmission line from the UV Disinfection Facility to Jarvis Street consists of about 10,300 of 30” pipe and 13,400’ of 24” pipe. The total volume of water in these pipes is about 693,100 gallons. So contact time is determined by dividing the set point flow rate at the UV Facility in gallons per minute into the total volume in the transmission piping.

2.1.2.5 Corrosion Control Facility

The Blue Lake water supply is considered corrosive due to its low pH and low alkalinity. The addition of chlorine and fluoride further depresses the pH and increases the corrosiveness of the water.

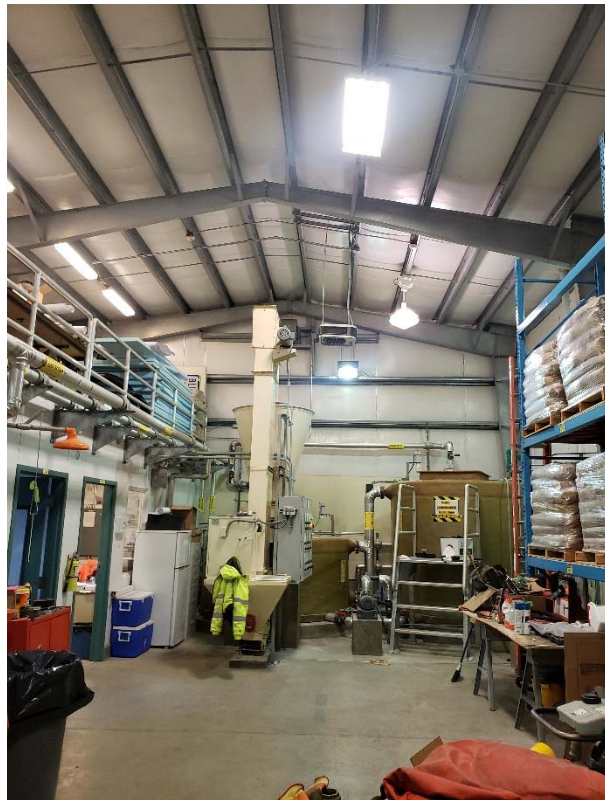


Exhibit 4 – Corrosion Control Facility

In 1998, Sitka began construction of a corrosion control facility located at Jarvis Street, shown in Exhibit 4. The intent of this facility is to feed soda ash into the water system to increase the pH to a target level of 8.0. At this pH level leaching of lead and copper is significantly reduced. The system has been online since construction was completed. The facility is in good working order, and all of the equipment and controls are in good condition. Online analyzers in the laboratory were recently updated and tied into the city-wide SCADA system.

The system was designed for a range of flows, soda ash dosages, and target pH. The peak flow was assumed to be 5.0 million gallons per day, maximum soda ash dose was assumed to be 16 mg/l, and the high target value for pH was assumed to be 9.0. Under these peak conditions the facility would be using about 670 lbs of soda ash/day. Under average design conditions of a 3.5 million gallon per day flow, soda ash dosage of 8 mg/l, and a target pH of 8.0 the facility would be using about 230 lbs/day of soda ash.

2.1.3 Water Storage

The CBS water system has three existing water storage tanks. The total volume of water storage in the tanks is 2,950,000 gallons.

The **Gavan or 1.2 MG Tank**, shown in Exhibit 5, is located on Charteris Street, and serves as the control elevation of the water system. It supplies water for peak flows in the downtown area and the beginning of Halibut Point Road. The base of the tank is at elevation 178’ and the top water surface in the tank is at elevation 220’ (approximately 9’ higher than the Harbor Mountain tank). The tank is about 42’ tall and 70’ in diameter. The tank was last drained, cleaned, and painted in 2009.

Exhibit 5 – Gavan Tank

Water level in the tank is reported to SCADA and used to adjust the flow setpoint to the UV Facility or Membrane Facility in order to keep the tank full. If the tank level is low the flow from the WTP is increased. If the tank is full, the flow from the WTP is decreased.

The **Harbor Mountain Tank**, shown in Exhibit 6, is located on Harbor Mountain Road on the northern end of the community and provides water for peak demands in that area. The base of the tank is at elevation 192' and the top water surface in the tank is at elevation 211'. The tank is about 20' tall and 85' in diameter. It has a nominal capacity of 750,000 gallons. The Harbor Mountain Tank was last painted in 2006 Some recent vandalism has damaged parts of the exterior coating, which should be repaired.


Exhibit 6 – Harbor Mountain Tank

The Harbor Mountain Tank level is controlled by valves in a vault along the tank access road. The vault contains an actuated butterfly valve that opens to allow water to drain from the tank and supply the system when the pressure falls below 9 psi at the valve. The valve is also opened at night to fill the tank from the distribution system.


Exhibit 7 – Whitcomb Heights Tank

The **Whitcomb Heights Tank** (Exhibit 7) was constructed in 2010. It is located at the top of Emmons Street and has a capacity of 1,000,000 gallons. The base of the tank is at elevation 360' and the top water surface in the tank is at elevation 392'. The tank is about 32' tall and 72' in diameter. The Whitcomb Heights Tank is filled nightly by the Whitcomb Heights Pump Station, and an altitude valve opens to supply water to the system on low pressure in the service area. The tank was last cleaned in 2018.

2.1.4 Water Transmission and Distribution System

2.1.4.1 Piping

The City and Borough of Sitka has about 267,660' (50.7 miles) of water transmission and distribution system piping. Over 3,240' of the pipe is asbestos cement pipe that is known to be brittle and susceptible to leaks. About 110,000' of the pipe has been in use for over 40 years; over 40,000' of pipe has been in use between 30 and 40 years.

The City's "Water_Wastewater" water network GIS files were provided by the City to prepare the inventory of water pipes and to update the existing WaterCad distribution system model. The record drawings of recent water system projects from 2006 to 2021 were reviewed to input updated information into the model. Information such as the year installed, pipe material, pipe diameter, and length of pipe were checked against the data files in the GIS network and WaterCAD model. Additionally street names were updated to the network piping data tables so that the pipes could be identified by the street in which they are found. Appendix A includes tables that sort the pipe inventory data according to Street Name, Date of Pipe Installation, Pipe Materials, and Pipe Label.

2.1.5 Water Booster Pump Stations

Water booster pump stations supply water to areas that are too high to be served by the gravity supply from Blue Lake. For instance with a water surface elevation of about 211' at the Harbor Mountain Tank, the water system pressure at elevation 165' is about 20 psi. Any development above that elevation will have water system pressures less than 20 psi.

Sitka currently has three water booster pump stations, one each serving the Wortman Loop area, the Hillside area (Eliason Loop), and in conjunction with the Whitcomb Heights Tank.

Exhibit 8 – Wortman Loop Pump Station

2.1.5.1 Wortman Loop Booster Pump Station

The Wortman Loop Pump Station is located below grade in a cylindrical vault. The pump station does not have standby power, and consequently cannot provide water during power outages.

There are three pumps that serve as the backup and a single pump that runs continuously. The pumps are aged and difficult to maintain due to the location in the vault. The station is located on the edge of the roadway above a steep embankment. The pump station is shown in Exhibit 8.

2.1.5.2 Hillside Pump Station

Hillside Pump Station is located in a pre-fabricated fiberglass building. The pump station includes two small pumps (one duty, one standby) and one high service pump to serve high demands. The pump station has an emergency generator, but it does not automatically switch from standby to utility power after power is restored. Additionally the pump station communications to SCADA need to be repaired. The pump station is shown in Exhibit 9.

Exhibit 9 - Hillside Pump Station

2.1.5.3 Whitcomb Booster Pump Station

Whitcomb Pump Station, shown in Exhibit 10, operates nightly to fill the Whitcomb Heights Tank. Additionally the pump station serves as backup for the Tank in the Kramer Avenue neighborhood in the event the tank is out of service for cleaning or maintenance. The pump station was constructed in 2010, the same time as the tank, and is in good repair. The pump station includes duty and standby pumps, a high demand pump, and a connection for a portable standby power generator

Exhibit 10 - Whitcomb Heights Pump Station

2.2 Wastewater System Inventory

The Sitka sanitary sewer system collects and treats wastewater from nearly 98% of the population of CBS with approximately 3,000 residential and commercial customer services. The wastewater system consists of four major components:

- Collection System
- Wastewater Treatment Plant
- Solids Disposal
- Marine Outfall

2.2.1 Collection System

The wastewater collection system includes approximately 40 miles of interconnected collection pipes on Baranof and Japonski Islands. The system is made up of a combination of gravity and pressurized force mains with 39 major lift stations and a series of smaller individual or dual user lift stations serving single family homes on Cedar Beach Road, Rands Drive, and Shotgun Alley. The system extends nearly six miles from the central business district to the north just past the Alaska Marine Lines barge facility, five miles southeast to the Gary Paxton Industrial Park, and two miles west to the United States Coast Guard Air Station.

Gravity and force mains vary in size and material throughout the system. Most neighborhood gravity collectors are eight inches in diameter with sizes increasing up to 20 inches in diameter on the larger trunk lines. Most neighborhood pressurized force mains are four to six inches in diameter with sizes increasing up to 14 inches in diameter on the larger trunk lines. There are dual force mains carrying wastewater from Thomsen Harbor Lift Station on Baranof Island to the wastewater treatment plant on Japonski Island. These force mains are 10 and 16 inches in diameter and run along the bottom of Sitka Sound. These mains also collect the wastewater on Japonski Island. Materials used in the system include ductile and cast iron, PVC, concrete, and asbestos concrete.

Twenty-three of the lift stations are connected to the Supervisory Control and Data Acquisition (SCADA) remote monitoring and control system. Eleven lift stations and the generator building for Thomsen Lift Station are connected to separate alarm systems.

A schematic of the wastewater collection system is shown in Figure 2.

2.2.2 Wastewater Treatment Plant

The wastewater treatment plant (WWTP), located on Japonski Island, consists of a conventional primary treatment process that provides raw sewage screening, grit removal, and primary clarification. The plant, constructed in 1984, is designed to serve a population of approximately 10,500 with a peak design flow of 5.3 million gallons per day and a maximum permitted average flow of 1.8 million gallons per day. It currently operates at an average flow of approximately one million gallons per day. Current flow rates reflect a significant decrease in flow from the 1980s values due to the removal of both inflow and infiltration from stormwater and groundwater sources through upgrades and retrofits in the collection system.

Wastewater enters the main facility through a flow distribution box and is screened for debris. Screenings are removed once each day. Wastewater then flows through a grit classifier system. The facility is equipped with space for a second classifier if needed. Grit is removed from the waste stream and dewatered for disposal. From the grit collector, wastewater enters the clarifier building. Three clarifier basins hold the wastewater, shown in Exhibit 11. Sludge falls to the bottom of the tanks through gravity and is pumped to a thickening chamber then dewatered on a belt filter press and limed. Scum is skimmed from the top of the clarifier tanks and concentrated. Wastewater is then discharged to the marine outfall.

Exhibit 11 – WWTP Primary Clarifiers

In 2020, upgrades at the wastewater treatment plant were initiated to repair the building envelope, the heating and ventilation systems, and corroded electrical and plumbing components. Process equipment was not upgraded as part of this project.

A process flow diagram for the wastewater treatment plant is shown in Figure 3.

2.2.3 Biosolids Disposal

Screenings, dewatered grit, sludge cakes, and concentrated scum from the wastewater treatment plant are trucked to a biosolids disposal facility at the Sitka Granite Creek Landfill on Baranof Island. The landfill is classified and permitted as a Type III Landfill and is part of the active Granite Creek Quarry.

2.2.4 Marine Outfall

The deep-water marine outfall discharges effluent from the wastewater treatment plant into the Middle Channel of Sitka Sound. The outfall is 5,500 linear feet of 24-inch pipe with a 197-foot diffuser located 85 feet below mean lower low water. The diffuser includes 54 feet of 24-inch pipe, 65 feet of 20-inch pipe, 26 feet of 16-inch pipe, 26 feet of 14-inch pipe, and 24 feet of 10-inch pipe. Discharge is diluted with ocean water after leaving the diffuser in a permitted mixing zone and is monitored for pollutants within, at the edge of, and beyond the mixing zone limits

3. Current and Future Population and Flow Data

3.1 Population Trends

The Alaska Department of Labor and Workforce Development (AKDOL) tracks historic and projected population statistics for cities and census designated areas throughout the state. Census data for CBS is reported by AKDOL from 1880 through 2010. Exhibit 12 graphs population for each Census year. CBS experienced moderate growth through 1950 followed by a significant population increase through 1980 sparked by economic growth from the timber and seafood industries. Between 1980 and 2000, population growth began to level off as timber harvest slowed. There was slight growth from 2000 to 2010 as the economy transitioned with more health care and education employment.

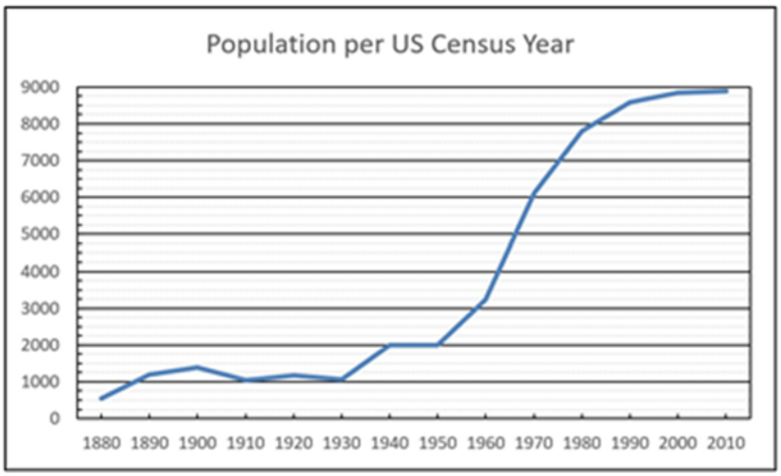


Exhibit 12 - US Census Population

According to AKDOL population counts from 2010 to 2020, a significant decline is noted with population remaining in a slight growth state going from 8,881 in 2010 to a high of 9,078 in 2014, then falling to the current estimate of 8,523. Based on the current population and historic birth, death, and migration trends, AKDOL has projected population growth rates for CBS through 2045. The entire Southeast Region of Alaska is projected to lose population in the coming years. This is primarily because the existing population of Southeast is older with low birth rates that cannot keep up with the combination of death rates and net migration out of the region. The total population loss for CBS is projected at approximately 12 percent through 2045 as shown in Exhibit 13. A declining population will lower both water usage and the resulting wastewater stream. A full 12 percent decline would mean a population of 7,519 in 2045 and reflect a decrease of approximately 298,000 gallons of water and 110,000 gallons of wastewater per day. This does not account for any potential changes in industry.

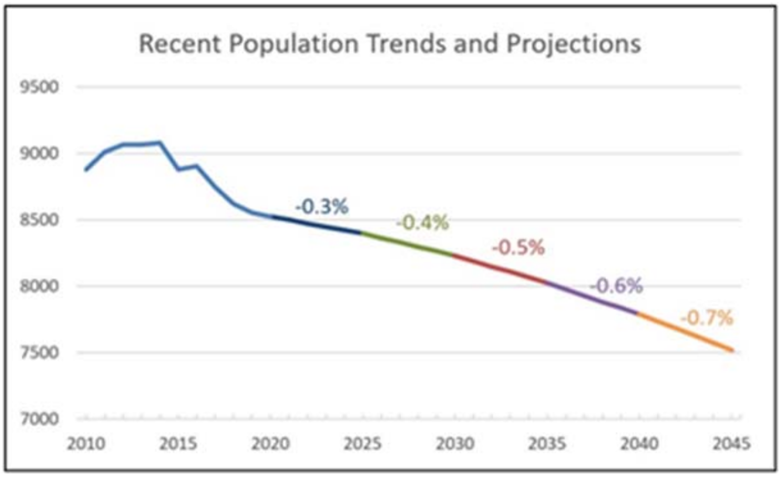


Exhibit 13 - Population Trends and Projections

3.2 Future Development

While expected population is projected to trend steadily downward through 2045 based on historic data, there are opportunities for residential and commercial growth throughout the city and borough. The *Sitka Comprehensive Plan 2030* identifies an increase in year-round employment and population as a primary goal with focus on manufacturing, the maritime industry, tourism, health and elder care, government, and an investment in youth engagement. Discussions with CBS as well as review of numerous CBS planning documents suggest many suitable areas for land development. Areas of potential growth in the next 10 to 20 years are outlined in Figure 4 and summarized below. These potential growth opportunities could increase water flow by 323,500 gallons per day and wastewater flow by up to 191,500 gallons per day.

- The Southeast Alaska Regional Health Consortium (SEARHC) is moving forward with a planned $300 million hospital expansion. Groundbreaking on the project started in 2022. The project is located on Japonski Island at SEARHC's Mt. Edgecumbe Medical Center campus. The expansion will include a new 25 bed hospital and renovated medical office building. SEARHC is coordinating the project with plans to build approximately 75 new housing units in multiplex structures. The SEARHC development is projected to increase water usage by 56,000 gallons per day as well as increase loading on the wastewater collection system by approximately 40,000 gallons per day. Short term wastewater system upgrades may be needed at the Japonski 3 and Japonski 5 lift stations and may include increasing the size of each force main pipe.
- The United States Coast Guard plans to homeport a Fast Response Cutter (FRC) in Sitka. The plan requires pier revitalization and construction of maintenance buildings and community housing to support the FRC and the crew. Project funding for the pier and maintenance facility is included in the Consolidated Appropriations Act of 2021. Construction completion is planned by 2025. Funding for housing expansion has not been identified. An FRC is manned by a crew of 24. The Coast Guard development is projected to increase water usage by 28,000 gallons per day and increase loading on the wastewater collection system by approximately 8,000 gallons per day.
- Several large tracts of land in the Indian River Uplands owned by the Baranof Island Housing Authority (BIHA), the Alaska Department of Natural Resources, and CBS are identified as an area of high priority residential development in the *Sitka Comprehensive Plan 2030.* Combined, this property is approximately 275 acres. Development strategies for these large parcels have not been formed. Emergent wetlands are sporadic throughout the property. Assuming moderate

development over the next 20 years with a mix of residential structures, there could be approximately 100 to 150 new units constructed. This development is projected to increase water usage by 55,000 to 85,000 gallons per day and increase loading on the wastewater collection system by approximately 35,000 to 50,000 gallons per day.

- The *No Name Mountain / Granite Creek Land Use Master Plan* issued in June 2020 identified potential residential and commercial development over the next 15 years. Two areas for possible residential housing development that would include approximately 120 new homes are described. In addition, the plan identifies areas for numerous recreational tourism facilities aimed at cruise ship passengers including camping, restaurant, and restroom facilities. Access roads and utility extensions would be required for any future development at an estimated cost of roughly $13.5 million, which has not been secured. Development outlined in the master plan is projected to increase water usage by 68,000 gallons per day and increase loading on the wastewater collection system by approximately 42,000 gallons per day.
- The Kraemer Benchlands includes approximately 150 lots that were subdivided as part of the Whitcomb Heights Subdivision and an additional 155 acres of unsubdivided land owned by CBS north of Halibut Point Road. A significant portion of the Whitcomb Heights Subdivision is in a debris flow runout zone based on preliminary landslide modeling prepared by the Alaska Division of Geological & Geophysical Surveys (DGGS). The unsubdivided land has not been studied for landslide potential. Further development of the Whitcomb Heights Subdivision is expected to be limited. Assuming light development in these two areas over the next 25 years with mostly single-family homes, there could be approximately 25 to 50 new units constructed. This development is projected to increase water usage by 14,000 to 28,000 gallons per day and increase loading on the wastewater collection system by approximately 8,500 to 16,500 gallons per day.
- CBS owns approximately 60 acres of unsubdivided land behind the high school. While no current development plan exists, this property is noted in the Comprehensive Plan for residential infill with high density housing. A portion of the property is in the debris flow runout zone based on the DGGS preliminary study. If light development were to occur over the next 20 years with multiplex units, an additional 80 to 100 residential homes could be assumed. This development is projected to increase water usage by 45,000 to 55,000 gallons per day and increase loading on the CBS wastewater collection system by approximately 25,000 to 33,000 gallons per day.
- The Gary Paxton Industrial Site is identified in the *Sitka Comprehensive Plan 2030* for priority development to support economic opportunities. Access to the site was upgraded with the reconstruction of Sawmill Creek Road in 2015 and the construction of a multi-purpose deep water dock in 2017. Four lots totaling 1.5 acres are currently available for lease or purchase. Assuming industrial uses to support job creation in the marine service industry (no process wastewater) at each lot and an associated increase in docking, development is projected to increase water usage by 3,500 gallons per day and increase loading on the CBS wastewater collection system by approximately 2,000 gallons per day.

3.3 Water System Impacts

The water treatment process is designed and permitted for a maximum flow of 6.0 million gallons per day (MGD). Meter records from 2019 indicate an average daily flow of 3.2 MGD. Combining potential water demand decrease based on population trends with potential water demand increase based on future development, results in a new increase of 25,500 gallons per day. The water treatment capacity can accommodate this net increase.

On the conservative side, if population holds stead, the water treatment capacity can still handle the full increase of water demand of 323,500 gallons per day from future development.

3.4 Wastewater System Impacts

The wastewater treatment plant is designed and permitted for a minimum flow of 500,000 gallons per day, an average flow of 1,800,000 gallons per day, and a peak flow of 5,300,000 gallons per day. Flow records from 2019 and 2020 indicate an average daily flow of 900,000 gallons per day. Combining potential wastewater flow loss based on population trends with potential wastewater flow increase based on future development, results in a net increase of 81,060 gallons per day. This net increase can be accommodated by the plant.

On the conservative side, if population holds steady, the wastewater treatment plant can still handle the full increase of wastewater flow of 191,500 gallons per day from future development and conversely, if future development stalls, the wastewater treatment plant can handle the full decrease of 110,440 gallons per day from the declining population trends.

4. Summary of Current and Anticipated Future Regulations

4.1 State and Federal Water System Regulations

The State of Alaska's Department of Environmental Conservation (ADEC) holds primacy for enforcing federal drinking water regulations set by the United States Environmental Protection Agency (EPA). The relevant regulations are:

- ***Surface Water Treatment Rule*** (SWTR, published June 29, 1989)
- ***Enhanced Surface Water Treatment Rules*** (ESWTRs)
    - ***Interim Enhanced Surface Water Treatment Rule*** (IESWTR, promulgated December 16, 1998; final revisions published January 16, 2001)
    - ***Long Term 1 Enhanced Surface Water Treatment Rule*** (LT1ESWTR, promulgated January 14, 2002)
    - ***Long Term 2 Enhanced Surface Water Treatment Rule*** (LT2ESWTR, promulgated January 6, 2006)
    - ***Disinfectants/Disinfection By-Products Rules*** (D/DBPRs)
    - ***Stage 1 Disinfectants/Disinfection By-Products Rule*** (Stage 1 D/DBPR, promulgated December 16, 1998; final revisions published January 16, 2001)
    - ***Stage 2 Disinfectants/Disinfection By-Products Rule*** (Stage 2 D/DBPR, promulgated January 4, 2006)
- ***Lead and Copper Rule*** (LCR, promulgated June 7, 1991; revised in 2007 and 2021)
- ***Revised Total Coliform Rule*** (RTCR, promogulated February 13, 2007; revised in 2014, to replace the 1989 total coliform rule*)*

The CBS is currently serving a community of less than 10,000 people with two sources; a filtered and unfiltered surface water. CBS's water system meets all current regulations, with treatment operations being driven primarily by the Surface Water Treatment Rule, and some additional treatment added to meet the Lead and Copper Rule.

4.1.1 Surface Water Treatment Rule & Enhancements

The SWTR establishes treatment and monitoring requirements for all public water systems that use surface water. The SWTR requires that all surface water sources be treated to achieve a minimum 3-log removal of *Giardia* and 4-log removal of enteric viruses.

The ESWTRs were issued as a supplement to the SWTR in order to provide additional microbial and disinfection controls for surface water systems. The ESWTRs were implemented in separate stages as the Interim Enhanced Surface Water Treatment Rule (IESWTR), and Stage 1 and Stage 2 Long-term Enhanced Surface Water Treatment Rules (LT1ESWTR and LT2EWSTR). These rules build upon the provisions set forth in the SWTR by providing improved public health protection against *Cryptosporidium*, while addressing risk tradeoffs with disinfection by-products (DBPs).

The ESWTRs added *Cryptosporidium* monitoring and inactivation to the watershed control requirements for unfiltered surface water systems. Other specific provisions that have an impact on CBS include disinfection profiling and benchmarking provisions, and a requirement that unfiltered surface water systems conduct initial source water monitoring for Cryptosporidium. Table 1 summarizes CBS's strategy for meeting these requirements.

Table 1 - Microbial Removal & Inactivation Strategy

	Virus Inactivation	Giardia Removal/Inactivation	Crypto Removal/Inactivation
Required Removal/ Inactivation	4-log	3-log	3-log
Sawmill Creek/Penstock - Membrane Filter Plant			
Membrane Filtration	0-log	2.5-log	3-log
Chlorination	4-log	0.5-log	0-log
Total	4-log	3-log	3-log
Blue Lake/Penstock – UV Facility			
UV Disinfection	0-log	3-log	3-log
Chlorination	4-log	0.5-log	0-log
Total Provided	4-log	3.5-log	3-log

4.1.1.1 Filtration Avoidance

The SWTR requires filtration of all surface water supplies unless stringent source water quality, disinfection criteria, and site specific conditions are met. The following requirements pertain to public water systems operating under filtration avoidance:

Source Water Quality Criteria

The source water prior to disinfection must have:

- Fecal coliforms ≤ 20/100 mL, or;
- Total coliforms ≤ 100/100 mL in at least 90 percent of the samples taken for the previous six months.

Furthermore, the turbidity level of the source water prior to disinfection must not exceed 5 NTU unless:

- The State determines that the event was caused by unusual or unpredictable circumstances, and;
- There have not been more than two events in the past twelve months or more than five events in the past 120 months, where an event is a series of consecutive days in which at least one turbidity measurement each day exceeds 5 NTU.

Disinfection Criteria

- The calculated CT must meet or exceed the CT value stated in the SWTR.
- CBS must have redundant disinfection components including an auxiliary power supply with automatic startup and alarm; or if approved by the State, automatic shutoff of the water supply when the residual drops below 0.2 mg/L for more than four hours.
- The chlorine disinfection concentration entering the distribution system must not be less than 0.2 mg/L for more than four hours.

- CBS must maintain detectable disinfectant residual in the distribution system or show that the heterotrophic plate count is not higher than 500/mL.
- Turbidity samples are to be taken at least once every 4 hours. If turbidity exceeds 1 NTU, one raw water sample must be collected for fecal or total coliform analysis.
- The ESWTR added a provision that a minimum of two disinfectants must be used.

Site Specific Criteria

- Maintenance of a watershed control program
- Subjection to an annual onsite inspection
- No history of waterborne disease outbreaks
- Compliance with the monthly MCL for total coliforms
- Compliance with disinfection by-product regulations

4.1.1.2 Filtration

The new Sawmill Creek intake and membrane filter plant provide CBS with a secondary water source and filter plant for use when the primary unfiltered source is unavailable. Several regulatory requirements are specific to filtration facilities:

Filter Effluent Monitoring

Turbidity requirements for filtered water systems under the SWTRs consist of monitoring combined filter effluent (CFE) levels and individual filter effluent (IFE) levels. CFE levels must be no greater than 0.3 NTU. If this threshold is exceeded, reporting of IFE readings and filter performance assessment actions will be required. The filter performance assessments are based on the severity of the exceedance of the CFE reading, and includes detailed evaluation of the cause of the high turbidity, filter profiling, and filter self-assessments.

Membrane Integrity Monitoring

Direct or indirect integrity testing is required to verify that adequate particulate removal is occurring. Direct testing requires the system to be taken offline at least once per day, and pressurized with air to determine if there are any breaks in the membrane fibers. Continuous indirect integrity testing consists of continuous monitoring of the filtered water for a parameter that should be removed by the filtration process—generally turbidity. This process provides verification of the removal credits received through challenge testing. Turbidity requirements to verify Cryptosporidium removal for membrane filters require that IFE must measure below 0.15 NTU.

4.1.1.3 Watershed Protection

The SWTR also establishes watershed protection requirements for filtered and unfiltered systems. Source water protection is considered as the first barrier in a holistic approach toward reducing contaminant levels in drinking water. Because information on the inactivation of Cryptosporidium is still somewhat limited, watershed protection in unfiltered systems is a particularly important barrier for protection against this microbial pathogen.

Under the provisions of the SWTR, public water systems must maintain a watershed control program that minimizes the potential for source water contamination by viruses and Giardia cysts.

The SWTR provisions state that a watershed control program must satisfy the following objectives:

- Characterize watershed ownership and hydrology;
- Identify characteristics of the watershed and activities within the watershed that might have an adverse effect on water quality, and;
- Minimize the potential for source water contamination by Giardia lamblia and viruses.

The public water system must demonstrate through ownership and/or written agreements with landowners within the watershed that it can control all human activities which may have an adverse impact on the microbiological quality of the source water. Both natural and human-caused sources of watershed contamination to be controlled are listed in the EPA Guidance Manual. These sources include wild animal populations, wastewater treatment plants, grazing animals, feedlots, and recreational activities.

The public water system must also undergo an annual on-site inspection to assess the watershed control program and disinfection process. A report of the on-site inspection summarizing all findings must be prepared on an annual basis.

4.1.1.4 Disinfectants/Disinfection By-Products Rule (D/DBPRs)

The D/DBPRs apply to all water systems that add a chemical disinfectant during any part of the treatment process. The rules are being implemented in two separate stages—Stage 1 and Stage 2. The D/DBPRs address levels of disinfection by-products that are allowed in finished water supplies. Historically, the DBPs that were regulated under the SWTR were the total trihalomethanes (TTHMs). The D/DBPRs expand the DBP regulations to include five haloacetic acids (HAA5s).

<u>Stage 1 D/DBPR</u>

The Stage 1 rule establishes MCLs of 80 μg/L for TTHMs and 60 μg/L for HAA5. As of January 1, 2004 CBS's water system, as one of small systems serving less than 10,000 people, was required by the Stage 1 D/DBPRs to collect DBP samples from the distribution system on a quarterly basis and to comply with the rule. Compliance is based on a running annual average (RAA) of all sampling sites.

The Stage 1 D/DBPR also contains maximum residual disinfectant levels (MRDLs) for chlorine. CBS is required to limit the chlorine residual of water entering the distribution system to less than 4 mg/L as Cl2, based on a running annual average. Chlorine samples are required to be taken at the same points in the distribution system as samples currently taken for compliance with the Total Coliform Rule.

<u>Stage 2 D/DBPR</u>

The Stage 2 D/DBPR was promulgated simultaneously with the LT2ESWTR to address concerns about risk tradeoffs between pathogens and DBPs. The Stage 2 D/DBPR addresses reductions in DBP occurrence peaks in the distribution system based on changes to compliance monitoring provisions. Compliance monitoring will be preceded by an initial distribution system evaluation (IDSE) with the purpose of selecting site-specific optimal sampling points for capturing peaks of TTHMs and HAA5s. The monitoring frequencies and locations of IDSE depend on the system type and size.

Compliance with the maximum contaminant levels for two groups of disinfection byproducts (TTHMs and HAA5s) will be calculated for each monitoring location in the distribution system. This approach, referred to as the locational running annual average (LRAA), differs from running annual average (RAA) calculation defined in Stage 1 requirements. The LRAA avoids the high DBP occurrences at certain locations by ensuring every monitoring site is in compliance with the MCLs on an annual average. The DBP MCLs remain the same as Stage 1 MCLs - 80 µg/L for TTHMs and 60 µg/L for HAA5s.

Each system must determine if they have exceeded an operational evaluation level based on their compliance monitoring results. A system that exceeds an operational evaluation level is required to conduct an operational evaluation and submit a report to their state that identifies actions that may be taken to mitigate future high DBP levels, particularly those that may jeopardize their compliance with the DBP MCLs. The schedule of IDSE and monitoring compliance varies by water system size. CBS was required to submit IDSE monitoring plan by April 1, 2008, complete an IDSE by March 31, 2010, submit IDSE report by July 1, 2010 and begin Stage 2 compliance monitoring by October 1, 2013.

CBS has not had any compliance issues with the D/DBPR regulations.

4.1.2 Lead and Copper Rule

Published in 1991, the LCR established monitoring requirements for lead and copper, whereby CBS is required to monitor consumers' taps for lead and copper every six months. Water samples at the customers' tap must not exceed the following action levels:

- ***Lead:*** 0.015 mg/L detected at the 90^{th} percentile of all samples.
- ***Copper:*** 1.3 mg/L detected at the 90^{th} percentile of all samples.

If the action levels are exceeded for either lead or copper, CBS is required to collect source water samples and to submit the data with a treatment recommendation to the State.

Additionally, if the lead action level is exceeded, CBS is required to present a public education program to its customers within 60 days of learning the results. The public education program must be continued as long as CBS water system exceeds the lead action levels.

The 2021 revisions to the LCR makes the following changes to the LCR to promote reductions in lead for the most vulnerable populations:

- Changes to the sampling protocol to better locate elevated lead levels.
- Establishing a trigger level to jumpstart mitigation earlier and in more communities.
- Driving more and complete lead service line replacements.
- For the first time, requiring testing in schools and child care facilities.
- Requiring water systems to identify and make public the locations of lead service lines

Sitka exceeded the action levels and the Corrosion Control Facility (CCF) was constructed on Jarvis Street to address this issue. Since the CCF was constructed, CBS has not had compliance issues with the LCR, and is not expected to with the revised regulations.

4.1.3 Revised Total Coliform Rule

The Revised Total Coliform Rule (RTCR) sets a maximum contaminant level goal (MCLG) and MCL for E. coli in treated water for protection against potential fecal coliforms. The regulations is intended to initiate a "find and fix" approach to address any sources of fecal contamination. The rule has the following major provisions:

- Total coliform samples must be collected from sites which are representative of water quality throughout the distribution system
- Samples are collected throughout the month.
- If total coliforms are found, repeat sampling is required, which may trigger assessments and corrective action.

CBS has developed the required sampling plan and is monitoring as required. No potential microbial contamination sources within the system have been identified.

4.1.4 Future Drinking Water Regulatory Implications

There are not currently any outstanding state or federal regulations that would impact Sitka's regulatory compliance. The EPA develops a list of contaminants for potential future regulation. The most recent list was published in 2021, and includes per-and polyfluoroalkyl substances (PFAS), cyanotoxins, disinfection byproducts, and microbes. Of the chemicals on the list, none are known to occur in the CBS water supply.

4.2 Federal Wastewater Regulations

In 1972, Congress passed the Federal Water Pollution Control Act Amendments known as the Clean Water Act (CWA). Key provisions of the CWA include requirements that all publicly owned treatment works (POTW) discharging to waters of the United States meet secondary treatment standards. These standards, defined by regulation (Code of Federal Regulations 40 CFR 132.102), include achieving performance goals for reduction of influent wastewater solids and organic concentrations as well as effluent wastewater quality.

To administer these regulatory requirements, the CWA promulgated the National Pollutant Discharge Elimination System (NPDES) permit program. Under this program, POTWs are issued individual permits for the discharge of treated wastewater to a receiving environment. These permits stipulate each plant's specific performance requirements for both the reduction of influent loadings and effluent quality.

In addition, the CWA directs each state to develop and update its own set of water quality standard regulations. Water quality standard regulations define designated uses of waters receiving treated wastewater discharges, establish water quality criteria to be maintained in those receiving waters, and prohibit lowering receiving water quality to conditions that would prevent the designated use of the water body assigned by the state. The CWA charges states with the responsibility of reviewing proposed POTW discharge permits and certifying that the draft permits will not allow for degradation of the receiving water (section 401 Reasonable Assurance Certifications).

Congress amended the CWA in 1977 by adding Section 301(h) that authorized the EPA to issue modified permits allowing discharge of effluent of less than secondary quality when discharging to marine waters. Eligibility for operation under a 301(h)-waiver included submittal of an application by September 1979 (subsequently extended to December 1982) and demonstration that the proposed discharge complies with criteria intended to protect the marine environment. The CWA specifies that the permits may not be issued for longer than five-year terms, with applications for renewal filed at least 180 days prior to an existing permit's expiration date. If the permit is not reissued prior to its expiration date, the existing permit is considered "administratively extended," and the permit application process is considered "backlogged."

On August 27, 2005, the governor of Alaska signed Senate Bill 10 that directed the State of Alaska Department of Environmental Conservation (ADEC) to seek primacy for the NPDES wastewater permit program administered by the EPA. The bill directed ADEC to submit a primacy application to EPA by July 1, 2006.

The EPA granted the State of Alaska primacy to administer the NPDES program under the State's Alaska Pollutant Discharge Elimination System (APDES) in October 2008. Authority to administer the program was transferred from EPA to ADEC in phases from 2008 through 2012. Facilities for which the EPA retained authority include federal facilities in Denali National Park and Preserve, Indian Country facilities, facilities operating outside state waters (three miles from shore), and facilities issued CWA Section 301(h) waivers from secondary treatment standards.

The discharge permit for the City and Borough of Sitka (CBS) includes a 301(h) waiver and remains under the jurisdiction of EPA. The current permit (AK-0021474) was issued on December 31, 2001 and expired on January 2, 2007. In accordance with the regulations, the CBS re-submitted their application for permit renewal on June 7, 2006. In December 2006, EPA responded that the application was complete and timely and that the permit would be administratively extended until such time as EPA could issue a new permit. In January 2020, EPA initiated the reissuance process for CBS. Permit review is underway, and a new permit is expected in 2022.

4.3 State Wastewater Regulations

If EPA, working with the State of Alaska, decides not to renew the 301(h)-waiver, then authority to administer the CBS permit will transfer to ADEC. The following provides a summary of the state wastewater regulations (Alaska Administrative Codes 18 AAC 72 and 18 AAC 70) that may be applicable for wastewater treatment should the permit be transferred.

4.3.1 Secondary Treatment

The minimum level of effluent quality attainable by secondary treatment is defined in federal statute (40 CFR 133) in terms of treated effluent quality using the 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. Alaska wastewater regulations adopt these minimum criteria. The quality of treated effluent is regulated in terms of concentrations of organics and solids and in terms of percent removal achievement. Table 2 summarizes the minimum treatment requirements for conventional treatment plants. In this context, conventional treatment systems are those systems using biological and/or mechanical processes to achieve secondary treatment standards and discharging effluent from a source other than a stabilization pond.

Table 2 - Secondary Treatment Criteria

Parameter	Criteria for Conventional Treatment Systems
Concentration of Effluent BOD	30-day average shall not exceed 30 mg/L 7-day average shall not exceed 45 mg/L 24-hour average shall not exceed 60 mg/L 30-day average percent removal shall not be less than 85 percent

Concentration of Effluent TSSs	30-day average shall not exceed 30 mg/L 7-day average shall not exceed 45 mg/L 24-hour average shall not exceed 60 mg/L 30-day average percent removal shall not be less than 85 percent
Effluent pH	Between 6.0 and 9.0

4.3.2 Water Quality Standard Regulations for Discharge to Water

In addition to meeting secondary treatment, wastewater regulations also require point-source dischargers to meet state and federal receiving water quality standards as outlined in Alaska Statute (18 AAC 70). In these regulations, release of treated wastewater into surface or groundwater must not raise the concentration of contaminants in the receiving water at the edge of a designated mixing zone above the water quality criteria limitations stipulated in the regulations.

To evaluate the impact on the receiving environment, a determination of water quality use designation is first required. Alaska statue establishes four classifications of water quality that apply to marine waters (18 AAC 70). These classifications are based on intended water use. The water quality criteria include color, bacteria, dissolved gases, dissolved inorganic substances, petroleum hydrocarbons, pH, radioactivity, residues, sediment, temperature, toxic and other deleterious organic and inorganic substances, and turbidity. For wastewater discharged from small community facilities, the most difficult water quality parameter to meet is normally the bacteria requirement.

Bacteria is measured as fecal coliform colonies (FC) or enterococci colony forming units (CFU). Table 3 identifies the maximum concentration of bacteria allowed for each type of intended water use based on the geometric mean of samples taken in a 30-day period. The marine waters around Sitka are unclassified; the most stringent water quality criteria apply unless the community applies for a water body reclassification. The most stringent water quality standards require that the FC concentration not exceed 14 colonies per 100 milliliters (mL) of sample outside of the designated mixing zone.

Table 3 - State of Alaska Water Quality Standards for Fecal Coliform

Water Body Use	Bacteria FC/100mL
(A)Water supply	
(i)aquaculture	20 FC/100mL with not more than 10% of samples exceeding 40 FC/100mL
(ii)seafood processing	20 FC/100mL with not more than 10% of samples exceeding 40 FC/100mL
(iii)industrial	200 FC/100mL with not more than 10% of samples exceeding 400 FC/100mL
(B)Water recreation	
(i)contact recreation	35 enterococci CFU/100mL with not more than 10% of samples exceeding 130 enterococci CFU/100mL
(ii)secondary recreation	200 FC/100mL with not more than 10% of samples exceeding 400 FC/100mL
(C)Growth and propagation of fish, shellfish, other aquatic life, and wildlife	Not applicable

(D)Harvesting for consumption of raw mollusks or other raw aquatic life	14 FC/100mL with not more than 10% of samples exceeding various thresholds based on testing type

The concept of a mixing zone was developed as a method of administering wastewater discharge regulations in a practical methodology considering treatment technologies, economics, and environmental impacts. A mixing zone is designated by the applicant and then reviewed and approved by ADEC or USEPA. The regulations stipulate that ADEC will consider: (1) physical, biological, and chemical characteristics of the receiving water; (2) characteristics of the effluent; (3) the cumulative effects that discharges will have on the uses of the receiving water; (4) any additional measures that would mitigate adverse effects to aquatic resources; and (5) any other factors that must be considered to determine if a mixing zone will comply with the law.

Water quality regulations require that the mixing zone be as small as practicable and be authorized only after the applicant has submitted evidence that demonstrates that water quality standards will be met, and that effluent treatment is adequate for the parameters of concern. The mixing zone must also comply with the maximum size limitations. For estuarine and marine waters, measured at mean lower low water, the cumulative linear length of mixing zones intersected on any given cross section of an estuary, inlet, cove, channel, or other marine water may not exceed 10% of the total length of that cross section, nor may the total horizontal area allocated to mixing zones exceed 10% of the surface area. (18 AAC 70.255(e)(1)(A)).

4.4 Current Wastewater Compliance Status

The current permit effluent limits for CBS and the required monitoring requirements are shown in the tables below.

Table 4 - Effluent Limitations

Effluent Parameter	Unit of Measurement	Monthly Average	Maximum Daily
BOD_5[1]	mg/L	140	200
	lbs/day	2,100	3,000
TSS[1]	mg/L	140	200
	lbs/day	2,100	3,000
Total Flow	mgd	1.8	5.3
Fecal Coliform	# FC/100 mL	1,000,000	1,500,000
Copper	µg/L	243	354
Dissolved Oxygen	mg/L	--	2.0[2]

[1]The monthly average effluent loading shall not exceed 70% of the monthly average influent loading for 5-day BOD_5 and TSS.
[2]Minimum daily limitation.

Table 5 - Influent/Effluent Monitoring Requirements

Effluent Parameter	Sample Location	Sample Frequency	Sample Type
Average Monthly Flow, mgd	Influent or Effluent	Continuous	Recording
BOD_5, mg/L	Influent and Effluent	Weekly	24-hour composite
TSS, mg/L	Influent and Effluent	Weekly	24-hour composite
Temperature, ºC	Effluent	Weekly	Grab

pH, S.U.	Effluent	Weekly	Grab
Dissolved Oxygen, mg/L	Effluent	Weekly	Grab
Fecal Coliform Bacteria, Colonies/100 mL	Effluent	Monthly	Grab
Total Ammonia as N, mg/L	Effluent	Monthly	24-hour composite
Copper, µg/L[1]	Effluent	Monthly	24-hour composite
Toxic Pollutants and Pesticides$_2$	Effluent	2/permit term[3]	Grab
Whole Effluent Toxicity[4], TU$_c$	Effluent	2/permit term[5]	24-hour composite

[1]Copper results will be reported as total recoverable copper.
[2]"Toxic pollutants" are defined as the 126 priority pollutants listed in 40 CFR 401.15.
[3]The permittee shall conduct analyses of the effluent for toxic pollutants and pesticides during the dry season (July through September) in the first and fourth years of the permit term. Samples shall be grab samples. Sampling and analysis shall be conducted according to methods approved in 40 CFR Part 136.
[4]See Part I.C.
[5]Whole Effluent Toxicity monitoring shall be conducted once per year in the first and fourth years of the permit term.

To evaluate treatment plant performance and permit compliance, recent discharge monitoring reports CBS wastewater treatment plant as well as recent monitoring summaries for the established mixing zone were analyzed and are discussed below.

4.4.1 Wastewater Flows

Exhibit 14 shows the monthly average of the daily flows and the maximum daily flows for each month for 2019 and 2020. The results indicate that the plant has been in compliance with the permit requirements of 1.8 mgd for average daily flows, and 5.3 mgd for maximum day flows.

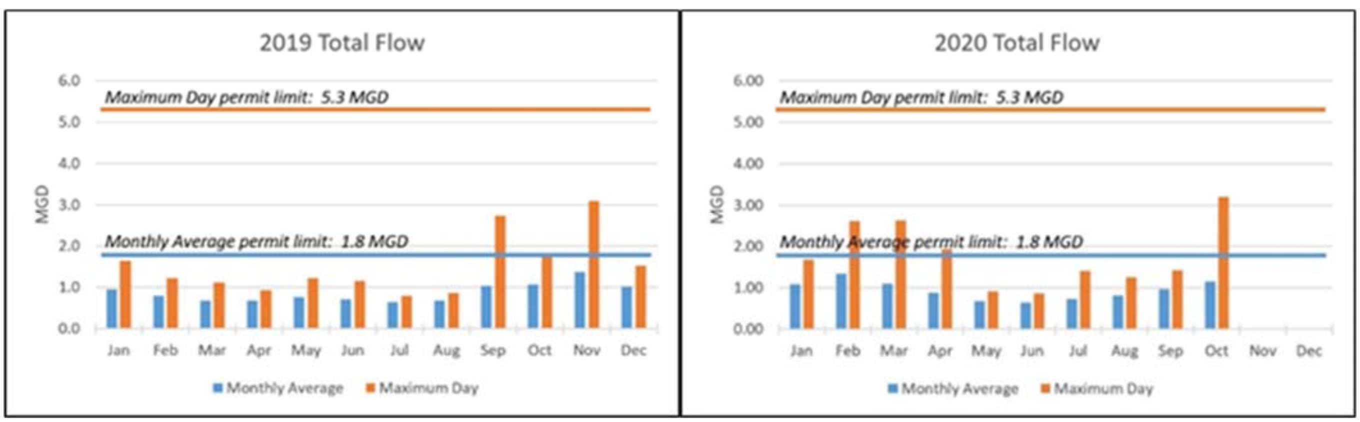


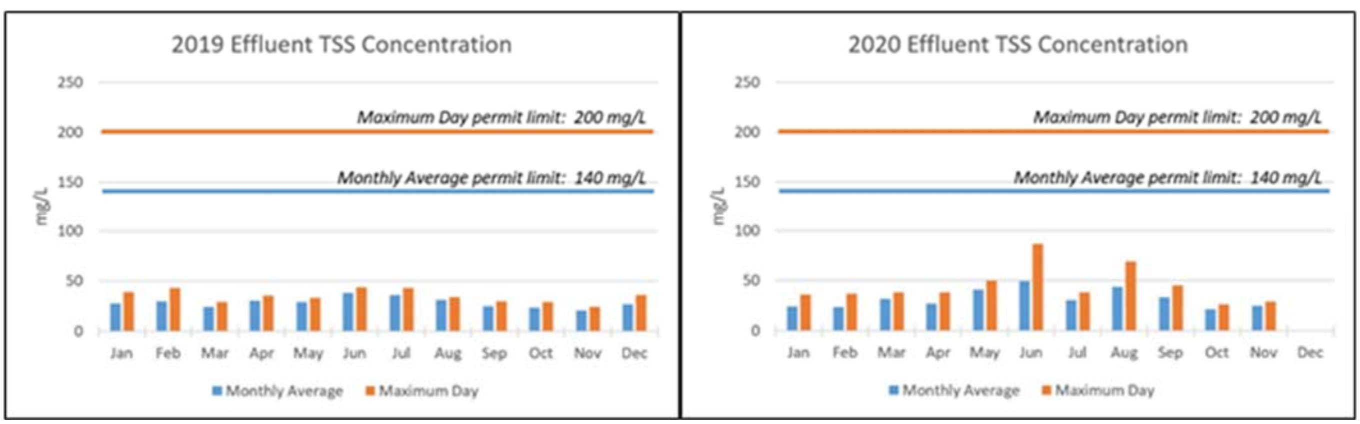
Exhibit 14 - Wastewater Flows for 2019 and 2020

4.4.2 Wastewater Treatment Plant Performance

The discharge permit establishes monthly average and maximum daily limits based on concentration (mg/L) and mass (lbs/day) for BOD5 and TSS, and minimum percentage removal (30%) for each. In addition, maximum discharge concentrations of FC and copper, and a minimum daily dissolved oxygen (DO) concentration are stipulated as well as minimum and maximum pH levels. **Exhibit 15** through Exhibit 21 show average monthly effluent concentrations for these permitted parameters.

Overall, the plant continues to comply with permit conditions. In 2019, there was one exceptional FC sample taken in July. FC counts are controlled in the wastewater stream through the addition of chlorine pellets and sodium hypochlorite. In 2017, chlorine pellets were added at Thomsen Lift Station beginning in May. Sodium hypochlorite addition then started in July. Effluent also showed one slightly low pH reading in January 2020, at 6.4.

Exhibit 15 - BOD Effluent Discharge Concentration and Mass for 2019 and 2020



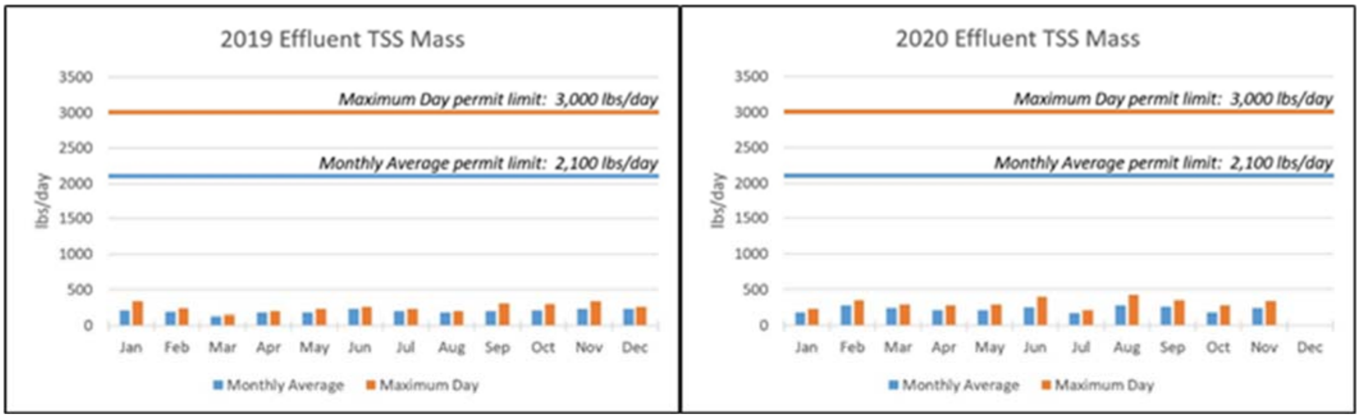


Exhibit 16 - TSS Effluent Discharge Concentration and Mass for 2019 and 2020

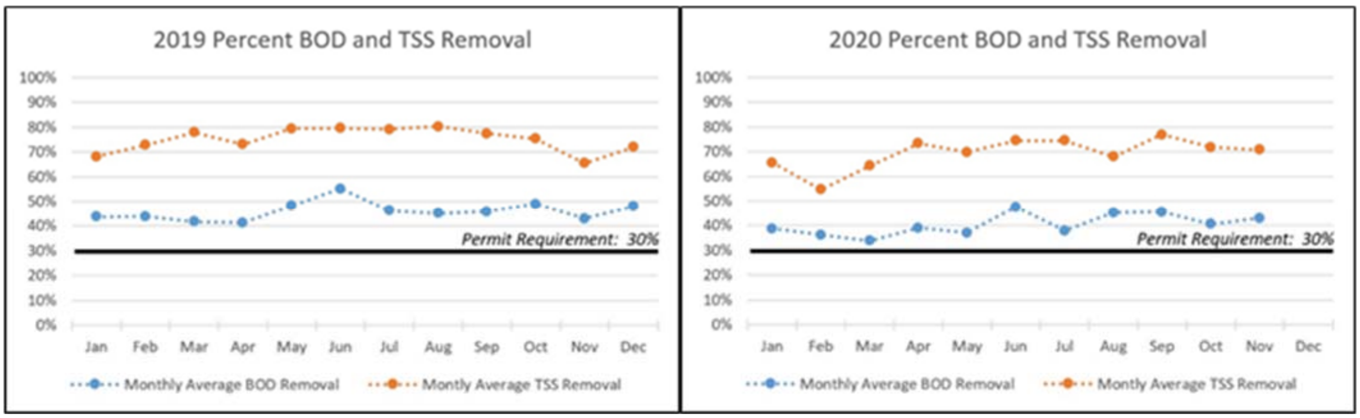


Exhibit 17 - BOD and TSS Average Removal Efficiency for 2019 and 2020

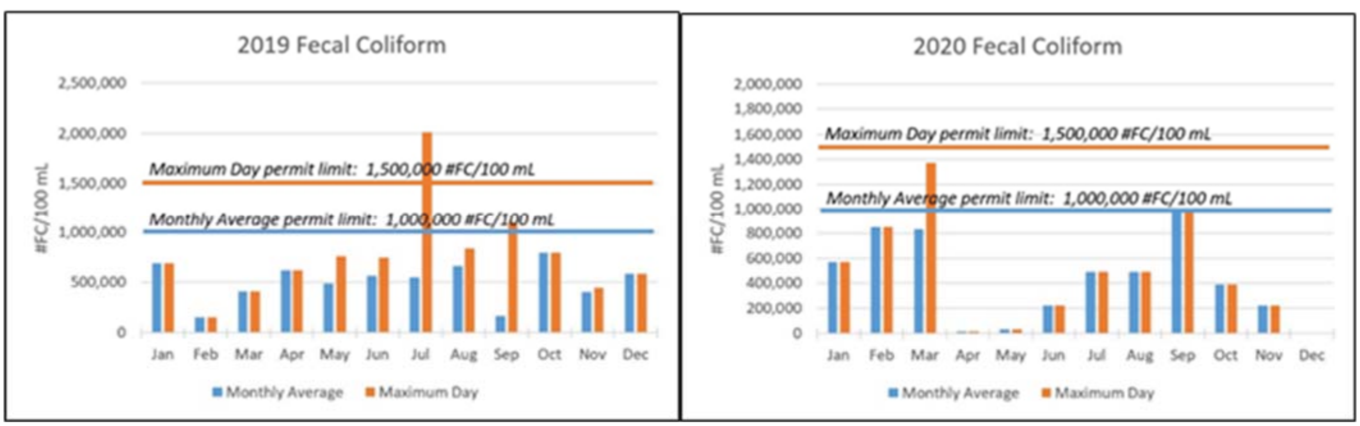


Exhibit 18 - FC Effluent Discharge Concentrations for 2019 and 2020

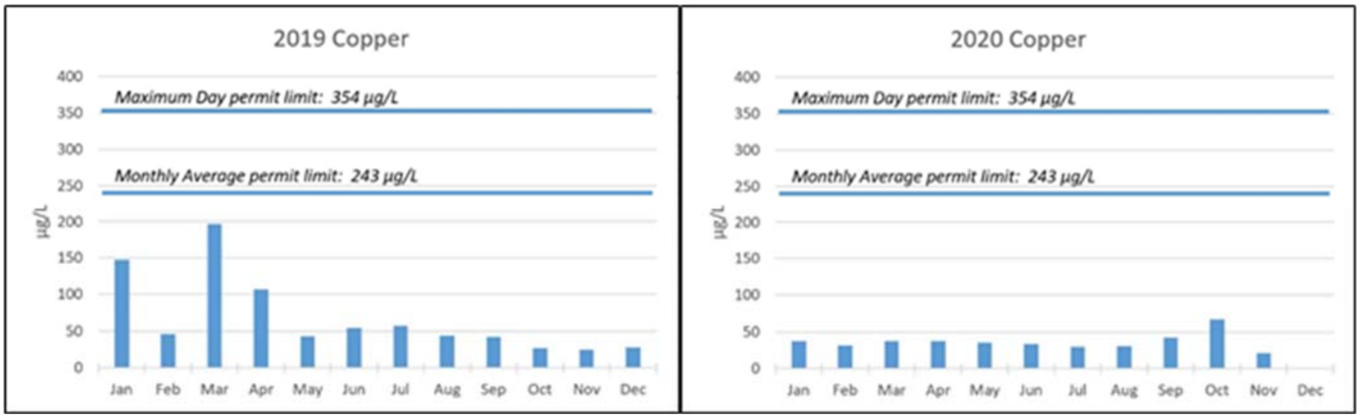


Exhibit 19 - Copper Effluent Discharge Concentrations for 2019 and 2020

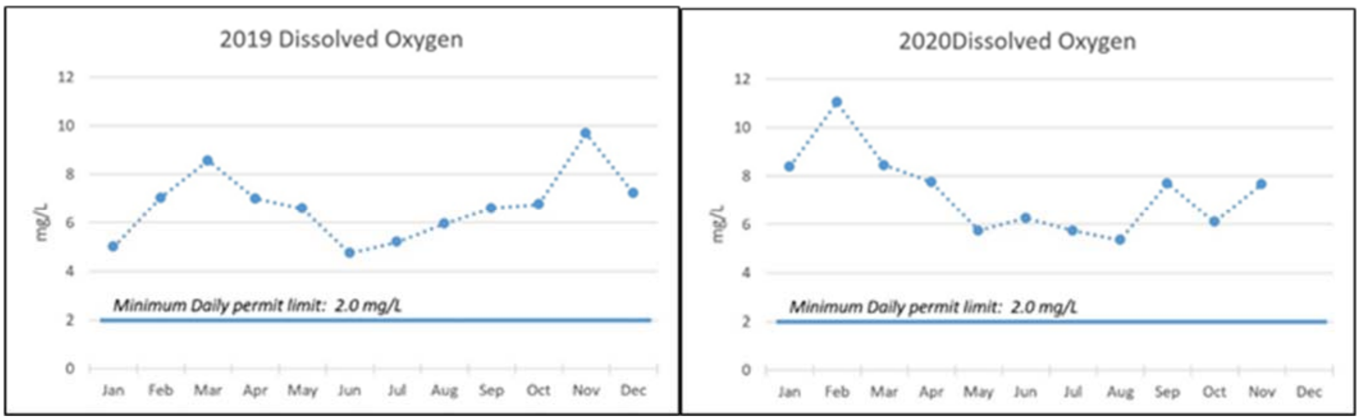


Exhibit 20 - Dissolved Oxygen Effluent Discharge Concentrations for 2019 and 2020

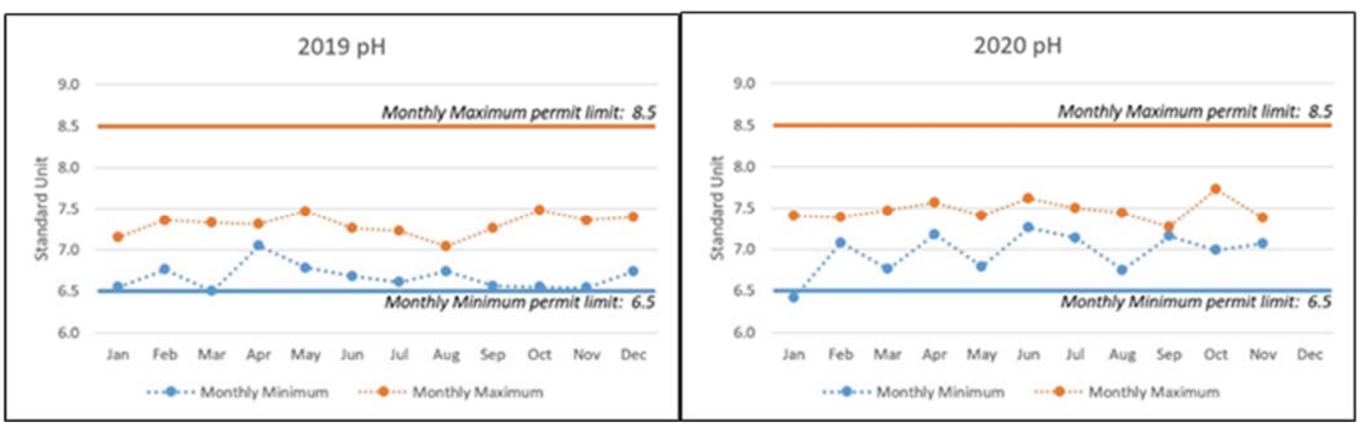


Exhibit 21 - Effluent Discharge pH for 2019 and 2020

4.4.3 Chlorine Residual

The discharge permit notes that if a chlorination process is added at the wastewater treatment facility as a method of disinfection, then a maximum daily total residual chlorine limitation of 0.244 mg/L becomes effective. Monitoring for chlorine residual is required once per week. Monitoring reports from the treatment plant from 2010 through 2020 were reviewed for compliance with the permit limitation. Two high readings were found, 0.50 mg/l in September 2015 and 1.36 mg/L in 2018. After adjustment of the sodium hypochlorite injection rate, the chlorine residual dropped to 0.00 mg/L within 5 hours in 2015 and within 3 hours in 2018.

4.4.4 Receiving Water Quality Compliance

The discharge permit outlines sampling of the receiving waters in the second and fourth years of the permit for temperature, salinity, DO, pH, and Secchi disk depth. Monitoring is performed one meter below the surface, at mid-depth, and one meter above the marine bottom at four locations, including the eastern and western boundaries of the zone of initial dilution, one reference station west of the discharge within the boundary, and one reference station east of the discharge within the boundary. The zone of initial dilution is defined in the permit as a rectangle of 118 meters long (perpendicular to shore) and 58 meters wide centered on the diffuser. Monitoring is completed twice per year, once during the dry season and once during the wet season. Recent monitoring was completed in 2013, 2015, 2018, and 2020.

The permit requires FC monitoring in July of each year, and in the fourth year of the permit, requires monitoring five times a year (April, June, July, August, and November) at the water surface at the seven locations listed in Table 6. The mixing zone for FC is defined as a circle of radius 1,600 meters centered over the outfall diffuser and extending from the marine bottom to the surface. Outside the mixing zone, FC concentrations may not exceed a monthly average of 14 FC/100mL with a daily maximum of 43 FC/100mL. In addition, FC concentrations may not exceed 200FC/100mL at the shoreline within the mixing zone.

Table 6 - Fecal Coliform Surface Water Sampling Locations and Fecal Coliform Permit Limits

Location	Description	Water Quality Permit Limitations
1	Shoreline area of human use, close to the discharge point	200 FC/100mL
2	Shoreline area just outside of the point where the outer edge of the mixing zone touches the shoreline near the Sitka National Historical Park	14 FC/100mL
3	Outside the edge of the mixing zone between Passage and Smith Islands	14 FC/100mL
4	Shoreline area of human use inside the mixing zone in Sitka Harbor near the boat ramp on Japonski Island	200 FC/100mL
5	Outside edge of the mixing zone between Morne Island and the Sitka National Historical Park	14 FC/100mL
6	Outside the edge of the mixing zone between Whale and Kayak Islands	14 FC/100mL
7	500 m southeast of the discharge (between Rockwell and Beardslee Islands)	200 FC/100mL

Monitoring reports from 2013 through 2019 were reviewed for FC compliance. All reported FC concentrations were within permit requirements, with the highest colony concentration recorded during 2019 period at 11 FC/100mL at Location 4, a shoreline area within the mixing zone requiring concentrations below 200 FC/100mL, as shown in Table 7.

Table 7 - Fecal Coliform Colonies per 100 mL

	2013	2014	2015(1)	2015(2)	2015(3)	2015(4)	2015(5)	2016	2017	2018	2019
1	0	0	0	1	1	0	7	5	1	0	0
2	1	1	0	0	2	0	3	0	0	0	0
3	1	0	2	1	0	0	3	1	0	0	0
4	7	0	0	0	7	0	8	6	1	0	11
5	0	0	1	0	0	2	7	1	0	0	0
6	3	0	2	0	0	0	3	0	0	0	0
7	4	0	0	1	0	1	4	0	0	0	0

The permit also requires biological monitoring for Benthic Infauna in August of the second and fourth permit years. Qualitative observations are made at three stations and were most recently conducted in 2013, 2015, 2018, and 2020. Monitoring found that the effects of the wastewater discharge on the benthic community as a whole are negligible.

4.4.5 Whole Effluent Toxicity (WET) Testing

The permit requires toxicity testing in the first and fourth permit years on available organisms found in spawning condition. Organisms may include sand dollar; green, purple, or red sea urchin; pacific oyster; or mussel. WET testing results are reported in Chronic Toxic Units or TUc and cannot exceed 122 TUc. WET testing conducted in 2015 and 2017 did not exceed the permit limitations with results at 30.49 TUc and 30.3 TUc respectively.

4.4.6 Future Wastewater Regulatory Implications

As previously noted, the CBS wastewater treatment plant is permitted to treat wastewater to less than secondary standards under provisions of USEPA’s 301(h) waiver program. The permit is issued at 5-year intervals based on information collected by the utility to show that no adverse impacts of solids accumulation, water quality standard violations, or negative biological impacts in the vicinity of the discharge has occurred. The permit also requires state concurrence.

There are currently no proposed federal plans or policies that would change or phase out the 301(h) waiver program, however, the promulgation of more stringent state water quality standards and changes in receiving water conditions could render a wastewater treatment plant ineligible for the waiver. The USEPA is currently working with the State of Alaska on a new permit for Sitka and several other Southeast Alaska communities. New draft permits are expected in late 2022 or early 2023.

Initial discussions with USEPA suggest that technology based effluent limitations for fecal coliform will be included in the new permit and disinfection of effluent from the WWTP will be required. Technology-based effluent limits are derived from secondary treatment standards with the intent of requiring a minimum level of treatment based on currently available treatment technologies while allowing the discharger to use any available control technique to meet the limitations. Disinfection of primary effluent is commonly performed through either the addition of chlorine or through a UV process.

Disinfection through chlorination requires injection of a chlorine compound, mixing and detention in a chlorine contact basin, and dechlorination for removal of chlorine residuals with sodium and sulphur compounds. Chlorine disinfection is effective and commonly used, however, there are disadvantages. The near zero chlorine residual levels typically required by wastewater permits based on regulatory requirements for disinfection byproducts are hard to obtain. The compounds used for dechlorination are toxic and require strict adherence to storage, handling, and dosing requirements. The contact chamber requires significant space and detention time. Operations and maintenance costs can be high as well.

UV disinfection systems use mercury arc lamps to destroy microorganisms with ultraviolet light. The main components of a UV disinfection system are the ballast, mercury arc lamps, and a reactor or treatment channel. Chemical addition is not required and there is shorter contact time than that required in a chlorination system. The effectiveness of UV disinfection is strongly tied to the control of fouling on the lights as well as total suspended solids levels in the effluent, which can be a disadvantage when using UV disinfection after only primary treatment. Contact between the light and the effluent is imperative. Also, capital costs for a UV system can be high.

A site specific engineering study would be required to evaluate which disinfection method would yield the lowest life cycle cost.

5. Water and Wastewater System Evaluation

Areas of improvement are identified in each of the following sections. The different improvement areas are combined into projects detailed in the Capital Improvement Plan detailed in Section 6. The project numbers shown with the improvement area allow tracking from an individual need to a project developed in the CIP.

5.1 Water System

The water system design criteria are developed based on data provided by CBS and standard engineering principles and practices. Many of these standard practices are included in guidance documents that are specifically referenced in the Alaska Drinking Water Regulations, 18 AAC 80, as promulgated by the Alaska Department of Environmental Conservation (ADEC). One such guidance standard included in State regulation and used by many states is the “Recommended Standards for Water Works, Great Lakes-Upper Mississippi River Board of State Sanitary Engineers”. This guidance document is better known by its common name, the Ten State Standards. In the absence of specific guidance from ADEC, the Ten State Standards will be referenced.

5.1.1 Water Treatment & Regulatory Compliance

With the recent construction of the UV Disinfection facility, Sawmill Creek Intake, and Membrane Filter Plant, the water treatment system is in good working order and has the capacity and flexibility to meet the City’s needs for many years.

Recommendation: Continue maintenance of existing systems. Budget for replacement of equipment as it ages.

5.1.2 Water System Demand

The daily water demand for Sitka is recorded by the Public Works Department and has averaged about 3.2 million gallons per day for the year 2019. The average water demand in 2020 was 2.9 million gallons per day, but was not used for analysis purposes due to the effects from the COVID-19 pandemic. Table 8 shows the flow records from the Blue Lake Water Treatment Plant (BLWTP) recorded by CBS.

Table 8 - Water System Demand

Year	Average Day Demand
2019	3.20 MGD
2020	2.93 MGD
Projected Future	3.52 MGD
Plant Capacity	6.0 MGD

Based on water production data, meters, and customer billing database, evaluation of the existing water transmission and distribution system consisted of flow rate setpoints at 2,200 gpm (3.2 MGD) for average daily demand, 3,400 gpm (4.9 MGD) for the max day demand, and 3,850 gpm (5.54 MGD) for peak hour demand. The flow rate of 3,850 gpm represents an increase of about 70% above current average demand.

5.1.3 Water Transmission and Distribution

The water pressure and flow criteria established in the Ten State Standards are:

- The minimum pressure anywhere in the distribution system under all conditions of flow (which includes fire flows) should be 20 psi;
- Pressures anywhere in the system should not be less than 35 psi during normal operation;
- The normal working pressure in the system should be approximately 60 to 80 psi (CBS design direction allows for operation pressures between 40 and 90 psi to allow higher elevations to receive adequate water pressure)

The Sitka WaterCAD model was updated to allow for modeling different demand and flow scenarios. The scenarios took the existing Sitka Water Model and modified the water demand allocation to account for increased use by Silver Bay Seafood in the Gary Paxon Industrial Park and development at higher elevations along Sawmill Creek Road. The model results are summarized below, with additional figures and results included in Appendix B:

1. Under average day demand the water system appears to provide adequate pressures and flows to most areas. As development occurs at higher elevations (above about 150') pressures will be less than 30 psi. This is true of the upper elevations in the Lance Drive area where low water pressures occur even under conditions of normal water demand.
2. The water system can provide flows in excess of 1,500 gpm to the extreme ends of the water system but again it will result in some areas having negative pressure.
    a. Most of the areas of low pressure are between Indian River and GPIP especially at the upper elevations in the Lance Drive area and at the high points along Sawmill Creek Road (e.g. Shotgun Alley).
3. The higher elevation area around Shotgun Alley experiences low pressure during average and peak flow periods. Private water systems at higher elevations in this area experience water shortages due to low pressure in the CBS main and inadequate pumping systems in the private developments.
4. Water system expansion into areas such as Granite Creek, Indian River, Kramer Benchlands, Japonski Island, North of Sitka High School, and Gary Paxton Industrial Park are feasible provided system elevations do not exceed about 150'. Any water system development above this elevation will require booster pumps for neighborhoods or the establishment of a new pressure zone.

5.1.3.1 Hydraulic Improvements

The following projects were identified to improve the hydraulic conditions throughout the water system. These improvements include completion of loops and installation of parallel lines to allow for flexibility and redundancy in water transmission. Additional improvements can be made with water storage and pump station improvements identified in the following sections.

- Project W-2 and W-6: Lincoln St– Replace the existing water main in Lincoln St between Katlian Avenue and Jeff Davis Street with 3,610' of 16" HDPE to improve water transmission in the downtown core and replaces failing pipe.

- Project W-7: Upsize approximately 7,500 feet of water main in Halibut Point Road from 8” cast iron to 12” HDPE to replace sections that have been leaking and improve the hydraulic conditions of transmission along Halibut Point Road.
- Project W-24: Connect Indian River Road to Jarvis St - Construct new 12” HDPE line between Indian River Road and Jarvis Street to provide a looped redundant routing to convey water to downtown and beyond.
- Project W-17: Erler St – Replace existing line between Kaagwaantann St and Marine St with 55’ of 12” HDPE to improve water transmission.
- Project W-19: Hillside Pressure Zone & Lance Drive – Connect the Hillside Pressure Zone with Lance drive by installing 840’ of 10” HDPE with a PRV at Lance Drive set at 30 psi.
- Project W-31: Granite Creek Rd – Upgrade the existing line in Granite Creek Rd with 902’ of 8” HDPE.
- Project W-32: Kashevaroff St – Upgrade the existing line with 450’ of 12” HDPE.
- Project W-33: Benchlands to Harbor Mountain – Install 5,425’ of 12” HDPE to connect the Benchlands area to Harbor Mountain Tank to improve flow distribution and transmission.
- Project W-34: Granite Creek to Harbor Mountain – Install 885’ of 12” HDPE to connect Granite Creek Road to Harbor Mountain Road to provide redundancy in the system.

5.1.3.2 Breaks and Preventative Repair & Replacement

Interviews with CBS staff, review of recent work orders for main breaks, and an evaluation of installation dates and materials in the water system identified areas of needed improvements to address maintenance issues and regular repair and replacement of water system components:

- Project W-4: Kirkman Way – Existing 6” CIP with unknown installation date pipe has had three recent breaks (2015, 2017, and 2020) due to galvanic corrosion at the bottom of the pipe. Recommendation: replacement with 300’ of 6” HDPE.
- Project W-13: Merrill St – Existing 6” CIP installed in 1966 has had a recent leak (2012), and is similar age as other problematic pipe in the system. Recommendation: replacement with 870’ of 6” HDPE.
- Project W-16: Gavan St and Moller Ave – Existing 6” DIP installed in 1979 has had leaks in 2012 and 2017. Recommendation: replacement with 875’ of 6” HDPE.
- Project W-17: Marine St from New Archangel to Erler – Existing 10” CIP was installed in 1996 and had breaks in 2012 and 2013. Recommendation: replacement with 630’ of 10” HDPE.
- Project W-17: Dearmond St from new Archangel to Erler – Existing 6” DIP from 1966 had a break in 2013. Recommendation: replacement with 585’ of 6” HDPE.

5.1.3.3 Fire Flow

Water system fire flow requirements are typically based on buildings and other facilities to be protected. There is a wide array of factors that are used to establish fire flows. These include criteria such as the size of the facilities being served; the fire resistance of the construction; separation distance from adjacent buildings; whether a facility has a sprinkler system or not; as well as many other criteria. Fire flows in water systems are evaluated by the Insurance Services Office (ISO) and are used, along with other factors, such as the training and capacity of the fire department, to determine fire insurance rates. Generally the ISO gives significant credit to any water system capable of providing fire flow in excess of 250 gpm and give progressively greater credit for systems capable of higher flows.

The 2012 International Fire code contains the "Minimum Required Fire-Flow and Flow Duration for Buildings" in Table B105.1. These minimum required flows range from a low of 1,500 gpm lasting for a 2-hour duration, up to a fire flow of 8,000 gpm lasting for a 4-hour duration. A typical fire flow for commercial and high density residential areas that has been used by other communities in Southeast Alaska is 3,500 gpm with a 3-hour duration. Additionally, the needed fire flow that the insurance services office grades a community on is 3,500 gpm.

For lower density commercial development and residential development the fire flow requirements are usually assumed to be about 1,500 gpm.

Model Results

1. During large fire demands of 3,500 gpm in downtown Sitka and Japonski Island, some areas of the water system currently have negative or very low water pressures. These areas include Upper Charles Street, Pherson Street, Lance Drive, Jamestown Drive, Knutson Drive, Anna Drive, and the high point on Sawmill Creek Road at the Shotgun Alley intersection.
2. Available fire flows while maintaining 20 psi residual pressure throughout the system are shown in the following Table 9 and Exhibit 22.

Table 9 - Available Fire Flow

Area	Available Fire Flow (GPM)
Ferry and Cruise Ship Terminal	1,200
Upper Granite Creek Rd.	1,100
Halibut Point Road from Davidoff St. To Old Harbor Mountain Rd.	3,500
Swan Lake, Downtown, and Japonski Island	2,000
Indian River Valley	1,500
Jarvis St. to Hillside	1,000
Wolff Dr. to GPIP	700

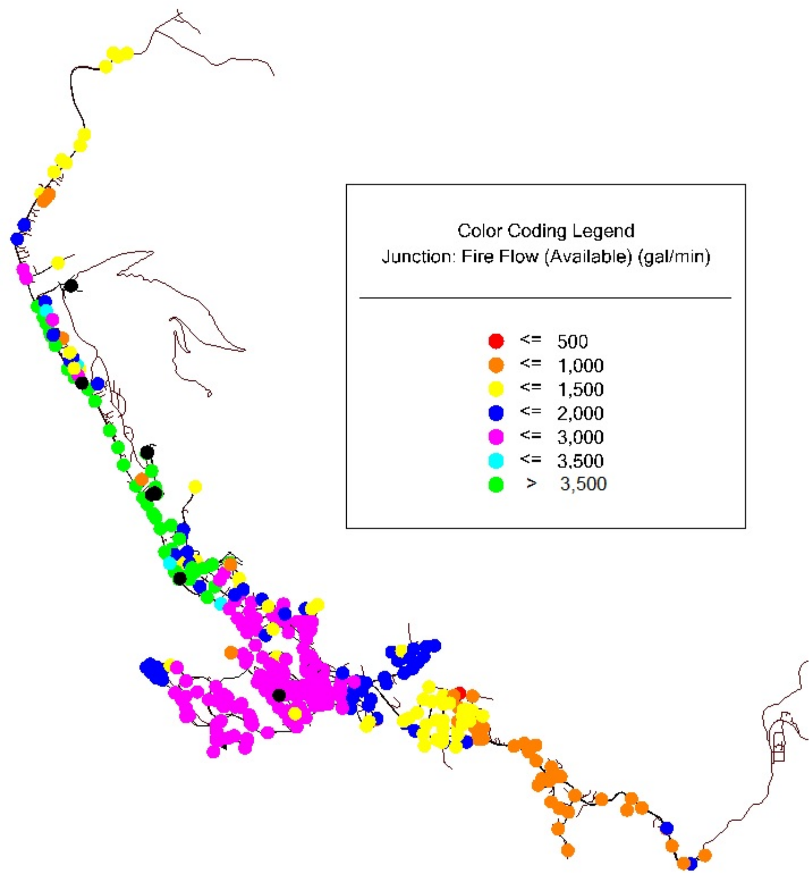


Exhibit 22 - Available Fire Flow for Existing Conditions with 20 psi Residual Pressure

Projects to improve fire flow are:

- Project W-18: Wortman Loop – Replace 6" DIP with 1640' of 8" HDPE to increase fire flow capacity to 1,500 gpm.
- Project W-21: Halibut Point Road 1 – Upgrade the existing water main between Old Harbor Mountain Road to Krestof Dr to increase fire flow to 1,500 gpm.
- Project W-28: Burkhart St & Lance Drive – Upgrade to 10" HDPE to increase the fire flow for Vitskari St and Hillside Drive to 1,500 gpm.
- Project W-30: Halibut Point Road 2 – Replace 1,700' of 12" CIP with 16" HDPE between Krestof Dr to Viking Way to increase fire flow to 1,000 gpm.

5.1.3.4 Wastewater Plan Coordination

The following projects were identified as water main replacements that should be completed in conjunction with required wastewater system upgrades. These projects take advantage of the road being excavated to replace aging infrastructure.

- Project W-27: Viking Way – Replace 320' of 6" DIP with 8" HDPE to improve fire flow.
- Project W-1: Lake St – Replace 1,050' of 10" CIP with 14" HDPE from Arrowhead St to DeGroff St.

- Project W-1: Hirst St – Replace existing pipe with 6” HDPE.
- Project W-1: Monastery St (Kinkead to Hirst)– Replace 400’ of 6” CIP with 6” HDPE from Kinkead St to Hirst St.
- Project W-1: Kinkead St – Replace existing pipe with 6” HDPE.
- Project W-1: Monastery St (Arrowhead to Kinkead) – Replace 430’ of 6” CIP with 6” HDPE.
- Project W-3: Wolff Dr – Upgrade existing pipe with 8” HDPE.
- Project W-14: Tilson St – Replace existing pipe with 6” HDPE.
- Project W-14: Kimsham St – Replace 950’ of 8” DIP and 2” Copper with 8” HDPE from Tilson St to Peterson St.
- Project W-14: Peterson St – Replace 530’ of 10” CIP with 14” HDPE from Kimsham St to Edgecumb Drive.
- Project W-17: New Archangel St – Replace 200’ of 8” CIP with 8” HDPE between Halibut Point Road to Marine St.
- Project W-23: Princess Way – Replace 160’ of exiting pipe with 6” HDPE.
- Project W-23: Seward St – Replace 410’ of existing 10” DIP with 10” HDPE from Princess Way to Kaagwaantann St.
- Project W-23: Barracks St. – Replace 190’ of 6” DIP with 6” HDPE from Seward St. to Race St.
- Project W-25: Anna Dr and Circle – Replace existing pipe with 6” HDPE.
- Project W-26: Upper Jamestown Dr. – Replace existing pipe with 8” HDPE.

5.1.4 Pump Station Improvements

5.1.4.1 Project W-8: Hillside Booster Station Upgrades

During the condition assessment site visit the Hillside Booster Station was identified as requiring a new standby generator and new hard wired connections to SCADA.

5.1.4.2 Project W-11: New Pressure Zone at Shotgun Alley

Under the existing conditions, pressures at Shotgun Alley and the surrounding high elevations do not meet minimum requirements during peak demands at GPIP and during large fire flows elsewhere in town.

Recommendation: Create a new pressure zone along Sawmill Creek Road between Jamestown Drive and Blueberry Lane (e.g. “Shotgun Alley Pressure Zone”). This new zone would be served by a new pump station to maintain the required pressures in this area. Two alternatives for constructing a booster station are summarized below.

Construct Booster Station Only – Alternative 1

Construct a booster station east of Wolff Drive to increase pressure in the Shotgun Alley Pressure Zone, a pressure reducing valve would be required to reduce the pressure for water that flows further out the road to GPIP. The booster station would pump all of the water that flows between the downtown portion of CBS to GPIP. The booster station would be sized to satisfy average, maximum, and peak flow demands. Variable frequency drives (VFD) would control the pumps to adjust flows to meet demands. If the booster station is west of Jamestown drive, available fire flow in the area will increase due to the booster pumps increasing residual pressure for high elevations. A PRV at Blueberry Lane will reduce the pressure for flows exiting Shotgun Alley Pressure Zone prior to entering GPIP. This option has a lower capital cost but higher operating cost to pump water to GPIP. A rough order of magnitude cost for operating this pump station is $45,000/year.

<u>Construct Isolated Pressure Zone – Alternative 2</u>

This alternative would construct a directionally drilled bypass line along Sawmill Creek Road and construct a booster station on the east end of the directionally drilled line to serve the pressure zone located to the west. Water serving GPIP would continue along the existing pipe network without pressure boosting. The directional drilling would span between Jamestown Drive and Blueberry Lane along Sawmill Creek Road. Flows into the Shotgun Alley Pressure Zone would enter though the bypass and booster station. The existing mains would remain in place to serve as distribution within the pressure zone. Flows to GPIP will bypass the pressure zone and booster station. Other potential utilization of the bypass line include rerouting water flows during maintenance and emergencies. A rough order of magnitude cost for operating this pump station is $17,000/year.

5.1.4.3 Project W-12: Wortman Loop Pump Station Improvements

The Wortman Loop Pump Station is aged with pumps approach the end of their design life. This project would replace the existing pumps with four new VFD driven pumps to optimize the performance of the pump station. The upgrade would include communication for SCADA for the new pump system and a connection point for a portable backup generator. The project also includes replacing the check valves in vaults located at Mills, Cascade, and Georgeson Loop.

5.1.5 Water Storage

Alaska does not have published regulations or guidelines regarding the total storage needed by a system, so general requirements from the State of Washington were used to evaluate the storage needs. Storage can be classified in the following categories, and the volume required for each category is subjective and based on the needs of a given system.

- Equalizing: Supplementing supply when demand is greater than the capacity
  - Peak hour flow – supply flow * 150 minutes = 420,000 gal
- Standby: Provides water when supply is interrupted for any reason
  - 500 gal/Equivalent Residential Unit (ERU) = 3,237,000 gal
- Fire: Provides fire supply water
  - Based on the Authority Having Jurisdiction (AHJ), assumed 3500 gpm for 3 hours = 630,000 gal
- Dead: Unusable volume due to elevation or tank inlet/outlet geometry.
  - As little as practical

The total storage needed for CBS with these criteria and recent demands is 4,287,000 gallons with no dead storage, a shortage of 1,337,000 gallons.

The total water storage in the system should be sufficient for one-day worth of equalizing, standby, and fire suppression storage. If it is assumed that the peak hour demand is 8.9 MGD and the max day demand is 4.9 MGD, the equalizing storage required is 420,000 gallons. Based on 500 gallons per ERU, the standby storage required is 3,237,000 gallons. To satisfy a fire flow of 3,500 gpm for 3-hour duration, the fire suppression storage required is 630,000 gallons. The total required storage is approximately 4.3 million gallons. If the water demand increases due to future development, additional storage of 367,000 gallons is required as equalizing and standby storage.

Currently Sitka is served by three water tanks as shown below in Table 10:

Table 10 - Water Storage Tanks

Tank Name	Location	Capacity (Gal)
Gavan Tank	Charteris St.	1,200,000
Harbor Mountain Tank	Harbor Mountain Rd.	750,000
Whitcomb Heights Tank	Emmons St.	1,000,000
Total Capacity	n/a	2,950,000
Storage Requirement	n/a	4,300,000
Shortfall	n/a	1,350,000

The combined total storage capacity for these tanks are 2.95 million gallons. This is nearly 1.34 million gallons less than is desirable for Sitka's recent demand and 1.7 million gallons less than should be provided for future development. Consequently, Sitka should have at least an additional 1.34 million gallons of water storage to provide a reserve capable of one day of water demand.

Recommendation: Construct two water storage tanks each with a capacity of 1 million gallons each to meet current and future water system needs in the event of an interruption in water supply. The excess 300,000 gallons allow for dead storage allocation when needed to maintain minimum hydraulic grade line. The tanks should be located in the eastern portion of town to support the demands and fire flows in that area. A preliminary desktop evaluation indicated that locations east of Indian River may be unsuitable due to land acquisition, landslide hazards, and low elevations at practical building sites. A detailed tank siting study should be conducted to confirm the inadequacy of the eastern tank locations (Project W-9). For the purposes of this plan, two tanks located on properties owned by CBS were identified: Northeast of Sitka High School (Project W-9) and Keet Gooshi Heen Elementary School (Project W-15). These tanks share similar elevation as the existing Gavan Tank.

Recommendation: During a condition assessment site visit, all three existing tanks showed some signs of damage to the exterior paint. The Harbor Mountain Tank should be repainted soon (Project W-10), and the paint touched up on the other two tanks. Typically paint lasts 15-20 years, so the Gavan Tank (Project W-35) and Whitcomb Heights (Project W-36) tanks should be painted around 2030.

5.1.6 Water Meters

The CBS water system is partially metered. Water meters are installed on high demand commercial accounts, and checked monthly for billing and tracking. Additional resolution in water demand can be achieved by adding additional water meters to the system as shown in Table 11. Rather than requiring meters for each service, meters to monitor flow in general geographic areas would be installed. The meters would be clamp-on ultrasonic meters designed for direct burial on existing meters such as the IP68 meters by Flexim. Data recording and transmission to SCADA would require a buried conduit to a control box nearby.

Table 11 - Water Meter Locations

Meter Installation Project Phase	Meter Locations
1 Project W-7	Kramer Ave & Halibut Point Road Sawmill Creek Road at Chirikov Dr 600 Katlian St Tongass Dr and Seward Ave
2 Project W-20	Indian River Road at Sawmill Creek Sawmill Creek at Sisters Lane Jarvis St at Sawmill Creek
3 Project W-22	Halibut Point Road at Old Harbor Mountain Road Lake St. and DeGroff St Halibut Point Road at Katlian St
4 Project W-29	Sawmill Creek Rd at entry to GPIP O'Connell Bridge

5.2 Wastewater System

Similar to the Water System Criteria, wastewater system design, performance and operation criteria are based on industry standards and sanitary engineering principals. There are multiple industry organizations which develop and publish recommended standards, including, American Water Works Association (AWWA), Water Environment Federation (WEF), and the Great-Lakes Upper Mississippi River Board of State Sanitary Engineers. Other organizations such as the American National Standards Institute (ANSI) and sub-branches including the Hydraulic Institute (HI) publish standards for piping and pumping systems used in municipal systems. Some general criteria for gravity sewer and pressurized sewer include:

- Collection System – Gravity Sewer:
  - Gravity sewer mains should be 8-inches in diameter or greater
  - Gravity sewer and flow structures such as manholes or junction boxes should be sloped to provide minimum pipe velocities of 2 feet per second to maintain solids suspension. Higher velocities are desirable to self-clean or scour and re-suspend sediment and solids which have settled.
  - Gravity sewer and manholes should be designed to keep flow velocity below 10 feet per second.
  - Excessive water drops in manholes should be avoided to prevent generation of odorous gases in the collection system
  - Manholes spaced 400 feet or less with straight pipe runs
- Collection System – Pressurized Sewer:
  - Force mains should be 4-inches in diameter or greater
  - Force mains should be sized to maintain between 2 and 8 feet per second flow velocity
  - Air release valves should be located at high points in the force mains
  - Pipes and joints should be designed for the water hammer conditions caused by cyclical pumping.

- Force mains shall be buried sufficiently deep to prevent freezing.
- Pump or lift stations should include a minimum of one redundant pump

5.2.1 Wastewater System Model Update

The wastewater system hydraulic model was converted to Bentley SewerCAD to represent the sanitary sewer collection system. The model includes all known gravity mains, force mains, lift stations, and specifics such as pump capacities, manhole invert elevations, pipe type and diameters, and wet well diameters. Most of the model data originated from the CBS ArcGIS geodatabase. Additional information needed to develop the model was found via record drawings and the sanitary sewer master plan developed by DOWL in 2012.

The model was calibrated to best represent the existing system performance using discharge pressure data gathered by CBS. Discrepancies observed between the results generated by the model and the data collected in the field were investigated and remedied so that the model better represents the existing system.

Results generated by the model indicate the proposed sanitary sewer loading for the three main future expansion areas including the Southeast Alaska Regional Health Consortium campus, the Kraemer Benchlands, and the Indian River Uplands do not significantly impact the capacity of the existing system or require increases.

5.2.2 Collection Mains

On-site inspection and testing of the wastewater collection mains were not conducted for this master plan. Gravity and pressurized mains were evaluated based on drainage basin function found during the previous master plan through CCTV field reports, smoke test data, and historic knowledge combined with updated CCTV and discussion with CBS staff. The following issues were identified.

5.2.2.1 Project WW-2: Lake, Hirst, Kinkead, and Monastery Streets – Basin 23

Gravity mains in Basin 23 exhibit bellies, standing sewage, debris build-up, joint offsets, and leaky service taps. The 12- and 14-inch cast iron main in Lake Street is at a shallow slope and is half full of sewage with settled debris and rocks. The 8-inch asbestos concrete main in Hirst Street is shallow relative to area homes and has resulted in sewage backups into the basement of one home. The Hirst main also exhibits numerous bellies with joint offsets. The 8-inch PVC main in Kinkead Street has numerous bellies with grease and sludge build-up and the 8-inch PVC main in Monastery upstream of the manhole at Monastery/Kinkead has leaky service taps and bellies. These mains received a poor structural rating during the previous master plan evaluation and were noted as needing maintenance numerous times per year.

<u>Recommendation:</u> Replace the gravity mains in Lake, Hirst, Kinkead, and Monastery Streets within Basin 23. The downstream manhole at Lake and DeGroff Streets was lowered by a previous improvement project. This allows for a portion of the upstream gravity main on Lake Street to also be lowered. Lowering a portion of the main will increase the slope and remove bellies. The main on Hirst Street should also be lowered to guard against future backups into area homes. Mains in Kinkead and Monastery should be tied into the lower elevation, increasing slopes. The project will include replacement of approximately 2,680 linear feet of sewer main, seven manholes, four cleanouts, and 45 services.

5.2.2.2 Project WW-6: Japonski Island Uplands Force Mains

As with the submarine force mains across Sitka Channel, the condition of the 10- and 16-inch uplands force mains running on Japonski Island from the channel crossing to the wastewater treatment plan is unknown. These pipes are beyond their expected design life. Failure would cause widespread contamination in the soils on Japonski Island and disrupt service for the entire community.

Recommendation: Plan for the replacement of both force mains with 10 and 16-inch diameter HDPE pipe. The project will include approximately 6,000 linear feet of force main.

5.2.2.3 Project WW-13: Wolff Drive – Basin 4

Settlement has occurred throughout Basin 4 causing offset and deflected joints, point loads with deformations, and infiltration at service connections. New CCTV from 2020 also found root intrusion and bellies. Piping throughout the basin is 8-inch diameter PVC.

Recommendation: Replace the gravity mains along Wolff Drive. The project will include replacement of 1,450 linear feet of sewer main, six manholes, two cleanouts; and 33 services.

5.2.2.4 Project WW-16: 1700 Block Halibut Point Road to Brady Lift Station – Basin 37

The existing 20-inch ductile iron gravity mains in Basin 37 run along the shore front west of Halibut Point Road from the entrance road to the Sunshine and Oceanside trailer parks (just north of Shelikof Way) to Brady Lift Station. These mains are aged. CBS plans to conduct CCTV on the line in summer 2022. Mains at the southern end of Basin 37 may have been compromised by the recent replacement of Brady Lift Station and subsequent issues with the Brady force main. Future repairs or replacements along these gravity mains will be challenging given the location. The shore frontage is subject to tidal waters and easements from Halibut Point Road into Basin 37 are limited.

Recommendation: Replace the gravity mains in Basin 37. The project will include replacement of 4,975 linear feet sewer main, 18 manholes, and 60 services.

5.2.2.5 Project WW-17: Monastery, Highland, and Merrill Streets – Basin 12

Gravity mains in Basin 12 exhibit bellies, deflected and separated joints, sludge and sediment accumulation, and leaky services. Structurally, the mains were noted to be in an imminent collapse condition during the previous master plan with maintenance required once or twice a year. Mains in DeGroff Street, Hollywood Way, and Baranoff Street have already been replaced. The old 8-inch mains in Monastery, Highland, and Merrill Streets remain. The mains in Highland and Merrill are PVC and the main in Monastery is asbestos concrete.

Recommendation: Replace the gravity mains in Monastery, Highland, and Merrill Streets. the project will include replacement of approximately 1,200 linear feet of sewer main, two manholes, three cleanouts, and 35 services.

5.2.2.6 Project WW-19: Kimsham, Tilson, and Peterson Streets – Basin 31

Gravity mains in Basin 31 have bellies, rock infiltration, offset joints, deflections, and sludge build-up. The mains considered in a condition of imminent collapse include the entire length of Kimsham Street, Peterson Street from the intersection with Edgecumbe to the intersection with Kimsham, and the gravity portion of the main in Tilson Street just upstream from the intersection with Kimsham. The mains in Kimsham and Peterson are 8-inch diameter asbestos concrete. The main in Tilson is 8-inch diameter PVC.

Recommendation: Replace the gravity mains identified above in Kimsham, Tilson, and Petersen Streets. The project will include replacement of 1,600 linear feet of sewer main, six manholes, and 24 services.

5.2.2.7 Project WW-22: Submarine Force Mains

The condition of the 10- and 16-inch force mains that run from Thomsen Lift Station on Baranof Island across Sitka Channel to Japonski Island is unknown. These pipes are beyond their expected design life. Failure in the pipe wall or at pipe joints from life cycle wear would cause raw sewage to contaminate the soil on the bottom of the channel and disrupt service for all of Baranof Island. Burial depth of the pipe was designed at 6.5 feet.

Recommendation: Plan for the replacement of both force mains with 10- and 16-inch diameter HDPE pipe. The project will include approximately 2,700 linear feet of force main. Directional drilling may be an option.

5.2.2.8 Project WW-25: New Archangel Street – Basin 22

The existing New Archangel sewer main is eight-inch asbestos cement pipe. The main has bellies and experiences plugs.

5.2.2.9 Project WW-27: Tlingit Way – Basin 19

The existing Tlingit Way sewer main is a combination of concrete and orangeburg and is six inches in diameter. The main is undersized and rated between poor and imminent of collapse.

Recommendation: Replace the Tlingit Way gravity main. The project will include replacement of 380 linear feet of sewer main, one manhole, one cleanout, and 6 services.

5.2.2.10 Project WW-28: Princess Way, Seward Street, and Barracks Street – Basins 18 and 19

The gravity sewer mains in Basin 18 are aged and undersized. The main in Princess Way is believed to be 4-inches in diameter but the material is not known. It serves three homes and may have been constructed as early as the 1930s. It connects into the main on Seward Street, which is of an unknown size and believed to be concrete, then into Barracks Street. The main in Barracks is 8- and 10-inch diameter concrete. It is in poor structural condition. In addition, a portion of the Sitka Pioneer Home roof drainage is believed to enter the sewer main from two separate manholes, one inside the southeast corner of the building, and one just outside of the building. Also of note, are the fuel tanks for the Pioneer Home. These tanks are buried in Barracks Street, the concrete covers apparent on the street surface.

The main in Seward Street in Basin 19 between the intersection at Marine Street and the intersection at Kaagwaantaan Street is 6-inch concrete with numerous holes. This main was rated in poor condition with some sections noted as potentially ready to collapse.

Recommendation: Replace the gravity mains in Basin 18. Redirect any stormwater collection that enters the sewer main into a separate storm drain. Sewage flow along Seward Street may be redirected toward Marine Street instead of Barracks to avoid potential complications with stormwater disposal and the location of the buried fuel tanks. Replace the concrete mains in Seward from Marine to Kaagwaantaan. The project will include replacement of 975 linear feet of sewer main, five manholes, two cleanouts, and 18 services.

Recommendation: Replace the New Archangel Street gravity main. The project will include replacement of 200 linear feet of sewer main and 2 services.

5.2.2.11 Project WW-29: Katlian Avenue – Basin 30

During significant storm events, manholes along Katlian Avenue leading up to the Thomsen Harbor Lift Station begin surcharging. Surcharge is likely caused by significant inflow and infiltration in the system.

Recommendation: Replace the sewer main in the surcharging area. The project will include replacement of approximately 1,890 linear feet of sewer main, 10 manhole, and 30 services.

5.2.2.12 Project WW-34: Anna Drive – Basin 2

The 8-inch diameter PVC gravity mains in Basin 2 have settled creating bellies in several sections. Previously collected CCTV supported replacement of the sewer mains along Anna Drive from Sawmill Creek Road to Anna Court and along Anna Court from Anna Drive to the cul-de-sac. New CCTV from 2020 also shows a vertical section of pipe approximately 100 feet upstream of Manhole 2 on Anna Drive. The displaced pipe prevented further inspection of the sewer main. Manholes further up Anna Drive are buried greater than a foot below the ground surface and could not be located.

Recommendation: Replace the gravity mains along both Anna Drive and Anna Court. The project will include replacement of 950 linear feet of sewer main, six manholes, two cleanouts, and 24 services.

5.2.2.13 Project WW-38: Lance Drive – Basin 5

The section of sewer main along Lance Drive in Basin 5 between Manholes 5 and 6 is damaged. The 8-inch diameter PVC main has joint off-sets, bellies, and significant debris, grease, and sludge build-up. A 1-foot-long piece of the top of the main is missing approximately 179 feet downstream of Manhole 6.

Recommendation: Replace the damaged section of main. The project will include replacement of approximately 560 linear feet of sewer main and 10 services as well as installation of a new manhole.

5.2.2.14 Project WW-36: Viking Way – Basin 11

The 8-inch diameter PVC sewer main in Basin 11 running between Manholes 1 and 2 contains offset and deformed joints with point loads.

Recommendation: Replace the subject sewer main. The project will include replacement of 350 linear feet of sewer main, one manhole, and 10 services.

5.2.2.15 Project WW-35: Jamestown Drive – Basin 3

The lower portion of sewer main in Basin 3 was replaced by the CBS as part of a drainage project aimed at stabilizing the slopes along Jamestown Drive. The upper portion of the sewer main was not included in the project. This portion runs from Manhole 4 to the cleanout at the Jamestown Drive culdesac. It is 8-inch diameter PVC and has developed bellies, point loads, and moderate leakage.

Recommendation: Replace the old section of sewer main at the upper end of Jamestown Drive. The project will include replacement of approximately 275 linear feet of sewer main, one manhole, one cleanout, and 6 services.

5.2.3 Lift Stations

A two-day field visit conducted by DOWL in March 2021 included the inspection of all major lift stations. Evaluation of lift station function is based on the March inspection and input from CBS staff. Staff also updated the lift station data sheets used in the 2012 Master Plan, which are included in Appendix C. The following issues were identified.

5.2.3.1 Project WW-1: Thomsen Harbor

The Thomsen Harbor lift station is the largest in the CBS sewer system. All sewage on Baranof Island flows through Thomsen to the wastewater treatment plant on Japonski. The station was constructed in 1982 and is configured with the wet well under the building slab making it difficult to access and clean. The dry well leaks at high tide causing significant flooding a couple times of year. The designed bypass loop and three-way plug valve at the station no longer work and the 16-inch force main running under the harbor can no longer be isolated. A recent flooding of the station required bypass from the upstream manhole. Of the station's three pumps, one runs continuously with the others used for high flow periods. The 350 KW back-up power generator is outdated and needs replaced. The station is currently using a calcium hypochlorite tablet feeder to chlorinate flows in summer months.

Recommendation: Replace the lift station. Include conversion of the existing wet and dry wells into a single larger wet well with submersible pumps. Reconfigure the above-grade structure to reduce the footprint and allow the submersible pump hatches to be outdoors. This will eliminate space classification and reduce the cost of the electrical and mechanical equipment housed in the building. Install a new concrete valve vault above the existing steel dry-well with the existing station remaining operational. Make force main connections one at a time to facilitate minimal bypass pumping time. Add isolation valves in a doghouse vault. Improve the chlorine addition system. Replace the power distribution and backup generator. An alternate to abandoning the existing steel dry well would be to convert it to a valve vault with a manway hatch and stairwell for improved access, replacing the discharge piping and valves.

5.2.3.2 Project WW-3: Lake and Lincoln

The Lake and Lincoln lift station was constructed in 1982. It is a dry pit and is inundated during high tide. Salt water corrosion has caused a hole to form in the well behind the check valves. The 75 KW generator used for back-up power is also outdated.

Recommendation: Replace the lift station. Include conversion of the existing manhole wet well to a submersible pump wet well. Improve the manhole to accommodate the submersible pumps, bases, rails and pressure transducer housing. Construct a new bypass manhole upstream of the existing wet well manhole in the Lincoln Street shoulder to facilitate bypass pumping without interrupting traffic. Construct a new valve vault. Install an access hatch with fall-through protection, concrete manhole lid, and vent piping above the existing steel dry well or as best fits within the existing parking lot and sidewalk landscaping. Abandon the existing steel dry well by removing the access tube below grade and filling it with gravel and soil cement to prevent future soil settlement. Replace the power distribution and backup generator. Replace the PLC-based controls and reconnect into the SCADA system.

5.2.3.3 Project WW-8: Japonski #3

The SEARHC hospital expansion project will increase flows to Japonski Island Lift Station #3. The lift station was replaced in 2012 and experiences issues with the existing pumps and valves. Additional flows will exacerbate these issues and the 4-inch diameter force main will be too small to adequately handle the new condition.

Recommendation: Upgrade the lift station pumps and valves and increase the force main from 4-inch diameter to 6-inch diameter. Given the importance of this lift station to the hospital, a back-up generator should also be included in the project. The generator could serve both Japonski #3 and Japonski #5. Japonski #5 currently collects sewage from Mount Edgecombe High School.

5.2.3.4 Project WW-20: Old Sitka Rocks

The Old Sitka Rocks lift station was constructed in 1985. It is a dry pit station. Electrical controls were moved above ground after the lift station flooded in 2019.

Recommendation: Replace the lift station. Convert from the steel can dry-well style to a wet well style with submersible pumps, separate valve vault, and an above grade electrical and controls hut. The existing upstream manhole could be converted to a wet well or a new caisson constructed to house the pumps with the existing steel drywell and above grade electrical equipment rack abandoned or removed.

5.2.3.5 Project WW-21: Granite Creek

The Granite Creek lift station was constructed in 1985. It is a dry pit station and the controls are still in the underground pit.

Recommendation: Replace the lift station. Convert from the steel can dry-well style to a wet well style with submersible pumps, separate valve vault, and an above grade electrical and controls hut. The existing upstream manhole could be converted to a wet well or a new caisson constructed to house the pumps with the existing steel drywell abandoned or removed.

5.2.3.6 Project WW-23: Castle Hill

The Castle Hill lift station was constructed in 1982. It is a dry pit station with the control panel below ground. There is significant inflow and infiltration at the Castle Hill lift station possibly from sump pumps at the nearby commercial buildings.

Recommendations: Replace the lift station. Convert from the steel can dry-well style to a wet well style with submersible pumps, separate valve vault, and an above grade electrical and controls hut. The existing upstream manhole could be converted to a wet well or a new caisson constructed to house the pumps with the existing steel drywell abandoned or removed.

5.2.3.7 Project WW-30: Indian River

The Old Indian River lift station is a dry pit station and the controls are still in the underground pit.

Recommendation: Replace the lift station. Convert from the steel can dry-well style to a wet well style with submersible pumps, separate valve vault, and an above grade electrical and controls hut. The existing upstream manhole could be converted to a wet well or a new caisson constructed to house the pumps with the existing steel drywell abandoned or removed.

5.2.3.8 Project WW-31: Halibut Point

The Halibut Point lift station is a dry pit station constructed in 1984.

Recommendations: Replace the lift station. Convert from the steel can dry-well style to a wet well style with submersible pumps and a separate valve vault. The existing upstream manhole could be converted to a wet well or a new caisson constructed to house the pumps with the existing steel drywell abandoned or removed.

5.2.3.9 Project WW-32: Sandy Beach

The Sandy Beach lift station is a dry pit station constructed in 1984. There is significant inflow and infiltration at this lift station with pump run times significantly increasing during heavy rain events.

Recommendations: Replace the lift station. Convert from the steel can dry-well style to a wet well style with submersible pumps and a separate valve vault. The existing upstream manhole could be converted to a wet well or a new caisson constructed to house the pumps with the existing steel drywell abandoned or removed.

5.2.3.10 Project WW-33 Landfill

The Landfill lift station is a submersible station constructed in 2017 and functions well except for excess corrosion due to the leachate. Corrosion is significant on the pumping equipment, requiring new pump seals approximately every 4000 hours of runtime. Iron deposition in also significant in the force main requiring routine flushing and attention of the CBS operators.

Recommendations: Retrofit the pipes, valves, and pumps to a material of higher corrosion resistance or a material that is otherwise compatible with the landfill leachate.

5.2.3.11 Project WW-37: Lift Station Emergency Generators

CBS operates seven back-up power generators for emergency lift station operations. The generators at Cove, Thomsen Harbor, Jamestown Bay, and Lake & Lincoln lift stations are beyond expected life and need to be replaced. The Cove generator provides emergency back-up power for Cove, Old Sitka Rocks, and Granite Creek lift stations and the Thomsen Harbor generator provides power for both Thomsen Harbor and Brady lift stations.

Recommendations: Replace generators at Cove and Jamestown Bay lift stations. The generators at Thomsen Harbor and Lake & Lincoln lift stations will be replaced through separate capital improvement projects.

5.2.3.12 Project WW-39: East Jamestown

This lift station is currently serving two single family homes. It is an outdated pneumatic injector type pump.

Recommendations: Replace the existing grinder pump with an E-One and transfer ownership to the residential properties that it serves.

5.2.3.13 Wachusetts (Project Underway)

The Wachusetts lift station is located close to the Peterson Creek culvert under Wachusetts Drive. It is a submersible station that was constructed in 2009. While there are no systematic problems at the station, a new fish passage culvert project is in design and will go to construction soon. The wet well is located in the roadway near the culvert. Relocation of the lift station will be required as part of the ongoing culvert project

5.2.3.14 Project WW-42: Individual and Dual Residential Stations

Twenty-six properties along Cedar Beach Road, Shotgun Alley, and Rands Drive have individual simplex or duplex E-One pumps serving their individual residences. These pumps are maintained by the CBS.

Recommendations: As problems arise with these individual stations, the existing E-ones should be replaced with ownership transferred to the residential property that each pump serves. Note that the E-one located on the property at 222 Shotgun Alley serves three properties. Transfer of this lift station will need to include a maintenance agreement between the three residences.

5.2.3.15 Project WW-7: Lift Station Communications

Table 12 outlines the data communications utilized at all 39 primary lift stations. Twenty-three of the lift stations are currently connected to the SCADA system and use a variety of communications forms including ISP/telecon, Esteem radio, and MDS radio. Six of these 23 stations have continual communications issues. Eleven of the primary lift stations have audio or visual alarms. CBS staff have identified four of these stations that require upgrade to SCADA. The remaining five stations serve small or seasonal facilities with low wastewater flows and do not require alarm or communications systems at this time.

Recommendation: Initiate a lift station communications capital improvement project. This project will include upgrading the radio systems at the Rands Drive, Jamestown, New Indian River, Monastery, and Lake Street lift stations so that SCADA communications are available continually without interruption. Note that while the Lake-Lincoln Lift Station has experienced communications issues, it is expected that these issues will be handled through a separate capital improvement project. The project will also include installation of radio systems and SCADA connection at the Castle Hill, Centennial, Old Indian River, and Granite Creek lift stations.

Table 12 - Lift Station Communications

Lift Station	Detection System	Type
Cove	SCADA	ISP/Telecon
Old Sitka Rocks	Visual Alarm	Red Light
Granite Creek[2]	***Audio Alarm***	***Autodialer to Sitka PD***
Halibut Point	SCADA	ISP/Telecon
Channel	Audio Alarm	IO Radio
Sandy Beach	SCADA	Esteem Radio
Brady Street	SCADA	MDS Radio
Thomsen Harbor	SCADA	MDS Radio
New Thomsen Harbor (Harbor Department)	none	
Blatchley	none	
Monastery Street[1]	**SCADA**	**MDS Radio**
Lake Street[1]	**SCADA**	**MDS Radio**
Wachusetts	Visual Alarm	Red Light
Landfill	SCADA	ISP/Telecon
Eagle Way	SCADA	Esteem Radio
Jamestown Bay[1]	**SCADA**	**Esteem Radio**
East Jamestown Bay	Audio Alarm	Autodialer to Sitka PD
Blueberry Lane	SCADA	ISP/Telecon

Peace Lane	SCADA	ISP/Telecon
Whale Park	none	
Sawmill Cove	SCADA	Esteem Radio
Rands Drive[1]	**SCADA**	**Esteem Radio**
New Indian River[1]	**SCADA**	**Esteem Radio**
Old Indian River[2]	***Audio Alarm***	***Autodialer to Sitka PD***
Indian River E-One	none	
Crescent	SCADA	ISP/Telecon
Lake-Lincoln[1]	SCADA	Esteem Radio
Lightering	Visual Alarm	Red Light
Castle Hill[2]	***Audio Alarm***	***Autodialer to Sitka PD***
Centennial[2]	***Audio Alarm***	***Autodialer to Sitka PD***
Sealing Cove	Visual Alarm	Red Light
Japonski #1	Visual Alarm	Red Light
Japonski #2	SCADA	MDS Radio
Japonski #3	SCADA	MDS Radio
Japonski #4	SCADA	MDS Radio
Japonski #5	SCADA	MDS Radio
Japonski #6	SCADA	MDS Radio
Japonski #7	SCADA	??
Japonski #8	none	

[1] Experiences routine communications issues.
[2] Recommend full SCADA installation.

5.2.4 Wastewater Treatment and Disposal

The March 2021 field visit included inspection of the wastewater treatment plant with a follow-up conference with the Chief Wastewater Operator. The plant has had few upgrades to the process equipment since opening in 1982. The following issues were identified.

5.2.4.1 Compressed Air Pipe (Project Underway)

Sludge is thickened through the introduction of compressed air through diffuser boxes in the sludge chamber. The compressed air piping, made up of 20 one and a half-inch galvanized iron pipes, runs from the blower room through the plant to the concrete sludge tank where it enters through the floor. Two blowers, replaced approximately two years ago, run through six cycles per day, with an hour of run time and three hours of shut down. The piping is original to the plant. At blower design pressures, air does not pass through all the pipes and holes have formed along corroded sections of the pipe. CBS has a project underway to replace the compressed air piping.

5.2.4.2 Biosolids Disposal (Project Underway)

The Granite Creek disposal site is undersized. The 2012 Master Plan estimated the site had approximately six years of life remaining. A preliminary design to expand the site has been completed and permitted through the US Army Corps of Engineers. The USACE permit expires on October 31, 2024. The project will include expansion of the biosolids containment berm and perimeter road with development of the internal area for biosolids disposal. This project is underway.

5.2.4.3 Project WW-9: Grit Collector

The grit collector is a conical chamber that allows grit to fall out into a sump where the waste stream is pumped to a separator. Grit is removed and sent to a hopper while the waste liquid is returned to the system. The grit collector is original to the plant and parts are no longer available from the manufacturer. Similar to the belt filter press, the grit collector is operational, but any breakage could result in permanent shut down.

Recommendations: Replace the grit collector with a new model. The project will include purchase, installation, and start-up costs.

5.2.4.4 Project WW-10: Scum Concentrator

Scum collected from the surface of the clarifier basins and the sludge thickener is pumped to a scum concentrator for further dewatering. The scum concentrator is original to the plant and is showing significant wear. Parts are no longer available from the manufacturer. While the concentrator is operational, breakage could result in permanent shutdown.

Recommendations: Replace the scum concentrator with a new model. The project will include purchase, installation, and start-up costs.

5.2.4.5 Project WW-11: Belt Filter Press

The belt filter press is original to the plant. It underwent a complete overhaul in 2010 whereby the press was dismantled and cleaned, and some minor parts were replaced. At that time, CBS was told that the filter press was the oldest of its kind operating in original condition. Replacement parts are no longer available from the manufacturer and while the press is currently operational, any breakage could result in permanent shut down. Other types of filter presses are available on the market. A screw press would be higher capital costs, but would use less space in the plant and has fewer mechanical parts than a filter press; however, a screw press would require a polymer coagulant addition. CBS is hesitant to add chemical injection given the additional employee training, storage requirements, and operational costs.

Recommendations: Replace the belt filter press with a new model. The project will include purchase, installation, and start-up costs.

5.2.4.6 Project WW-12: Clarifier Pumps

The clarifier pumps move collected solids and scraped scum from the clarifier ponds to the sludge thickener. The pumps are original to the plant and there is one spare.

Recommendations: Replace the old belt filter press with a new model. The project will include purchase, installation, and start-up costs.

5.2.4.7 Project WW-14: Effluent Disinfection

Monitoring reports reviewed for this study show that FC counts in the wastewater effluent stream are within permitted limits except for a July 2019 incident. FC counts in the mixing zone are within permitted limits, but reports did show a higher-than-normal count during the same period. Effluent and mixing zone FC counts can be better controlled with installation of an effluent disinfection process that would treat the wastewater prior to disposal through the outfall. It is believed that the new discharge permit will require disinfection. Disinfection of primary effluent is commonly performed through either the addition of chlorine or through a UV process.

As previously discussed, there are advantages and disadvantages to each disinfection method. Both will require new construction for a disinfection contact chamber. A UV system will cost more to construct, while a chlorination system will cost more to maintain. Chlorination systems require chemical injection to dechlorinate prior to discharge and the near zero residual levels in the effluent are difficult to achieve. UV systems require higher levels of transmittance through the waste stream to be effective, which could require additional treatment to reduce total suspended solids levels.

<u>Recommendations:</u> Install an effluent disinfection system. The project will begin with a Preliminary Engineering Report that looks in depth into the two different types of systems. This will include review of chemicals and chemical storage, contact times, contact basin size, transmittance measurements (including fouling events such as iron release), and maintenance practices. For purposes of this Master Plan, a UV system, which has been operated successfully at other primary treatment facilities, is assumed as the preferred alternative. A UV disinfection system would consist of the following:

- New Concrete Contact Chambers (redundant with each chamber being able to handle design flow)
- Redundant UV Banister Banks
- Remote Monitoring and Controls
- Covering for the UV Banister Banks (for protection)
- Lift Systems and Compressors (for cleaning)
- Associated Site Work

5.2.4.8 Project WW-40: Marine Outfall Piping

The marine outfall piping, which disposes of treated effluent from the wastewater treatment plant, is due for a condition assessment. It is expected that portions of the outfall may need to be repaired or replaced. In the event a full replacement is warranted due to excessively corroded pipe or diffuser assembly, new pipe with concrete anchor assemblies is recommended and could be installed with a variety of means. Fused HDPE pipe with concrete collar anchors could be assembled on shore, floated into the harbor, and sunk by removing the air from the pipeline. A new diffuser assembly would be connected to the new pipeline and sunk in the harbor from a barge to enable placement in specific orientation and anchoring.

5.2.4.9 Project WW-43: Secondary Treatment

Secondary treatment of wastewater provides for effluent that meets more stringent requirements for biological oxygen demand, total suspended solids, ammonia and nitrogen, and fecal coliforms than primary treatment. To achieve secondary treatment standards, the CBS wastewater treatment plant will require expansion to support new processes. For estimating purposes, we assume that a conventional activated sludge configuration would be used. This process deploys an aeration system to add dissolved oxygen into the waste stream to support expanded oxidation of organic compounds. These oxidated compounds can then be settled out of the waste. For CBS, the treatment process would include several mechanisms already in place along with several new items. Wastewater would continue to be screened and grit removed. Sludge and scum would continue to be processed through the thickener or concentrator; and the belt filter press, lime processing, and disposal of biosolids would remain the same.

The existing clarifying basins would need to be replaced with similar but much deeper basins. Secondary effluent weirs and troughs would be installed and the sludge and scum collection mechanisms upgraded. Two new reactor basins would need to be installed in parallel with equipment that would split the waste stream into the two and provide for diffused aeration. A UV disinfection system would be required. Because the volume of residuals produced for secondary treatment is expected to be greater than the volume of residuals currently produced during primary treatment, there will be implications on how quickly the biosolids landfill is used up.

6. Capital Improvement Plan

In conjunction with CBS staff the water and wastewater systems were evaluated to consider the physical condition of existing facilities, the capacity of the system to meet water system demands and wastewater flows. Based on this evaluation, capital improvement projects were identified and are summarized in Table 13 and Table 14. Figures 5 through 36, illustrate the proposed projects.

Cost estimates for the proposed capital improvement projects were developed using unit bid prices for similar work elsewhere in Sitka, with a base cost in 2022 dollars. The projects and associated cost estimates are planning level estimates that will be refined during design as more accurate quantities are determined. Escalation will need to be considered due to current market conditions and economic uncertainty. Detailed cost estimates are included in Appendix D.

Table 13 – Water CIP Projects

No.	Title	Cost
High Priority		
W-1	Lake / Hirst / Kinkead / Monastery Water Mains*	$2,360,000
W-2	Lincoln Street (Lake to Jeff Davis) Water Mains*	$1,534,000
W-3	Wolff Drive Water and Sewer Mains*	$1,395,000
W-4	Kirkman Way Water Mains*	$381,000
W-5	Lincoln Street (Lake to Katlian) Water Mains*	$1,952,000
W-6	Install Areawide Water Meters (Four) Phase 1	$870,000
W-7	Halibut Point Road Roundabout to Davidoff) Water Mains*	$7,887,000
W-8	Retrofit Hillside Booster Station Backup Power & SCADA	$1,023,000
W-9	WST Siting Study & Construct 1MG Tank (Sitka High School)	$19,149,000
W-10	Repaint Harbor Mountain Tank	$702,000
W-11	Establish Shotgun Alley Pressure Zone	$8,886,000
W-12	Wortman Loop Pump Station Improvements	$1,711,000
W-13	Monastery / Highland / Merrill Water and Sewer Mains*	$1,068,000
W-14	Kimsham / Tilson / Peterson Water and Sewer Mains*	$1,439,000
Medium Priority		
W-15	Construct 1MG WST (Keet Gooshi Heen)	$19,338,000
W-16	Gavan Street and Moller Avenue Water Mains*	$756,000
W-17	Marine / DeArmond / New Archangel / Erler Water Mains*	$1,568,000
W-18	Wortman Loop Water and Sewer Mains*	$1,399,000
W-19	Connect Hillside Pressure Zone to Lance Dr.	$1,774,000
W-20	Install Areawide Water Meters (Three) Phase 2	$870,000
W-21	Halibut Point Rd.1 - Old Harbor Mountain Rd. to Krestof Dr.	$5,270,000
W-22	Install Areawide Water Meters (Three) Phase 3	$870,000
W-23	Princess / Seward / Barracks Water Mains*	$856,000
Low Priority		
W-24	Connect Indian River Rd. to Jarvis St.	$2,619,000
W-25	Anna Drive / Circle Water Mains*	$916,000

W-26	Jamestown Drive Water Mains*	$530,000
W-27	Viking Way Water Mains*	$380,000
W-28	Burkart Street and Lance Drive Water Mains*	$1,980,000
W-29	Install Areawide Water Meters (Two) Phase 4	$662,000
W-30	Halibut Point Rd. 2 - 16" Water Upgrade (Krestof Dr. to Viking Wy.)	$2,799,000
W-31	Granite Creek Rd. Water	$1,483,000
W-32	Kashevaroff St. Water	$798,000
W-33	Connect Benchlands to Harbor Mt. Tank	$6,763,000
W-34	Connect Granite Creek Rd. to Harbor Mt. Rd.	$2,197,000
W-35	Repaint Gavan Tank (2029)	$1,238,000
W-36	Repaint Whitcomb Heights Tank (2030)	$1,238,000
W-37	Upgrade Hillside Booster Station Pumps and 10" replacement	$3,251,000
This project corresponds with a sewer main replacement project with shared costs.		

Table 14 - Sewer CIP Projects

No.	Title	Cost
High Priority		
WW-1	Thomsen Harbor Lift Station	$2,517,000
WW-2	Lake / Hirst / Kinkead / Monastery Sewer Mains*	$2,676,000
WW-3	Lake-Lincoln Lift Station	$1,386,000
WW-4	Lincoln Street (Lake to Jeff Davis) Sewer Mains*	$2,066,000
WW-5	Lincoln Street (Lake to Katlian) Sewer Mains*	$2,084,000
WW-6	10" & 16" Force Main Replacement (Japonski Island Uplands)	$3,415,000
WW-7	Lift Station Communication System	$603,000
WW-8	Japonski #3 Lift Station and Force Main Replacement	$714,000
WW-9	WWTP Grit Collector	$368,000
WW-10	WWTP Scum Concentrator	$574,000
WW-11	WWTP Belt Filter Press	$545,000
WW-12	WWTP Clarifier Pumps	$113,000
WW-13	Wolff Drive Sewer Mains*	$1,603,000
WW-14	WWTP Effluent Disinfection	$3,826,000
WW-15	Kirkman Way Sewer Mains*	$415,000
WW-16	Halibut Point Road (Roundabout to Davidoff) Sewer Mains*	$6,066,000
WW-17	Monastery / Highland / Merrill Sewer Mains*	$1,319,000
WW-18	Gravity Sewer from 1700 HPR to Brady Lift Station	$4,028,000
WW-19	Kimsham / Tilson / Peterson Sewer Mains*	$1,566,000
Medium Priority		
WW-20	Old Sitka Rocks Lift Station	$1,139,000
WW-21	Granite Creek Lift Station	$891,000
WW-22	Submarine Force Mains	$2,440,000

WW-23	Castle Hill Lift Station	$957,000
WW-24	Gavan Street and Moller Avenue Sewer Mains*	$832,000
WW-25	Marine / DeArmond / New Archangel / Erler Sewer Mains*	$1,383,000
WW-26	Wortman Loop Sewer Mains*	$1,461,000
WW-27	Tlingit Way Sewer Main	$695,000
WW-28	Princess / Seward / Barracks Sewer Mains*	$1,075,000
WW-29	Katlian Avenue (Kirkman Way to Thomsen Lift Station) Sewer Mains*	$2,222,000
Low Priority		
WW-30	Old Indian River Lift Station	$957,000
WW-31	Halibut Point Lift Station	$908,000
WW-32	Sandy Beach Lift Station	$875,000
WW-33	Landfill Lift Station	$372,000
WW-34	Anna Drive / Circle Sewer Mains*	$1,132,000
WW-35	Jamestown Drive Sewer Mains*	$580,000
WW-36	Viking Way Sewer Mains*	$433,000
WW-37	Emergency Generators	$424,000
WW-38	Burkart Street and Lance Drive Sewer Mains*	$2,105,000
WW-39	East Jamestown Lift Station	$45,000
WW-40	Marine Outfall	$2,282,000
WW-41	Castle Hill Catchment Area Sewer Mains	$927,000
Other		
WW-42	E-Ones Lift Stations	$555,000
WW-43	WWTP Secondary Treatment	$49,500,000
Underway		
	Biosolids Disposal	
	WWTP Compressed Air Pipe	
	Wachusetts Lift Station (Peterson Creek Culvert Project)	
This project corresponds with a water main replacement project with shared costs.		

Appendix A
Water System Inventory Tables

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-95	A Street	372	6	Ductile Iron	125	1979	CJ-79	CJ-73	S-130
JP-20	Airport Rd.	252	16	Ductile Iron	125	1992	JJ-22	JJ-20	HNG FILE PG 33
JP-207	Airport Rd.	223	8	Cast iron	100	1967	JJ-205	JJ-206	M-52
JP-209	Airport Rd.	243	6	Cast iron	100	1967	JJ-206	JJ-207	M-52
JP-208	Airport Rd.	133	8	Cast iron	100	1967	JJ-206	JJ-203	M-52
JP-206	Airport Rd.	403	8	Cast iron	100	1967	JJ-138	JJ-205	M-52
JP-338	Airport Rd.	769	16	Ductile Iron	125	1992	JJ-30	JJ-203	HNG FILE PG 32
JP-339	Airport Rd.	1,410	16	Ductile Iron	125	1992	JJ-203	JJ-22	HNG FILE PG 33
JP-351	Airport Rd.	800	8	Cast iron	100	1967	JJ-144	JJ-141	M-52
JP-352	Airport Rd.	432	8	Cast iron	100	1967	JJ-141	JJ-138	M-52
JP-335	Airport Road	1,474	16	Ductile Iron	125	1992	JJ-20	JJ-10	HNG FILE PG 33
JP-219	Alice loop	283	8	Ductile Iron	125	2002	JJ-214	JJ-125	
JP-139	Alice loop	123	12	Ductile Iron	125	1985	JJ-130	JJ-135	W-124
JP-366	Alice loop	508	8	Ductile Iron	125	2002	JJ-208	JJ-214	
JP-367	Alice loop	676	8	Ductile Iron	125	1985	JJ-125	JJ-130	W-124
JP-368	Alice loop	564	8	Ductile Iron	125	1985	JJ-130	JJ-127	W-124
JP-369	Alice loop	699	8	Ductile Iron	125	1985	JJ-127	JJ-125	W-124
CP-197	American St.	140	6	Ductile Iron	125		CJ-132	CJ-134	
CP-167	American St.	170	6	Ductile Iron	125		CJ-122	CJ-134	
CP-306	Andrew Hope St.	627	8	Ductile Iron	125	1994	CJ-207	CJ-210	FLAT FILE PG 37
CP-307	Andrew Hope St.	442	8	Ductile Iron	125	1994	CJ-210	CJ-211	FLAT FILE PG 37
CP-141	Andrews St.	534	6	Cast iron	100		CJ-110	CJ-247	W-86
SP-238	Anna Dr.	365	8	Ductile Iron	125	1985	SJ-181	SJ-182	S-151
SP-239	Anna Dr.	394	6	Ductile Iron	125	1985	SJ-181	SJ-185	S-151
SP-237	Anna Dr.	176	8	Ductile Iron	125	1985	SJ-180	SJ-181	S-151
HP-387	Bahovec Ct.	476	6	Ductile Iron	125	1989	HJ-164	HJ-165	FLAT FILE PG 25
CP-175	Baranof St.	179	6	Cast iron	100	1975	CJ-141	CJ-140	W-106
CP-184	Baranof St.	189	6	Ductile Iron	125	1975	CJ-142	CJ-141	W-106
CP-112	Baranof St.	207	6	Cast iron	100	1971	CJ-90	CJ-91	W-11
CP-114	Baranof St.	401	12	HDPE	150	2015	CJ-90	CJ-139	W-132
CP-187	Baranof St.	318	6	Ductile Iron	125	1975	CJ-142	CJ-143	W-106
CP-176	Baranof St.	231	6	Ductile Iron	125	1975	CJ-140	CJ-139	W-106
HP-384	Barker St.	330	6	Ductile Iron	125	1986	HJ-162	HJ-163	S-150
CP-400	Barracks St.	186	6	Ductile Iron	125		CJ-121	CJ-178	
SP-441	Beardslee Way	398	8	HDPE	150	2005	SJ-158	SJ-258	
SP-442	Beardslee Way	504	8	HDPE	150	2005	SJ-258	SJ-261	
CP-177	Biorka St.	676	6	Ductile Iron	125		CJ-140	CJ-147	
CP-298	Biorka St.	631	8	Cast iron	100	1967	CJ-147	CJ-271	W-88
SP-426	Blueberry lane	554	4	Ductile Iron	125	2001	SJ-226	SJ-227	
CP-75	Brady St.	316	8	Ductile Iron	125	1975	CJ-63	CJ-64	W-109
CP-398	Buhrt Cir.	278	6	Ductile Iron	125	1989	CJ-76	CJ-176	S-163
SP-217	Burkhart St.	660	6	Ductile Iron	125	1986	SJ-166	SJ-168	S-164
SP-439	Burkhart St.	381	8	Ductile Iron	125	1995	SJ-168	SJ-234	FLAT FILE PG 41
CP-48	Cascade Cr. Drive	643	8	Ductile Iron	125	1989	CJ-36	CJ-196	S-158
CP-41	Cascade Cr. Drive	284	12	Cast iron	100		CJ-37	CJ-38	W-63, W-104
CP-43	Cascade Cr. Drive	132	12	Cast iron	100		CJ-36	CPRV-1	W-63, W-104
CP-42	Cascade Cr. Drive	30	12	Cast iron	100		CPRV-1	CJ-37	W-63, W-104
CP-267	Cascade Cr. Road	10	8	Ductile Iron	125	1992	CJ-220	CJ-221	W-138
CP-268	Cascade Cr. Road	54	8	Ductile Iron	125	1989	CJ-221	CJ-40	S-158
CP-269	Cascade Cr. Road	279	8	Ductile Iron	125	1989	CJ-196	CJ-221	S-158
CP-81	Cascade St.	1,008	8	Ductile Iron	125	1975	CJ-65	CJ-68	W-109
SP-422	Cedar Beach Rd.	1,148	8	HDPE	150	2001	SJ-194	SJ-201	
JP-210	Charcoal Dr.	245	8	Ductile Iron	125	2002	JJ-120	JJ-208	
JP-364	Charcoal Dr.	265	8	Ductile Iron	125	2002	JJ-22	JJ-120	
CP-89	Charles St.	165	10	Ductile Iron	125	1979	CJ-75	CJ-77	S-130
CP-88	Charles St.	581	8	Ductile Iron	125	1989	CJ-75	CJ-76	S-163
CP-300	Charles St.	400	6	Ductile Iron	125	1979	CJ-75	CJ-62	S-130
CP-56	Charteris St.	390	14	Cast iron	100	1968	CJ-48	CJ-224	W-46
CP-54	Charteris St.	437	14	Cast iron	100	1968	CJ-243	CJ-48	W-46
CP-277	Charteris St.	342	14	Cast iron	100	1968	CJ-47	CJ-243	W-46, W-47
CP-278	Charteris St.	976	8	Ductile Iron	125	1996	CJ-242	CJ-200	
CP-343	Charteris St.	68	6	Ductile Iron	125	1968	CJ-270	CJ-47	W-47
SP-419	Chirikov Dr.	508	10	Ductile Iron	125		SJ-267	SJ-266	

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
HP-375	Circle E.	440	8	Ductile Iron	125	1999	HJ-17	HJ-157	
CP-126	Crabapple Dr.	450	6	Ductile Iron	125	1980	CJ-95	CJ-96	W-117
CP-301	Crescent Dr.	313	8	Ductile Iron	125		CJ-250	CJ-206	
HP-406	Cushing St.	93	16	HDPE	150	2010	HJ-304	HJ-303	W-32
HP-409	Cushing St.	608	16	HDPE	150	2010	HT-3	HJ-305	W-32
HP-18	Darrin Dr.	884	6	Cast iron	100		HJ-18	HJ-19	
CP-61	Davidoff St.	548	8	Ductile Iron	125	2005	CJ-224	CJ-51	FLAT FILE PG 28
CP-502	Davidoff St.	570	8	HDPE	150	2006	CJ-56	CJ-52	CIP W4
CP-505	Davidoff St.	244	16	Ductile Iron	125	1992	J-36	CJ-229	W-138
CP-429	Davidoff st.	250	16	Ductile Iron	125	1992	CJ-229	CJ-224	W-138
CP-142	DeArmond St.	406	6	Cast iron	100		CJ-247	CJ-111	W-86
CP-294	DeArmond St.	175	6	Cast iron	100		CJ-247	CJ-115	
CP-113	DeGroff St.	897	6	Cast iron	100	1970	CJ-90	CJ-148	W-9
CP-111	DeGroff St.	345	6	Cast iron	100	1970	CJ-89	CJ-90	W-10
CP-500	DeGroff St.	203	10	Cast iron	100	1968	CJ-89	CJ-300	W-34
CP-106	DeGroff St.	188	10	Cast iron	100	1968	CJ-300	CJ-88	W-34
CP-47	Dodge Cir.	738	12	Cast iron	100	1972	CJ-35	CJ-36	W-64, W-104
CP-270	Donna Dr.	260	6	Ductile Iron	125	1997	CJ-196	CJ-241	FLAT FILE PG 27
SP-501	Eagle Wy.	627	8	HDPE	150	2018	SJ-300	SJ-301	W-18
CP-73	Edgecumbe Dr.	470	12	Cast iron	100	1968	CJ-58	CJ-61	W-43
CP-64	Edgecumbe Dr.	1,082	12	Cast iron	100	1968	CJ-56	CJ-57	W-43
CP-51	Edgecumbe Dr.	420	12	Cast iron	100	1972	CJ-45	CJ-44	W-62, W-109
CP-50	Edgecumbe Dr.	1,047	12	Cast iron	100	1972	CJ-38	CJ-44	W-104, W-64
CP-40	Edgecumbe Dr.	2,041	12	Cast iron	100	1972	CJ-38	CJ-39	W-65, W-63, W-104
CP-65	Edgecumbe Dr.	784	12	Cast iron	100	1968	CJ-57	CJ-58	W-43
CP-63	Edgecumbe Dr.	1,077	12	Cast iron	100	1968	CJ-48	CJ-56	W-45
CP-346	Edgecumbe Dr.	50	12	Cast iron	100	1972	CPMP-1	CJ-272	W-62, W-109
CP-336	Edgecumbe Dr.	147	12	Cast iron	100	1972	CJ-272	CJ-45	W-62, W-109
CP-430	Edgecumbe Dr.	227	12	Cast iron	100	1972	CJ-48	CJ-230	W-62, W-104
CP-431	Edgecumbe Dr.	126	12	Cast iron	100	1972	CJ-230	CPMP-1	W-62, W-109
SP-506	Eliason Lp.	287	8	HDPE	150	2006	SJ-304	SJ-305	
SP-507	Eliason Lp.	616	8	HDPE	150	2006	SJ-305	SJ-306	
SP-504	Eliason Lp.	45	8	HDPE	150	2006	SJ-303	HSPMP-11	
HP-405	Emmons St.	860	16	HDPE	150	2010	HJ-303	HJ-302	W-32
CP-150	Erler St.	256	10	Ductile Iron	125	1987	CJ-118	CJ-117	S-157
CP-151	Erler St.	417	10	Ductile Iron	125	1987	CJ-118	CJ-119	S-157
CP-146	Erler St.	271	10	Ductile Iron	125	1987	CJ-116	CJ-117	S-157
CP-143	Erler St.	220	10	Ductile Iron	125	1987	CJ-115	CJ-116	S-157
CP-181	Etolin St.	410	8	Ductile Iron	125	1980	CJ-150	CJ-145	W-116
CP-405	Etolin St.	321	8	Ductile Iron	125	1980	CJ-145	CJ-183	W-116
CP-406	Etolin St.	473	6	Ductile Iron	125	1980	CJ-183	CJ-142	W-116
CP-172	Etolin Way	359	8	HDPE	150	2012	CJ-127	CJ-136	
CP-182	Finn Alley	573	8	Cast iron	100	1968	CJ-145	CJ-144	W-20
CP-67	Furuhelm St.	620	8	Ductile Iron	125	1983	CJ-59	CJ-60	S-136
CP-76	Gavin St.	202	8	Ductile Iron	125	1975	CJ-64	CJ-65	W-109
CP-77	Gavin St.	439	6	Ductile Iron	125	1979	CJ-65	CJ-66	W-110
CP-332	Georgeson loop	781	14	Cast iron	100	1968	CJ-263	CJ-270	W-47
CP-281	Georgeson loop	773	8	Ductile Iron	125	1996	CJ-199	CJ-198	
CP-282	Georgeson loop	639	8	Ductile Iron	125	1996	CJ-198	CJ-270	FLAT FILE PG 28
CP-276	Georgeson loop	765	8	Ductile Iron	125	1996	CJ-199	CJ-195	
CP-280	Georgeson loop	18	8	Ductile Iron	125	1996	CJ-195	CJ-200	
CP-432	Gibson Pl	569	4	Ductile Iron	125		CJ-229	CJ-230	
HP-333	Granite Cr. Road	1,558	8	HDPE	150	2002	HJ-264	HJ-12	
CP-49	H.P.R at Cascade Ave.	33	8	Cast iron	100	1963	CJ-267	CJ-40	W-96
HP-43	Halibut Pt Road	325	12	Cast iron	100	1977	HJ-30	HJ-32	W-60
CP-83	Halibut Pt. Rd.	667	14	Cast iron	100	1968	CJ-63	CJ-92	W-40
HP-40	Halibut Pt. Road	790	12	Cast iron	100	1977	HJ-28	HJ-29	W-58
HP-1	Halibut Pt. Road	418	12	Ductile Iron	125	1989	HJ-1	HJ-2	Flat files
HP-6	Halibut Pt. Road	226	12	Cast iron	100	1977	HJ-6	HJ-265	W-92
CP-122	Halibut Pt. Road	388	8	Ductile Iron	125	1975	CJ-113	CJ-98	W-109
HP-39	Halibut Pt. Road	872	12	Cast iron	100	1977	HJ-27	HJ-28	W-58
HP-20	Halibut Pt. Road	1,165	12	Cast iron	100	1977	HJ-20	HJ-21	W-55
CP-70	Halibut Pt. Road	426	8	Ductile Iron	125	1975	CJ-53	CJ-245	W-109

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
HP-5	Halibut Pt. Road	972	12	Cast iron	100	1989	HJ-5	HJ-6	W-92
HP-7	Halibut Pt. Road	1,727	12	Cast iron	100	1977	HJ-6	HJ-8	W-92
HP-4	Halibut Pt. Road	519	12	Ductile Iron	125	1987	HJ-4	HJ-5	S-159
CP-123	Halibut Pt. Road	98	8	Ductile Iron	125	1975	CJ-98	CJ-97	W-109
CP-127	Halibut Pt. Road	431	8	Ductile Iron	125	1975	CJ-95	CJ-93	W-109
HP-10	Halibut Pt. Road	688	12	Cast iron	100	1977	HJ-10	HJ-11	W-50
HP-35	Halibut Pt. Road	461	12	Cast iron	100	1977	HJ-21	HJ-24	W-55
HP-38	Halibut Pt. Road	1,433	12	Cast iron	100	1977	HJ-26	HJ-27	W-57
CP-129	Halibut Pt. Road	623	8	Cast iron	100		CJ-93	CJ-92	
CP-121	Halibut Pt. Road	1,116	8	Ductile Iron	125	1975	CJ-119	CJ-113	W-109
CP-125	Halibut Pt. Road	230	8	Ductile Iron	125	1975	CJ-97	CJ-95	W-109
HP-16	Halibut Pt. Road	546	12	Cast iron	100	1977	HJ-14	HJ-17	W-53
CP-59	Halibut Pt. Road	363	8	Ductile Iron	125		CJ-41	CJ-43	W-109
HP-9	Halibut Pt. Road	1,551	12	Cast iron	100	1977	HJ-8	HJ-10	W-93
HP-3	Halibut Pt. Road	4,413	12	Ductile Iron	125	1989	HJ-3	HJ-4	Flat files
HP-13	Halibut Pt. Road	1,334	12	Cast iron	100	1977	HJ-14	HJ-12	W-52
CP-74	Halibut Pt. Road	367	14	Cast iron	100	1968	CJ-55	CJ-63	W-40
CP-120	Halibut Pt. Road	159	16	Cast iron	100	1966	CJ-125	CJ-119	S-177
HP-2	Halibut Pt. Road	683	12	Ductile Iron	125	1989	HJ-2	HJ-3	Flat files
CP-71	Halibut Pt. Road	406	8	Ductile Iron	125	1975	CJ-54	CJ-55	W-109
HP-12	Halibut Pt. Road	394	12	Cast iron	100	1977	HJ-12	HJ-13	W-52
CP-68	Halibut Pt. Road	1,518	8	Ductile Iron	125	1975	CJ-43	CJ-52	W-109
HP-11	Halibut Pt. Road	1,396	12	Cast iron	100	1977	HJ-11	HJ-13	W-51
CP-69	Halibut Pt. Road	672	8	Ductile Iron	125	1975	CJ-52	CJ-53	W-109
CP-265	Halibut Pt. Road	1,092	16	Ductile Iron	125	1992	CJ-34	CJ-220	W-138
CP-266	Halibut Pt. Road	902	16	Ductile Iron	125	1992	CJ-220	CJ-222	W-138
CP-290	Halibut Pt. Road	547	8	Ductile Iron	125	1975	CJ-54	CJ-245	W-109
HP-334	Halibut Pt. Road	637	6	Cast iron	100	1977	HJ-7	HJ-265	W-92
HP-371	Halibut Pt. Road	67	10	Ductile Iron	125	1989	HJ-2	HJ-153	Flat files
HP-372	Halibut Pt. Road	238	6	Ductile Iron	125	1989	HJ-153	HJ-154	Flat files
HP-376	Halibut Pt. Road	294	12	Cast iron	100	1977	HJ-17	HJ-158	W-54
HP-377	Halibut Pt. Road	432	12	Cast iron	100	1977	HJ-158	HJ-18	W-54
HP-379	Halibut Pt. Road	155	12	Cast iron	100	1977	HJ-18	HJ-160	W-54
HP-380	Halibut Pt. Road	455	12	Cast iron	100	1977	HJ-160	HJ-20	W-54
HP-381	Halibut Pt. Road	90	4	Ductile Iron	125		HJ-160	HJ-161	
HP-382	Halibut Pt. Road	210	6	Ductile Iron	125	1986	HJ-24	HJ-162	S-150
HP-386	Halibut Pt. Road	607	12	Cast iron	100	1977	HJ-164	HJ-26	W-56
HP-388	Halibut Pt. Road	1,066	12	Cast iron	100	1977	HJ-29	HJ-166	W-59
HP-389	Halibut Pt. Road	610	12	Cast iron	100	1977	HJ-166	HJ-30	W-60
CP-57	Halibut Pt. Road	437	8	Cast iron	100	1963	CJ-302	CJ-41	W-96
CP-45	Halibut Pt. Road	524	12	Cast iron	100	1977	CJ-303	CJ-34	W-60, W-61
CP-504	Halibut Pt. Road	459	12	Cast iron	100	1977	HJ-32	CJ-304	W-60, W-61
CP-503	Halibut Pt. Road	250	16	HDPE	150	2010	CJ-304	CJ-303	CIP W3
HP-385	Halibut Pt. Road	434	12	Cast iron	100	1977	HJ-24	J-35	W-56
HP-500	Halibut Pt. Road	364	12	Ductile Iron	130	2010	J-35	HJ-164	CIP W3
CP-428	Halibut Pt. Road	372	16	Ductile Iron	125	1992	CJ-222	J-36	W-138
CP-506	Halibut Pt. Road	52	6	Ductile Iron	125	1979	J-36	CJ-43	
CP-193	Harbor Dr.	738	12	Ductile Iron	125	1968	CJ-128	CJ-129	W-24
CP-200	Harbor Dr.	567	12	Cast iron	100	1968	CJ-130	CJ-129	W-24
JP-9	Harbor Dr.	145	16	Ductile Iron	125	1970s Early	JJ-9	JJ-10	
JP-78	Harbor Dr.	149	10	Cast iron	100		JJ-77	JJ-10	
JP-77	Harbor Dr.	202	10	Ductile Iron	125		JJ-76	JJ-77	
JP-348	Harbor Dr.	1,008	16	Ductile Iron	125		JJ-1	JJ-9	
HP-290	Harbor Mtn. Rd.	10	18	Ductile Iron	125	1983	HT-1	HJ-15	W-121
HP-14	Harbor Mtn. Road	2,372	18	Ductile Iron	125	1983	HJ-14	HJ-15	W-121
SP-410	Harvest Way	295	6	Ductile Iron	125	1988	SJ-167	SJ-265	WW-730
CP-317	Heab Didrickson St.	648	8	Ductile Iron	125	2005	CJ-255	CJ-257	
CP-149	Hemlock St.	755	6	Ductile Iron	125	1988	CJ-114	CJ-118	W-130
CP-103	Hirst St.	335	6	Cast iron	100		CJ-87	CJ-86	
CP-402	Hirst St.	99	6	Cast iron	100		CJ-86	CJ-180	
CP-501	Hollywood Wy.	264	8	HDPE	150	2014	CJ-300	CJ-301	FLAT FILE SH 15 OF 21
CP-312	Indian River Road	1,374	18	Cast iron	100	1971	CJ-208	CJ-155	FLAT FILE PG 37
CP-313	Indian River Road	350	8	Ductile Iron	125	2000	CJ-208	CJ-253	FLAT FILE PG 37

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-314	Indian River Road	850	8	Ductile Iron	125	2000	CJ-253	CJ-254	
CP-308	Indian River Road	452	18	Cast iron	100	1971	CJ-207	CJ-208	FLAT FILE PG 37
CP-407	Indian River Road	840	18	Cast iron	100	1971	CJ-154	CJ-184	FLAT FILE PG 37
CP-408	Indian River Road	875	18	Cast iron	100	1971	CJ-184	CJ-207	FLAT FILE PG 37
SP-245	Islander Dr.	1,086	6	Ductile Iron	125	1979	SJ-188	SJ-189	W-111, 112, 113
SP-325	Jamestown Dr.	474	8	Ductile Iron	125	1977	SJ-178	SJ-214	S-124, S-125
SP-326	Jamestown Dr.	573	8	Ductile Iron	125	1977	SJ-214	SJ-215	S-124, S-125
SP-438	Jarvis St	450	8	Ductile Iron	125	1987	SJ-233	SJ-157	S-155
SP-288	Jarvis St.	593	8	Ductile Iron	125	1987	SJ-158	SJ-159	S-155
SP-211	Jarvis St.	642	8	Ductile Iron	125	1987	SJ-157	SJ-158	S-155
SP-437	Jarvis St.	251	8	Ductile Iron	125	1987	SJ-156	SJ-233	
CP-180	Jeff Davis St.	265	16	HDPE	150	2017	CJ-149	CJ-250	W-22
CP-202	Jeff Davis St.	305	16	HDPE	150	2017	CJ-251	CJ-150	W-22
CP-299	Jeff Davis St.	159	16	HDPE	150	2017	CJ-250	CJ-150	W-22
CP-305	Jeff Davis St.	473	16	HDPE	150	2017	CJ-251	CJ-151	W-22
CP-304	John Brady Dr.	772	12	Ductile Iron	125	2004	CJ-204	CJ-251	
CP-284	Johnston St.	866	8	Ductile Iron	125	1996	CJ-197	CJ-243	FLAT FILE PG 28
CP-311	Joseph St.	303	6	Ductile Iron	125	1994	CJ-209	CJ-210	FLAT FILE PG 37
CP-316	Joseph St.	241	6	Ductile Iron	125	1994	CJ-256	CJ-209	FLAT FILE PG 37
CP-154	Kaagwaantaan St.	1,414	8	Ductile Iron	125	1982	CJ-104	CJ-109	S-135
CP-409	Kaasda Heen Cir.	278	6	Ductile Iron	125	1998	CJ-184	CJ-185	
CP-287	Kashevaroff St.	328	8	Ductile Iron	125	1987	CJ-59	CJ-203	FLAT FILE PG 29
CP-288	Kashevaroff St.	240	6	Ductile Iron	125	1987	CJ-59	CJ-244	
CP-289	Kashevaroff St.	165	6	Ductile Iron	125	1987	CJ-244	CJ-202	
CP-291	Kashevaroff St.	420	8	Ductile Iron	125		CJ-57	CJ-245	
CP-157	Katlian Ave	267	12	Cast iron	100	1968	CJ-105	CJ-106	W-25
CP-159	Katlian Ave	362	12	Cast iron	100	1968	CJ-107	CJ-108	W-26
CP-158	Katlian Ave	443	12	Cast iron	100	1968	CJ-106	CJ-107	W-25
CP-161	Katlian Ave	389	12	Cast iron	100	1968	CJ-108	CJ-131	W-25
CP-153	Katlian Ave.	511	12	Cast iron	100	1968	CJ-102	CJ-104	W-31
CP-130	Katlian Ave.	655	12	Cast iron	100	1968	CJ-92	CJ-100	W-32
CP-131	Katlian Ave.	224	12	Cast iron	100	1968	CJ-100	CJ-101	W-32
CP-132	Katlian Ave.	1,021	12	Cast iron	100	1968	CJ-101	CJ-102	W-31, W-32
CP-155	Katlian Ave.	243	12	Cast iron	100	1968	CJ-104	CJ-105	W-31
CP-404	Kelly St.	237	6	Ductile Iron	125	1985	CJ-152	CJ-182	S-146, SH 9
SP-416	Kiksadi Ct.	319	6	Ductile Iron	125	1995	SJ-235	SJ-236	
CP-66	Kimsham St.	406	8	Ductile Iron	125	1983	CJ-58	CJ-60	S-136
CP-292	Kimsham st.	524	2	Copper	140	1980	CJ-58	CJ-246	W-115
CP-99	Kincaid St.	257	6	Cast iron	100		CJ-85	CJ-84	FLAT FILE PG 36
SP-327	Knutson Dr.	252	8	Ductile Iron	125	1993	SJ-180	SJ-217	M-244
SP-328	Knutson Dr.	692	6	Ductile Iron	125	1993	SJ-217	SJ-218	M-244
SP-329	Knutson Dr.	355	6	Ductile Iron	125	1993	SJ-218	SJ-219	M-244
SP-330	Knutson Dr.	341	6	Ductile Iron	125	1993	SJ-219	SJ-217	M-244
HP-42	Kramer Ave.	589	16	HDPE	150	2010	HJ-30	HJ-31	M-177
HP-403	Kramer Ave.	274	16	HDPE	150	2010	HJ-301	HJ-300	W-32
HP-404	Kramer Ave.	711	16	HDPE	150	2010	HJ-302	HJ-301	W-32
HP-410	Kramer Ave.	2,589	8	HDPE	150	2010	HJ-306	HT-3	W-32
CP-171	Lake St.	334	12	Cast iron	100	1965	CJ-127	CJ-126	S-53
CP-82	Lake St.	296	10	Cast iron	100	1968	CJ-70	CJ-71	W-37
CP-101	Lake St.	708	10	Cast iron	100	1968	CJ-83	CJ-71	W-37, W-36
CP-102	Lake St.	404	10	Cast iron	100	1968	CJ-84	CJ-87	W-34
CP-108	Lake St.	731	12	HDPE	150	2018	CJ-88	CJ-125	CIP W-8
CP-119	Lake St.	312	12	Cast iron	100	1965	CJ-126	CJ-125	S-53
CP-100	Lake St.	980	10	Cast iron	100	1968	CJ-82	CJ-83	W-36, W-35
CP-192	Lake St.	268	12	Cast iron	100	1965	CJ-128	CJ-127	S-53
CP-107	Lake St.	173	10	Cast iron	100	1968	CJ-88	CJ-87	W-34
CP-285	Lake St.	433	10	Cast iron	100	1968	CJ-82	CJ-84	W-35
CP-128	Lakeview Dr.	1,327	6	Ductile Iron	125	1988	CJ-93	CJ-94	W-127
CP-124	Lakeview Dr.	657	6	Ductile Iron	125	1988	CJ-97	CJ-94	W-127
SP-324	Lance Dr.	633	6	Ductile Iron	125	1992	SJ-169	SJ-213	W-134
SP-433	Lance Dr.	291	6	Ductile Iron	125	1979	SJ-168	SJ-231	S-129
SP-434	Lance Dr.	523	6	Ductile Iron	125	1979	SJ-231	SJ-170	S-129
SP-435	Lance Dr.	323	6	Ductile Iron	125	1978	SJ-168	SJ-232	S-128

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-436	Lance Dr.	592	6	Ductile Iron	125	1981	SJ-232	SJ-169	S-133
JP-100	Lifesaver Dr.	88	10	Asbestos Cement	125	1992	JJ-30	JJ-97	HNG FILE
JP-142	Lifesaver Dr.	53	8	Cast iron	100	1992	JJ-30	JJ-138	HNG FILE
JP-340	Lifesaver Dr.	672	10	Asbestos Cement	125	1970-1980s	JJ-118	JJ-98	
JP-349	Lifesaver Dr.	911	10	Asbestos Cement	125		JJ-98	JJ-109	
SP-413	Lilian Dr.	1,161	6	Ductile Iron	125	2001	SJ-260	SJ-259	W-136
CP-189	Lincoln St.	284	8	Ductile Iron	125	1985	CJ-143	CJ-135	S-147, SH 52
CP-198	Lincoln St.	515	10	Ductile Iron	125	1985	CJ-132	CJ-131	S-147
CP-196	Lincoln St.	204	10	Ductile Iron	125	1985	CJ-133	CJ-132	S-147
CP-191	Lincoln St.	293	8	Ductile Iron	125	1985	CJ-135	CJ-128	S-147, SH 51
CP-188	Lincoln St.	651	8	Ductile Iron	125	1985	CJ-143	CJ-144	S-147, SH 52
CP-201	Lincoln St.	364	8	Ductile Iron	125	1985	CJ-144	CJ-151	S-147, SH 53
CP-203	Lincoln St.	1,104	6	Ductile Iron	125	1985	CJ-151	CJ-152	S-146, SH 9
CP-194	Lincoln St.	623	10	Ductile Iron	125	1985	CJ-128	CJ-133	S-147
CP-403	Lincoln St.	106	6	Ductile Iron	125	1985	CJ-144	CJ-181	S-147, SH 53
JP-101	Lifesaver Dr.	86	10	Asbestos Cement	125		JJ-97	JJ-98	
CP-195	Maksostoff St.	154	8	HDPE	150	2002	CJ-133	CJ-129	FLAT FILE PG 35
CP-136	Marine St.	270	10	Cast iron	100	1968	CJ-98	CJ-112	W-28
CP-145	Marine St.	380	10	Cast iron	100	1968	CJ-116	CJ-120	W-27
CP-144	Marine St.	628	10	Cast iron	100	1968	CJ-116	CJ-112	W-28
CP-163	Marine St.	700	10	Cast iron	100	1968	CJ-121	CJ-120	W-26
SP-411	Marys Court	451	6	Ductile Iron	125	2002	SJ-262	SJ-264	
CP-296	Merrill Street	868	6	Cast iron	100	1967, 1975	CJ-91	CJ-249	W-94, S-93
CP-204	Metlakatla St.	650	6	Ductile Iron	125	1985	CJ-152	CJ-153	S-146, SH 9
CP-283	Mills St.	350	8	Ductile Iron	125	1996	CJ-198	CJ-197	
CP-60	Mills St.	354	6	Cast iron	100		CJ-197	CJ-56	
CP-279	Mills St.	461	8	Ductile Iron	125	1996	CJ-198	CJ-201	
CP-275	Mills St.	19	8	Ductile Iron	125	1996	CJ-201	CJ-200	
CP-78	Moller Ave.	422	6	Ductile Iron	125	1979	CJ-66	CJ-67	W-110
CP-173	Monastery St.	240	8	HDPE	150	2014	CJ-136	CJ-137	W-107
CP-104	Monastery St.	390	6	Cast iron	100		CJ-86	CJ-85	
CP-105	Monastery St.	209	2	HDPE	150	1996	CJ-269	CJ-89	W-137
CP-96	Monastery St.	190	8	Ductile Iron	125		CJ-80	CJ-81	
CP-98	Monastery St.	794	6	Cast iron	100		CJ-81	CJ-85	
CP-94	Monastery St.	344	8	Ductile Iron	125	1979	CJ-79	CJ-80	S-130
CP-117	Monastery St.	363	8	HDPE	150	2012	CJ-248	CJ-137	W-107
CP-110	Monastery St.	555	12	HDPE	150	2014	CJ-248	CJ-89	W-33
CP-93	Monastery St.	254	8	Ductile Iron	125	1979	CJ-74	CJ-79	S-130
CP-190	Monastery St.	290	8	HDPE	150	2012	CJ-135	CJ-136	W-107
CP-318	Naomi Kanosh Lane	550	8	Ductile Iron	125	2002	CJ-254	CJ-257	W-135
CP-62	NE of Fergisun Loop	429	12	Ductile Iron	125	1998	CJ-263	CT-2	
CP-138	New Archangel St.	228	8	Cast iron	100	1968	CJ-112	CJ-111	W-30
CP-140	New Archangel St.	263	8	Cast iron	100	1968	CJ-110	CJ-103	W-30
CP-137	New Archangel St.	258	8	Cast iron	100	1968	CJ-112	CJ-113	W-30
CP-133	New Archangel St.	239	8	Ductile Iron	125	1968	CJ-102	CJ-103	W-30
CP-139	New Archangel St.	237	8	Cast iron	100	1968	CJ-111	CJ-110	W-30
HP-31	Nicole Dr.	275	10	Ductile Iron	125	1981	HJ-21	HJ-221	W-122
HP-22	Nicole Dr.	182	10	Ductile Iron	125	1981	HJ-221	HJ-22	W-122
CP-169	Observatory St.	459	8	Cast iron	100	1968	CJ-123	CJ-124	W-23
CP-134	O'Cain St.	222	6	Cast iron	100	1968	CJ-103	CJ-99	W-29
JP-262	O'Connell Bridge	1,360	12	Steel	125	1980	CJ-130	JJ-1	FLAT FILE PG 35
JP-216	Off Alice Loop	534	8	Ductile Iron	125	1985	JJ-210	JJ-212	
JP-213	Off Alice loop	104	8	Ductile Iron	125	1985	JJ-209	JJ-210	
JP-212	Off Alice loop	216	8	Ductile Iron	125	1985	JJ-208	JJ-209	
JP-370	Off Alice loop	690	8	Ductile Iron	125		JJ-214	JJ-210	
HP-378	Off Circle E	330	6	Ductile Iron	125		HJ-158	HJ-159	
CP-302	Off Crescent Dr.	634	8	Ductile Iron	125		CJ-206	CJ-205	
CP-160	Off Katlian Ave	116	10	Cast iron	100	1968	CJ-108	CJ-109	W-26
HP-264	Off Kinkroft Way	447	6	Ductile Iron	125	1993	HJ-195	HJ-223	FLAT FILE PG 25
CP-396	Off Lake St.	661	8	HDPE	150	2006	CJ-70	CJ-174	
CP-401	Off Lincoln St.	164	4	Ductile Iron	125	1989	CJ-134	CJ-179	S-179
CP-199	Off Lincoln St.	503	12	Cast iron	100	1968	CJ-131	CJ-130	W-24
CP-303	Off Metlakatla	802	12	Ductile Iron	125	2004	CJ-252	CJ-204	

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-156	off of Erler St.	404	12	Cast iron	100	1968	CJ-105	CJ-115	W-27
CP-297	Off Park St.	300	4	Ductile Iron	125		CJ-249	CJ-148	
SP-412	Off Price St.	269	6	HDPE	150	2002	SJ-261	SJ-263	
JP-34	Off Seward Ave.	320	8	Asbestos Cement	125		JJ-33	JJ-34	
JP-62	Off Seward Ave.	92	6	Ductile Iron	125	1984	JJ-61	JJ-62	S-154
JP-57	Off Seward Ave.	156	10	Ductile Iron	125	1984	JJ-56	JJ-57	S-154
JP-59	Off Seward Ave.	157	8	Ductile Iron	125	1984	JJ-58	JJ-59	S-154
JP-61	Off Seward Ave.	132	6	Ductile Iron	125	1984	JJ-60	JJ-61	S-154
JP-60	Off Seward Ave.	222	10	Ductile Iron	125	1984	JJ-58	JJ-60	S-154
JP-58	Off Seward Ave.	90	10	Ductile Iron	125	1984	JJ-57	JJ-58	S-154
JP-152	Off Seward Ave.	274	8	Ductile Iron	125		JJ-33	JJ-147	
JP-350	Off Seward Ave.	351	8	Cast iron	100	1967	JJ-147	JJ-144	M-52
JP-353	Off Seward Ave.	689	8	Ductile Iron	125		JJ-159	JJ-34	
JP-153	Off Seward Ave.	59	8	Ductile Iron	125		JJ-147	JJ-148	
JP-154	Off Seward Ave.	339	8	Asbestos Cement	125		JJ-148	JJ-149	
JP-155	Off Seward Ave.	275	8	Asbestos Cement	125		JJ-149	JJ-150	
JP-156	Off Seward Ave.	216	8	HDPE	150		JJ-150	JJ-151	
JP-354	Off Seward Ave.	548	8	Asbestos Cement	125		JJ-34	JJ-151	
CP-397	Off Verstovia St.	300	6	Ductile Iron	125		CJ-72	CJ-175	
CP-309	Off Yaw Dr.	481	12	Ductile Iron	125	1994	CJ-208	CJ-256	FLAT FILE PG 37
CP-185	Oja St.	552	6	Ductile Iron	125	1980	CJ-141	CJ-146	W-116
CP-118	Oja Way	499	6	Ductile Iron	125	1969	CJ-137	CJ-126	W-131
CP-135	Osprey St.	730	6	Cast iron	100	1968	CJ-99	CJ-98	W-29
CP-186	Park St.	242	6	Ductile Iron	125	1980	CJ-146	CJ-147	W-116
CP-178	Park St.	235	6	Ductile Iron	125	1967	CJ-147	CJ-148	
HP-24	Patterson Way	364	6	Ductile Iron	125	1981	HJ-22	HJ-23	W-122
CP-80	Peterson St.	151	10	Cast iron	100	1968	CJ-70	CJ-68	W-37
CP-79	Peterson St.	722	10	Cast iron	100	1968	CJ-61	CJ-68	W-41
CP-72	Peterson St.	505	10	Cast iron	100	1968	CJ-246	CJ-61	W-41
CP-293	Peterson St.	192	10	Cast iron	100	1968	CJ-246	CJ-55	W-41
CP-90	Pherson St.	802	8	Ductile Iron	125	1989	CJ-77	CJ-78	S-163
CP-91	Pherson St.	373	8	Ductile Iron	125	1979	CJ-62	CJ-77	S-130
CP-92	Pherson St.	350	8	Ductile Iron	125	1979	CJ-62	CJ-80	S-130
SP-215	Price St.	362	12	Ductile Iron	125	1986	SJ-260	SJ-166	S-164
SP-216	Price St.	344	12	Ductile Iron	125	1988	SJ-166	SJ-167	FLAT FILE PG 39
SP-320	Price St.	114	12	Ductile Iron	125	1986	SJ-260	SJ-259	S-164
SP-321	Price St.	136	12	Ductile Iron	125	1986	SJ-259	SJ-165	S-164
SP-322	Price St.	706	8	HDPE	150	2002	SJ-167	SJ-261	
SP-323	Price St.	376	8	HDPE	150	2002	SJ-261	SJ-262	
SP-423	Rands Dr.	429	6	Ductile Iron	125	1985	SJ-187	SJ-225	S-145
HP-383	Ross St.	377	6	Ductile Iron	125	1986	HJ-162	HJ-25	S-150
CP-310	Rudolph Walton Cir	320	6	Ductile Iron	125	1994	CJ-209	CJ-212	FLAT FILE PG 37
HP-390	Sand dollar Dr.	794	6	Ductile Iron	125	1987	HJ-166	HJ-167	FLAT FILE PG 26
SP-229	Sawmill Cr. Road	683	14	Cast iron	100	1972	SJ-177	SJ-178	W-67
SP-222	Sawmill Cr. Road	24	12	Ductile Iron	125	1987	SJ-172	TJ-4	W-125, SH 2
SP-236	Sawmill Cr. Road	941	14	Cast iron	100	1972	SJ-179	SJ-180	W-66
SP-241	Sawmill Cr. Road	15	12	Ductile Iron	125	1987	SJ-183	TJ-3	W-125
CP-115	Sawmill Cr. Road	768	16	Cast iron	100	1966	CJ-139	CJ-148	S-177
CP-209	Sawmill Cr. Road	2,406	14	Cast iron	100	1972	CJ-154	SJ-156	W-72
CP-207	Sawmill Cr. Road	176	18	Cast iron	100	1966	TJ-8	CJ-154	S177
CP-109	Sawmill Cr. Road	513	16	Cast iron	100	1966	CJ-125	CJ-138	S-177
SP-280	Sawmill Cr. Road	30	12	Ductile Iron	125	1987	SJ-192	TJ-2	W-125
CP-179	Sawmill Cr. Road	676	16	Cast iron	100	1966	CJ-148	CJ-149	S-177
SP-248	Sawmill Cr. Road	1,428	12	Ductile Iron	125	1980	SJ-191	SJ-192	W-118
SP-246	Sawmill Cr. Road	1,354	12	Ductile Iron	125	1980	SJ-186	SJ-190	W-118
CP-206	Sawmill Cr. Road	237	18	Cast iron	100	1966	CJ-149	TJ-8	S-177
SP-212	Sawmill Cr. Road	1,044	14	Cast iron	100	1972	SJ-156	SJ-162	W-70
CP-116	Sawmill Cr. Road	285	16	Cast iron	100	1966	CJ-139	CJ-138	S-177
SP-249	Sawmill Cr. Road	4	12	Ductile Iron	125	1980	SJ-192	SJ-196	W-118
SP-223	Sawmill Cr. Road	550	14	Cast iron	100	1972	SJ-172	SJ-173	W-68
SP-221	Sawmill Cr. Road	511	14	Cast iron	100	1972	SJ-170	SJ-172	W-68
SP-235	Sawmill Cr. Road	512	14	Cast iron	100	1972	SJ-178	SJ-179	W-66
SP-220	Sawmill Cr. Road	628	14	Ductile Iron	125	1972	SJ-170	SJ-165	W-69

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-242	Sawmill Cr. Road	1,246	14	Ductile Iron	125	1980	SJ-183	SJ-186	W-118
CP-295	Sawmill Cr. Road	10	8	HDPE	150	2012	CJ-138	CJ-248	W-107
SP-331	Sawmill Cr. Road	776	8	Ductile Iron	125	1980	SJ-196	SJ-216	W-118
SP-417	Sawmill Cr. Road	213	14	Cast iron	100	1972	SJ-173	SJ-267	W-68
SP-418	Sawmill Cr. Road	1,417	14	Cast iron	100	1972	SJ-267	SJ-177	W-68, W-67
SP-420	Sawmill Cr. Road	78	14	Ductile Iron	125	1980	SJ-180	SJ-194	W-118
SP-421	Sawmill Cr. Road	101	14	Ductile Iron	125	1980	SJ-194	SJ-183	W-118
SP-424	Sawmill Cr. Road	1,843	12	Ductile Iron	125	1980	SJ-190	SJ-226	W-118
SP-425	Sawmill Cr. Road	625	12	Ductile Iron	125	1980	SJ-226	SJ-191	W-118
SP-427	Sawmill Cr. Road	1,034	12	Ductile Iron	125	1992	SJ-216	SJ-228	W-133
SP-214	Sawmill Cr. Road	591	14	Cast iron	100	1972	SJ-162	SJ-300	W-70
SP-500	Sawmill Cr. Road	310	14	Cast iron	100	1972	SJ-300	SJ-165	W-70
SP-509	Sawmill Cr. Road	10,500	12	Ductile Iron	125		SJ-228	SJ-229	
JP-67	Seward Ave.	72	6	Ductile Iron	125	1984	JJ-66	JJ-67	S-154
JP-222	Seward Ave.	31	12	Ductile Iron	125	1984	JJ-215	JJ-73	S-154
JP-66	Seward Ave.	54	6	Ductile Iron	125	1984	JJ-65	JJ-66	S-154
JP-337	Seward Ave.	2,004	12	Ductile Iron	125	2004	JJ-53	JJ-37	
JP-357	Seward Ave.	301	10	Ductile Iron	125	1984	JJ-215	JJ-70	S-154
JP-358	Seward Ave.	590	12	Ductile Iron	125	1984	JJ-70	JJ-65	S-154
JP-359	Seward Ave.	165	12	Ductile Iron	125	1984	JJ-65	JJ-56	S-154
JP-360	Seward Ave.	454	12	Ductile Iron	125	1984	JJ-56	JJ-53	S-154
JP-362	Seward Ave.	129	6	Ductile Iron	125	1984	JJ-227	JJ-215	S-154
JP-363	Seward Ave.	603	10	Cast iron	100		JJ-76	JJ-73	
CP-168	Seward St.	140	10	Ductile Iron	125	1986	CJ-122	CJ-123	S-149
CP-170	Seward St.	680	12	Ductile Iron	125	1992	CJ-123	CJ-127	S-180
CP-162	Seward St.	220	10	Cast iron	100	1968	CJ-109	CJ-121	W-26
CP-165	Seward St.	190	10	Ductile Iron	125	1986	CJ-121	CJ-122	S-149
CP-58	Shelikof Way	561	6	Ductile Iron	125	1978	CJ-223	CJ-42	S-123
CP-271	Shelikof Way	10	6	Ductile Iron	125	1978	CJ-222	CJ-223	S-123
CP-272	Shelikof Way	54	6	Ductile Iron	125	1978	CJ-223	CJ-41	S-123
SP-243	Shotgun Alley	800	8	Ductile Iron	125	1980	SJ-186	SJ-187	W-118
SP-244	Shotgun Alley	1,051	8	Ductile Iron	125	1980	SJ-187	SJ-188	W-118
HP-15	Shuler Dr.	458	6	Ductile Iron	125	1975	HJ-14	HJ-16	W-105
CP-394	Sigtnaka Way	261	6	Cast iron	100		CJ-100	CJ-172	
CP-395	Sigtnaka Way	627	4	Ductile Iron	125		CJ-172	CJ-173	
JP-400	Sitka Channel	1,636	16	HDPE	150	2009	JJ-53	CJ-101	
CP-97	Sirstad St.	1,242	8	Ductile Iron	125	1975	CJ-81	CJ-72	W-103
SP-213	Smith St.	447	8	Ductile Iron	125	1983	SJ-162	SJ-163	FLAT FILE PG 39
SP-319	Smith St.	1,045	8	HDPE	150	1998	SJ-258	SJ-163	FLAT FILE PG 39
HP-23	Somer Dr.	257	6	Ductile Iron	125	1981	HJ-221	HJ-223	W-122
CP-148	Spruce St.	136	6	Ductile Iron	125	1989	CJ-114	CJ-113	W-129
CP-147	Spruce St.	571	6	Ductile Iron	125	1989	CJ-117	CJ-114	W-129
CP-392	Tilson St.	466	6	Ductile Iron	125	1983	CJ-60	CJ-170	S-136
CP-399	Tlingit Way	400	2	HDPE	150	1996	CJ-120	CJ-177	W-137
JP-84	Tongass Dr.	1,167	12	Ductile Iron	125	2004	JJ-92	JJ-20	
JP-355	Tongass Dr.	671	12	Ductile Iron	125	1984	JJ-53	JJ-92	S-154
HP-373	Valhalla Dr.	229	6	Ductile Iron	125	1978	HJ-155	HJ-9	W-108
HP-374	Valhalla Dr.	141	6	Ductile Iron	125	1978	HJ-9	HJ-156	W-108
SP-508	Versa Pl.	635	8	HDPE	150	2006	SJ-305	SJ-307	FLAT FILE SH 9 OF 11
CP-84	Verstovia Ave.	304	8	Ductile Iron	125	1975	CJ-71	CJ-72	W-103
CP-85	Verstovia Ave.	545	10	Ductile Iron	125	1979	CJ-72	CJ-73	S-130
CP-86	Verstovia Ave.	214	10	Ductile Iron	125	1979	CJ-73	CJ-74	S-130
CP-87	Verstovia Ave.	277	10	Ductile Iron	125	1979	CJ-74	CJ-75	S-130
HP-8	Viking Way	295	6	Ductile Iron	125	1978	HJ-8	HJ-9	W-108
SP-415	Vitskari St.	54	8	Ductile Iron	125	1995	SJ-235	SJ-237	FLAT FILE PG 41
SP-440	Vitskari St.	141	8	Ductile Iron	125	1995	SJ-234	SJ-235	FLAT FILE PG 41
SP-502	Vitskari St.	184	8	HDPE	150	2006	SJ-237	SJ-302	
SP-505	Vitskari St.	118	8	HDPE	150	2006	HSPMP-11	SJ-304	
SP-503	Vitskari St.	263	8	HDPE	150	2006	SJ-302	SJ-303	
CP-393	Wachusetts Wt.	826	6	Ductile Iron	125	1974	CJ-58	CJ-171	W-128
CP-46	West of Dodge Cir.	589	12	Cast iron	100	1977	CJ-34	CJ-35	W-61, W-104
SP-225	Wolff Dr.	591	6	Ductile Iron	125	1975-Post	SJ-174	SJ-175	
SP-226	Wolff Dr.	412	6	Ductile Iron	125	1975-Post	SJ-175	SJ-176	W-98

TABLE 1
SITKA WATER SYSTEM PIPE INVENTORY
BY STREET NAME

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-224	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-173	SJ-174	W-98
SP-227	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-176	SJ-174	W-98
CP-53	Wortman Loop	710	6	Ductile Iron	125	1979	CJ-242	CJ-46	S-115
CP-52	Wortman Loop	934	6	Ductile Iron	125	1979	CJ-44	CJ-46	S-114
CP-315	Yaw DrIve	668	12	Ductile Iron	125	2005	CJ-253	CJ-255	

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-49	H.P.R at Cascade Ave.	33	8	Cast iron	100	1963	CJ-267	CJ-40	W-96
CP-57	Halibut Pt. Road	437	8	Cast iron	100	1963	CJ-302	CJ-41	W-96
CP-171	Lake St.	334	12	Cast iron	100	1965	CJ-127	CJ-126	S-53
CP-119	Lake St.	312	12	Cast iron	100	1965	CJ-126	CJ-125	S-53
CP-192	Lake St.	268	12	Cast iron	100	1965	CJ-128	CJ-127	S-53
CP-120	Halibut Pt. Road	159	16	Cast iron	100	1966	CJ-125	CJ-119	S-177
CP-115	Sawmill Cr. Road	768	16	Cast iron	100	1966	CJ-139	CJ-148	S-177
CP-207	Sawmill Cr. Road	176	18	Cast iron	100	1966	TJ-8	CJ-154	S177
CP-109	Sawmill Cr. Road	513	16	Cast iron	100	1966	CJ-125	CJ-138	S-177
CP-179	Sawmill Cr. Road	676	16	Cast iron	100	1966	CJ-148	CJ-149	S-177
CP-206	Sawmill Cr. Road	237	18	Cast iron	100	1966	CJ-149	TJ-8	S-177
CP-116	Sawmill Cr. Road	285	16	Cast iron	100	1966	CJ-139	CJ-138	S-177
JP-207	Airport Rd.	223	8	Cast iron	100	1967	JJ-205	JJ-206	M-52
JP-209	Airport Rd.	243	6	Cast iron	100	1967	JJ-206	JJ-207	M-52
JP-208	Airport Rd.	133	8	Cast iron	100	1967	JJ-206	JJ-203	M-52
JP-206	Airport Rd.	403	8	Cast iron	100	1967	JJ-138	JJ-205	M-52
JP-351	Airport Rd.	800	8	Cast iron	100	1967	JJ-144	JJ-141	M-52
JP-352	Airport Rd.	432	8	Cast iron	100	1967	JJ-141	JJ-138	M-52
CP-298	Biorka St.	631	8	Cast iron	100	1967	CJ-147	CJ-271	W-88
JP-350	Off Seward Ave.	351	8	Cast iron	100	1967	JJ-147	JJ-144	M-52
CP-178	Park St.	235	6	Ductile Iron	125	1967	CJ-147	CJ-148	
CP-296	Merrill Street	868	6	Cast iron	100	1967, 1975	CJ-91	CJ-249	W-94, S-93
CP-56	Charteris St.	390	14	Cast iron	100	1968	CJ-48	CJ-224	W-46
CP-54	Charteris St.	437	14	Cast iron	100	1968	CJ-243	CJ-48	W-46
CP-277	Charteris St.	342	14	Cast iron	100	1968	CJ-47	CJ-243	W-46, W-47
CP-343	Charteris St.	68	6	Ductile Iron	125	1968	CJ-270	CJ-47	W-47
CP-500	DeGroff St.	203	10	Cast iron	100	1968	CJ-89	CJ-300	W-34
CP-106	DeGroff St.	188	10	Cast iron	100	1968	CJ-300	CJ-88	W-34
CP-73	Edgecumbe Dr.	470	12	Cast iron	100	1968	CJ-58	CJ-61	W-43
CP-64	Edgecumbe Dr.	1,082	12	Cast iron	100	1968	CJ-56	CJ-57	W-43
CP-65	Edgecumbe Dr.	784	12	Cast iron	100	1968	CJ-57	CJ-58	W-43
CP-63	Edgecumbe Dr.	1,077	12	Cast iron	100	1968	CJ-48	CJ-56	W-45
CP-182	Finn Alley	573	8	Cast iron	100	1968	CJ-145	CJ-144	W-20
CP-332	Georgeson loop	781	14	Cast iron	100	1968	CJ-263	CJ-270	W-47
CP-83	Halibut Pt. Rd.	667	14	Cast iron	100	1968	CJ-63	CJ-92	W-40
CP-74	Halibut Pt. Road	367	14	Cast iron	100	1968	CJ-55	CJ-63	W-40
CP-193	Harbor Dr.	738	12	Ductile Iron	125	1968	CJ-128	CJ-129	W-24
CP-200	Harbor Dr.	567	12	Cast iron	100	1968	CJ-130	CJ-129	W-24
CP-157	Katlian Ave	267	12	Cast iron	100	1968	CJ-105	CJ-106	W-25
CP-159	Katlian Ave	362	12	Cast iron	100	1968	CJ-107	CJ-108	W-26
CP-158	Katlian Ave	443	12	Cast iron	100	1968	CJ-106	CJ-107	W-25
CP-161	Katlian Ave	389	12	Cast iron	100	1968	CJ-108	CJ-131	W-25
CP-153	Katlian Ave.	511	12	Cast iron	100	1968	CJ-102	CJ-104	W-31
CP-130	Katlian Ave.	655	12	Cast iron	100	1968	CJ-92	CJ-100	W-32
CP-131	Katlian Ave.	224	12	Cast iron	100	1968	CJ-100	CJ-101	W-32
CP-132	Katlian Ave.	1,021	12	Cast iron	100	1968	CJ-101	CJ-102	W-31, W-32
CP-155	Katlian Ave.	243	12	Cast iron	100	1968	CJ-104	CJ-105	W-31
CP-82	Lake St.	296	10	Cast iron	100	1968	CJ-70	CJ-71	W-37
CP-101	Lake St.	708	10	Cast iron	100	1968	CJ-83	CJ-71	W-37, W-36
CP-102	Lake St.	404	10	Cast iron	100	1968	CJ-84	CJ-87	W-34
CP-100	Lake St.	980	10	Cast iron	100	1968	CJ-82	CJ-83	W-36, W-35
CP-107	Lake St.	173	10	Cast iron	100	1968	CJ-88	CJ-87	W-34
CP-285	Lake St.	433	10	Cast iron	100	1968	CJ-82	CJ-84	W-35
CP-136	Marine St.	270	10	Cast iron	100	1968	CJ-98	CJ-112	W-28
CP-145	Marine St.	380	10	Cast iron	100	1968	CJ-116	CJ-120	W-27
CP-144	Marine St.	628	10	Cast iron	100	1968	CJ-116	CJ-112	W-28
CP-163	Marine St.	700	10	Cast iron	100	1968	CJ-121	CJ-120	W-26
CP-138	New Archangel St.	228	8	Cast iron	100	1968	CJ-112	CJ-111	W-30
CP-140	New Archangel St.	263	8	Cast iron	100	1968	CJ-110	CJ-103	W-30
CP-137	New Archangel St.	258	8	Cast iron	100	1968	CJ-112	CJ-113	W-30
CP-133	New Archangel St.	239	8	Ductile Iron	125	1968	CJ-102	CJ-103	W-30
CP-139	New Archangel St.	237	8	Cast iron	100	1968	CJ-111	CJ-110	W-30
CP-169	Observatory St.	459	8	Cast iron	100	1968	CJ-123	CJ-124	W-23

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-134	O'Cain St.	222	6	Cast iron	100	1968	CJ-103	CJ-99	W-29
CP-160	Off Katlian Ave	116	10	Cast iron	100	1968	CJ-108	CJ-109	W-26
CP-199	Off Lincoln St.	503	12	Cast iron	100	1968	CJ-131	CJ-130	W-24
CP-156	off of Erler St.	404	12	Cast iron	100	1968	CJ-105	CJ-115	W-27
CP-135	Osprey St.	730	6	Cast iron	100	1968	CJ-99	CJ-98	W-29
CP-80	Peterson St.	151	10	Cast iron	100	1968	CJ-70	CJ-68	W-37
CP-79	Peterson St.	722	10	Cast iron	100	1968	CJ-61	CJ-68	W-41
CP-72	Peterson St.	505	10	Cast iron	100	1968	CJ-246	CJ-61	W-41
CP-293	Peterson St.	192	10	Cast iron	100	1968	CJ-246	CJ-55	W-41
CP-162	Seward St.	220	10	Cast iron	100	1968	CJ-109	CJ-121	W-26
CP-118	Oja Way	499	6	Ductile Iron	125	1969	CJ-137	CJ-126	W-131
JP-9	Harbor Dr.	145	16	Ductile Iron	125	1970s Early	JJ-9	JJ-10	
CP-113	DeGroff St.	897	6	Cast iron	100	1970	CJ-90	CJ-148	W-9
CP-111	DeGroff St.	345	6	Cast iron	100	1970	CJ-89	CJ-90	W-10
CP-112	Baranof St.	207	6	Cast iron	100	1971	CJ-90	CJ-91	W-11
CP-312	Indian River Road	1,374	18	Cast iron	100	1971	CJ-208	CJ-155	FLAT FILE PG 37
CP-308	Indian River Road	452	18	Cast iron	100	1971	CJ-207	CJ-208	FLAT FILE PG 37
CP-407	Indian River Road	840	18	Cast iron	100	1971	CJ-154	CJ-184	FLAT FILE PG 37
CP-408	Indian River Road	875	18	Cast iron	100	1971	CJ-184	CJ-207	FLAT FILE PG 37
CP-47	Dodge Cir.	738	12	Cast iron	100	1972	CJ-35	CJ-36	W-64, W-104
CP-51	Edgecumbe Dr.	420	12	Cast iron	100	1972	CJ-45	CJ-44	W-62, W-109
CP-50	Edgecumbe Dr.	1,047	12	Cast iron	100	1972	CJ-38	CJ-44	W-104, W-64
CP-40	Edgecumbe Dr.	2,041	12	Cast iron	100	1972	CJ-38	CJ-39	W-65, W-63, W-104
CP-346	Edgecumbe Dr.	50	12	Cast iron	100	1972	CPMP-1	CJ-272	W-62, W-109
CP-336	Edgecumbe Dr.	147	12	Cast iron	100	1972	CJ-272	CJ-45	W-62, W-109
CP-430	Edgecumbe Dr.	227	12	Cast iron	100	1972	CJ-48	CJ-230	W-62, W-104
CP-431	Edgecumbe Dr.	126	12	Cast iron	100	1972	CJ-230	CPMP-1	W-62, W-109
SP-229	Sawmill Cr. Road	683	14	Cast iron	100	1972	SJ-177	SJ-178	W-67
SP-236	Sawmill Cr. Road	941	14	Cast iron	100	1972	SJ-179	SJ-180	W-66
CP-209	Sawmill Cr. Road	2,406	14	Cast iron	100	1972	CJ-154	SJ-156	W-72
SP-212	Sawmill Cr. Road	1,044	14	Cast iron	100	1972	SJ-156	SJ-162	W-70
SP-223	Sawmill Cr. Road	550	14	Cast iron	100	1972	SJ-172	SJ-173	W-68
SP-221	Sawmill Cr. Road	511	14	Cast iron	100	1972	SJ-170	SJ-172	W-68
SP-235	Sawmill Cr. Road	512	14	Cast iron	100	1972	SJ-178	SJ-179	W-66
SP-220	Sawmill Cr. Road	628	14	Ductile Iron	125	1972	SJ-170	SJ-165	W-69
SP-417	Sawmill Cr. Road	213	14	Cast iron	100	1972	SJ-173	SJ-267	W-68
SP-418	Sawmill Cr. Road	1,417	14	Cast iron	100	1972	SJ-267	SJ-177	W-68, W-67
SP-214	Sawmill Cr. Road	591	14	Cast iron	100	1972	SJ-162	SJ-300	W-70
SP-500	Sawmill Cr. Road	310	14	Cast iron	100	1972	SJ-300	SJ-165	W-70
CP-393	Wachusetts Wt.	826	6	Ductile Iron	125	1974	CJ-58	CJ-171	W-128
CP-175	Baranof St.	179	6	Cast iron	100	1975	CJ-141	CJ-140	W-106
CP-184	Baranof St.	189	6	Ductile Iron	125	1975	CJ-142	CJ-141	W-106
CP-187	Baranof St.	318	6	Ductile Iron	125	1975	CJ-142	CJ-143	W-106
CP-176	Baranof St.	231	6	Ductile Iron	125	1975	CJ-140	CJ-139	W-106
CP-75	Brady St.	316	8	Ductile Iron	125	1975	CJ-63	CJ-64	W-109
CP-81	Cascade St.	1,008	8	Ductile Iron	125	1975	CJ-65	CJ-68	W-109
CP-76	Gavin St.	202	8	Ductile Iron	125	1975	CJ-64	CJ-65	W-109
CP-122	Halibut Pt. Road	388	8	Ductile Iron	125	1975	CJ-113	CJ-98	W-109
CP-70	Halibut Pt. Road	426	8	Ductile Iron	125	1975	CJ-53	CJ-245	W-109
CP-123	Halibut Pt. Road	98	8	Ductile Iron	125	1975	CJ-98	CJ-97	W-109
CP-127	Halibut Pt. Road	431	8	Ductile Iron	125	1975	CJ-95	CJ-93	W-109
CP-121	Halibut Pt. Road	1,116	8	Ductile Iron	125	1975	CJ-119	CJ-113	W-109
CP-125	Halibut Pt. Road	230	8	Ductile Iron	125	1975	CJ-97	CJ-95	W-109
CP-71	Halibut Pt. Road	406	8	Ductile Iron	125	1975	CJ-54	CJ-55	W-109
CP-68	Halibut Pt. Road	1,518	8	Ductile Iron	125	1975	CJ-43	CJ-52	W-109
CP-69	Halibut Pt. Road	672	8	Ductile Iron	125	1975	CJ-52	CJ-53	W-109
CP-290	Halibut Pt. Road	547	8	Ductile Iron	125	1975	CJ-54	CJ-245	W-109
HP-15	Shuler Dr.	458	6	Ductile Iron	125	1975	HJ-14	HJ-16	W-105
CP-97	Sirstad St.	1,242	8	Ductile Iron	125	1975	CJ-81	CJ-72	W-103
CP-84	Verstovia Ave.	304	8	Ductile Iron	125	1975	CJ-71	CJ-72	W-103
SP-224	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-173	SJ-174	W-98
SP-227	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-176	SJ-174	W-98
SP-225	Wolff Dr.	591	6	Ductile Iron	125	1975-Post	SJ-174	SJ-175	

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-226	Wolff Dr.	412	6	Ductile Iron	125	1975-Post	SJ-175	SJ-176	W-98
HP-43	Halibut Pt Road	325	12	Cast iron	100	1977	HJ-30	HJ-32	W-60
HP-40	Halibut Pt. Road	790	12	Cast iron	100	1977	HJ-28	HJ-29	W-58
HP-6	Halibut Pt. Road	226	12	Cast iron	100	1977	HJ-6	HJ-265	W-92
HP-39	Halibut Pt. Road	872	12	Cast iron	100	1977	HJ-27	HJ-28	W-58
HP-20	Halibut Pt. Road	1,165	12	Cast iron	100	1977	HJ-20	HJ-21	W-55
HP-7	Halibut Pt. Road	1,727	12	Cast iron	100	1977	HJ-6	HJ-8	W-92
HP-10	Halibut Pt. Road	688	12	Cast iron	100	1977	HJ-10	HJ-11	W-50
HP-35	Halibut Pt. Road	461	12	Cast iron	100	1977	HJ-21	HJ-24	W-55
HP-38	Halibut Pt. Road	1,433	12	Cast iron	100	1977	HJ-26	HJ-27	W-57
HP-16	Halibut Pt. Road	546	12	Cast iron	100	1977	HJ-14	HJ-17	W-53
HP-9	Halibut Pt. Road	1,551	12	Cast iron	100	1977	HJ-8	HJ-10	W-93
HP-13	Halibut Pt. Road	1,334	12	Cast iron	100	1977	HJ-14	HJ-12	W-52
HP-12	Halibut Pt. Road	394	12	Cast iron	100	1977	HJ-12	HJ-13	W-52
HP-11	Halibut Pt. Road	1,396	12	Cast iron	100	1977	HJ-11	HJ-13	W-51
HP-334	Halibut Pt. Road	637	6	Cast iron	100	1977	HJ-7	HJ-265	W-92
HP-376	Halibut Pt. Road	294	12	Cast iron	100	1977	HJ-17	HJ-158	W-54
HP-377	Halibut Pt. Road	432	12	Cast iron	100	1977	HJ-158	HJ-18	W-54
HP-379	Halibut Pt. Road	155	12	Cast iron	100	1977	HJ-18	HJ-160	W-54
HP-380	Halibut Pt. Road	455	12	Cast iron	100	1977	HJ-160	HJ-20	W-54
HP-386	Halibut Pt. Road	607	12	Cast iron	100	1977	HJ-164	HJ-26	W-56
HP-388	Halibut Pt. Road	1,066	12	Cast iron	100	1977	HJ-29	HJ-166	W-59
HP-389	Halibut Pt. Road	610	12	Cast iron	100	1977	HJ-166	HJ-30	W-60
CP-45	Halibut Pt. Road	524	12	Cast iron	100	1977	CJ-303	CJ-34	W-60, W-61
CP-504	Halibut Pt. Road	459	12	Cast iron	100	1977	HJ-32	CJ-304	W-60, W-61
HP-385	Halibut Pt. Road	434	12	Cast iron	100	1977	HJ-24	J-35	W-56
SP-325	Jamestown Dr.	474	8	Ductile Iron	125	1977	SJ-178	SJ-214	S-124, S-125
SP-326	Jamestown Dr.	573	8	Ductile Iron	125	1977	SJ-214	SJ-215	S-124, S-125
CP-46	West of Dodge Cir.	589	12	Cast iron	100	1977	CJ-34	CJ-35	W-61, W-104
SP-435	Lance Dr.	323	6	Ductile Iron	125	1978	SJ-168	SJ-232	S-128
CP-58	Shelikof Way	561	6	Ductile Iron	125	1978	CJ-223	CJ-42	S-123
CP-271	Shelikof Way	10	6	Ductile Iron	125	1978	CJ-222	CJ-223	S-123
CP-272	Shelikof Way	54	6	Ductile Iron	125	1978	CJ-223	CJ-41	S-123
HP-373	Valhalla Dr.	229	6	Ductile Iron	125	1978	HJ-155	HJ-9	W-108
HP-374	Valhalla Dr.	141	6	Ductile Iron	125	1978	HJ-9	HJ-156	W-108
HP-8	Viking Way	295	6	Ductile Iron	125	1978	HJ-8	HJ-9	W-108
CP-95	A Street	372	6	Ductile Iron	125	1979	CJ-79	CJ-73	S-130
CP-89	Charles St.	165	10	Ductile Iron	125	1979	CJ-75	CJ-77	S-130
CP-300	Charles St.	400	6	Ductile Iron	125	1979	CJ-75	CJ-62	S-130
CP-77	Gavin St.	439	6	Ductile Iron	125	1979	CJ-65	CJ-66	W-110
CP-506	Halibut Pt. Road	52	6	Ductile Iron	125	1979	J-36	CJ-43	
SP-245	Islander Dr.	1,086	6	Ductile Iron	125	1979	SJ-188	SJ-189	W-111, 112, 113
SP-433	Lance Dr.	291	6	Ductile Iron	125	1979	SJ-168	SJ-231	S-129
SP-434	Lance Dr.	523	6	Ductile Iron	125	1979	SJ-231	SJ-170	S-129
CP-78	Moller Ave.	422	6	Ductile Iron	125	1979	CJ-66	CJ-67	W-110
CP-94	Monastery St.	344	8	Ductile Iron	125	1979	CJ-79	CJ-80	S-130
CP-93	Monastery St.	254	8	Ductile Iron	125	1979	CJ-74	CJ-79	S-130
CP-91	Pherson St.	373	8	Ductile Iron	125	1979	CJ-62	CJ-77	S-130
CP-92	Pherson St.	350	8	Ductile Iron	125	1979	CJ-62	CJ-80	S-130
CP-85	Verstovia Ave.	545	10	Ductile Iron	125	1979	CJ-72	CJ-73	S-130
CP-86	Verstovia Ave.	214	10	Ductile Iron	125	1979	CJ-73	CJ-74	S-130
CP-87	Verstovia Ave.	277	10	Ductile Iron	125	1979	CJ-74	CJ-75	S-130
CP-53	Wortman Loop	710	6	Ductile Iron	125	1979	CJ-242	CJ-46	S-115
CP-52	Wortman Loop	934	6	Ductile Iron	125	1979	CJ-44	CJ-46	S-114
JP-340	Lifesaver Dr.	672	10	Asbestos Cement	125	1970-1980s	JJ-118	JJ-98	
CP-126	Crabapple Dr.	450	6	Ductile Iron	125	1980	CJ-95	CJ-96	W-117
CP-181	Etolin St.	410	8	Ductile Iron	125	1980	CJ-150	CJ-145	W-116
CP-405	Etolin St.	321	8	Ductile Iron	125	1980	CJ-145	CJ-183	W-116
CP-406	Etolin St.	473	6	Ductile Iron	125	1980	CJ-183	CJ-142	W-116
CP-292	Kimsham st.	524	2	Copper	140	1980	CJ-58	CJ-246	W-115
JP-262	O'Connell Bridge	1,360	12	Steel	125	1980	CJ-130	JJ-1	FLAT FILE PG 35
CP-185	Oja St.	552	6	Ductile Iron	125	1980	CJ-141	CJ-146	W-116
CP-186	Park St.	242	6	Ductile Iron	125	1980	CJ-146	CJ-147	W-116

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-248	Sawmill Cr. Road	1,428	12	Ductile Iron	125	1980	SJ-191	SJ-192	W-118
SP-246	Sawmill Cr. Road	1,354	12	Ductile Iron	125	1980	SJ-186	SJ-190	W-118
SP-249	Sawmill Cr. Road	4	12	Ductile Iron	125	1980	SJ-192	SJ-196	W-118
SP-242	Sawmill Cr. Road	1,246	14	Ductile Iron	125	1980	SJ-183	SJ-186	W-118
SP-331	Sawmill Cr. Road	776	8	Ductile Iron	125	1980	SJ-196	SJ-216	W-118
SP-420	Sawmill Cr. Road	78	14	Ductile Iron	125	1980	SJ-180	SJ-194	W-118
SP-421	Sawmill Cr. Road	101	14	Ductile Iron	125	1980	SJ-194	SJ-183	W-118
SP-424	Sawmill Cr. Road	1,843	12	Ductile Iron	125	1980	SJ-190	SJ-226	W-118
SP-425	Sawmill Cr. Road	625	12	Ductile Iron	125	1980	SJ-226	SJ-191	W-118
SP-243	Shotgun Alley	800	8	Ductile Iron	125	1980	SJ-186	SJ-187	W-118
SP-244	Shotgun Alley	1,051	8	Ductile Iron	125	1980	SJ-187	SJ-188	W-118
SP-436	Lance Dr.	592	6	Ductile Iron	125	1981	SJ-232	SJ-169	S-133
HP-31	Nicole Dr.	275	10	Ductile Iron	125	1981	HJ-21	HJ-221	W-122
HP-22	Nicole Dr.	182	10	Ductile Iron	125	1981	HJ-221	HJ-22	W-122
HP-24	Patterson Way	364	6	Ductile Iron	125	1981	HJ-22	HJ-23	W-122
HP-23	Somer Dr.	257	6	Ductile Iron	125	1981	HJ-221	HJ-223	W-122
CP-154	Kaagwaantaan St.	1,414	8	Ductile Iron	125	1982	CJ-104	CJ-109	S-135
CP-67	Furuhelm St.	620	8	Ductile Iron	125	1983	CJ-59	CJ-60	S-136
HP-290	Harbor Mtn. Rd.	10	18	Ductile Iron	125	1983	HT-1	HJ-15	W-121
HP-14	Harbor Mtn. Road	2,372	18	Ductile Iron	125	1983	HJ-14	HJ-15	W-121
CP-66	Kimsham St.	406	8	Ductile Iron	125	1983	CJ-58	CJ-60	S-136
SP-213	Smith St.	447	8	Ductile Iron	125	1983	SJ-162	SJ-163	FLAT FILE PG 39
CP-392	Tilson St.	466	6	Ductile Iron	125	1983	CJ-60	CJ-170	S-136
JP-62	Off Seward Ave.	92	6	Ductile Iron	125	1984	JJ-61	JJ-62	S-154
JP-57	Off Seward Ave.	156	10	Ductile Iron	125	1984	JJ-56	JJ-57	S-154
JP-59	Off Seward Ave.	157	8	Ductile Iron	125	1984	JJ-58	JJ-59	S-154
JP-61	Off Seward Ave.	132	6	Ductile Iron	125	1984	JJ-60	JJ-61	S-154
JP-60	Off Seward Ave.	222	10	Ductile Iron	125	1984	JJ-58	JJ-60	S-154
JP-58	Off Seward Ave.	90	10	Ductile Iron	125	1984	JJ-57	JJ-58	S-154
JP-67	Seward Ave.	72	6	Ductile Iron	125	1984	JJ-66	JJ-67	S-154
JP-222	Seward Ave.	31	12	Ductile Iron	125	1984	JJ-215	JJ-73	S-154
JP-66	Seward Ave.	54	6	Ductile Iron	125	1984	JJ-65	JJ-66	S-154
JP-357	Seward Ave.	301	10	Ductile Iron	125	1984	JJ-215	JJ-70	S-154
JP-358	Seward Ave.	590	12	Ductile Iron	125	1984	JJ-70	JJ-65	S-154
JP-359	Seward Ave.	165	12	Ductile Iron	125	1984	JJ-65	JJ-56	S-154
JP-360	Seward Ave.	454	12	Ductile Iron	125	1984	JJ-56	JJ-53	S-154
JP-362	Seward Ave.	129	6	Ductile Iron	125	1984	JJ-227	JJ-215	S-154
JP-355	Tongass Dr.	671	12	Ductile Iron	125	1984	JJ-53	JJ-92	S-154
JP-139	Alice loop	123	12	Ductile Iron	125	1985	JJ-130	JJ-135	W-124
JP-367	Alice loop	676	8	Ductile Iron	125	1985	JJ-125	JJ-130	W-124
JP-368	Alice loop	564	8	Ductile Iron	125	1985	JJ-130	JJ-127	W-124
JP-369	Alice loop	699	8	Ductile Iron	125	1985	JJ-127	JJ-125	W-124
SP-238	Anna Dr.	365	8	Ductile Iron	125	1985	SJ-181	SJ-182	S-151
SP-239	Anna Dr.	394	6	Ductile Iron	125	1985	SJ-181	SJ-185	S-151
SP-237	Anna Dr.	176	8	Ductile Iron	125	1985	SJ-180	SJ-181	S-151
CP-404	Kelly St.	237	6	Ductile Iron	125	1985	CJ-152	CJ-182	S-146, SH 9
CP-189	Lincoln St.	284	8	Ductile Iron	125	1985	CJ-143	CJ-135	S-147, SH 52
CP-198	Lincoln St.	515	10	Ductile Iron	125	1985	CJ-132	CJ-131	S-147
CP-196	Lincoln St.	204	10	Ductile Iron	125	1985	CJ-133	CJ-132	S-147
CP-191	Lincoln St.	293	8	Ductile Iron	125	1985	CJ-135	CJ-128	S-147, SH 51
CP-188	Lincoln St.	651	8	Ductile Iron	125	1985	CJ-143	CJ-144	S-147, SH 52
CP-201	Lincoln St.	364	8	Ductile Iron	125	1985	CJ-144	CJ-151	S-147, SH 53
CP-203	Lincoln St.	1,104	6	Ductile Iron	125	1985	CJ-151	CJ-152	S-146, SH 9
CP-194	Lincoln St.	623	10	Ductile Iron	125	1985	CJ-128	CJ-133	S-147
CP-403	Lincoln St.	106	6	Ductile Iron	125	1985	CJ-144	CJ-181	S-147, SH 53
CP-204	Metlakatla St.	650	6	Ductile Iron	125	1985	CJ-152	CJ-153	S-146, SH 9
JP-216	Off Alice Loop	534	8	Ductile Iron	125	1985	JJ-210	JJ-212	
JP-213	Off Alice loop	104	8	Ductile Iron	125	1985	JJ-209	JJ-210	
JP-212	Off Alice loop	216	8	Ductile Iron	125	1985	JJ-208	JJ-209	
SP-423	Rands Dr.	429	6	Ductile Iron	125	1985	SJ-187	SJ-225	S-145
HP-384	Barker St.	330	6	Ductile Iron	125	1986	HJ-162	HJ-163	S-150
SP-217	Burkhart St.	660	6	Ductile Iron	125	1986	SJ-166	SJ-168	S-164
HP-382	Halibut Pt. Road	210	6	Ductile Iron	125	1986	HJ-24	HJ-162	S-150

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-215	Price St.	362	12	Ductile Iron	125	1986	SJ-260	SJ-166	S-164
SP-320	Price St.	114	12	Ductile Iron	125	1986	SJ-260	SJ-259	S-164
SP-321	Price St.	136	12	Ductile Iron	125	1986	SJ-259	SJ-165	S-164
HP-383	Ross St.	377	6	Ductile Iron	125	1986	HJ-162	HJ-25	S-150
CP-168	Seward St.	140	10	Ductile Iron	125	1986	CJ-122	CJ-123	S-149
CP-165	Seward St.	190	10	Ductile Iron	125	1986	CJ-121	CJ-122	S-149
CP-150	Erler St.	256	10	Ductile Iron	125	1987	CJ-118	CJ-117	S-157
CP-151	Erler St.	417	10	Ductile Iron	125	1987	CJ-118	CJ-119	S-157
CP-146	Erler St.	271	10	Ductile Iron	125	1987	CJ-116	CJ-117	S-157
CP-143	Erler St.	220	10	Ductile Iron	125	1987	CJ-115	CJ-116	S-157
HP-4	Halibut Pt. Road	519	12	Ductile Iron	125	1987	HJ-4	HJ-5	S-159
SP-438	Jarvis St	450	8	Ductile Iron	125	1987	SJ-233	SJ-157	S-155
SP-288	Jarvis St.	593	8	Ductile Iron	125	1987	SJ-158	SJ-159	S-155
SP-211	Jarvis St.	642	8	Ductile Iron	125	1987	SJ-157	SJ-158	S-155
SP-437	Jarvis St.	251	8	Ductile Iron	125	1987	SJ-156	SJ-233	
CP-287	Kashevaroff St.	328	8	Ductile Iron	125	1987	CJ-59	CJ-203	FLAT FILE PG 29
CP-288	Kashevaroff St.	240	6	Ductile Iron	125	1987	CJ-59	CJ-244	
CP-289	Kashevaroff St.	165	6	Ductile Iron	125	1987	CJ-244	CJ-202	
HP-390	Sand dollar Dr.	794	6	Ductile Iron	125	1987	HJ-166	HJ-167	FLAT FILE PG 26
SP-222	Sawmill Cr. Road	24	12	Ductile Iron	125	1987	SJ-172	TJ-4	W-125, SH 2
SP-241	Sawmill Cr. Road	15	12	Ductile Iron	125	1987	SJ-183	TJ-3	W-125
SP-280	Sawmill Cr. Road	30	12	Ductile Iron	125	1987	SJ-192	TJ-2	W-125
SP-410	Harvest Way	295	6	Ductile Iron	125	1988	SJ-167	SJ-265	WW-730
CP-149	Hemlock St.	755	6	Ductile Iron	125	1988	CJ-114	CJ-118	W-130
CP-128	Lakeview Dr.	1,327	6	Ductile Iron	125	1988	CJ-93	CJ-94	W-127
CP-124	Lakeview Dr.	657	6	Ductile Iron	125	1988	CJ-97	CJ-94	W-127
SP-216	Price St.	344	12	Ductile Iron	125	1988	SJ-166	SJ-167	FLAT FILE PG 39
HP-387	Bahovec Ct.	476	6	Ductile Iron	125	1989	HJ-164	HJ-165	FLAT FILE PG 25
CP-398	Buhrt Cir.	278	6	Ductile Iron	125	1989	CJ-76	CJ-176	S-163
CP-48	Cascade Cr. Drive	643	8	Ductile Iron	125	1989	CJ-36	CJ-196	S-158
CP-268	Cascade Cr. Road	54	8	Ductile Iron	125	1989	CJ-221	CJ-40	S-158
CP-269	Cascade Cr. Road	279	8	Ductile Iron	125	1989	CJ-196	CJ-221	S-158
CP-88	Charles St.	581	8	Ductile Iron	125	1989	CJ-75	CJ-76	S-163
HP-1	Halibut Pt. Road	418	12	Ductile Iron	125	1989	HJ-1	HJ-2	Flat files
HP-5	Halibut Pt. Road	972	12	Cast iron	100	1989	HJ-5	HJ-6	W-92
HP-3	Halibut Pt. Road	4,413	12	Ductile Iron	125	1989	HJ-3	HJ-4	Flat files
HP-2	Halibut Pt. Road	683	12	Ductile Iron	125	1989	HJ-2	HJ-3	Flat files
HP-371	Halibut Pt. Road	67	10	Ductile Iron	125	1989	HJ-2	HJ-153	Flat files
HP-372	Halibut Pt. Road	238	6	Ductile Iron	125	1989	HJ-153	HJ-154	Flat files
CP-401	Off Lincoln St.	164	4	Ductile Iron	125	1989	CJ-134	CJ-179	S-179
CP-90	Pherson St.	802	8	Ductile Iron	125	1989	CJ-77	CJ-78	S-163
CP-148	Spruce St.	136	6	Ductile Iron	125	1989	CJ-114	CJ-113	W-129
CP-147	Spruce St.	571	6	Ductile Iron	125	1989	CJ-117	CJ-114	W-129
JP-20	Airport Rd.	252	16	Ductile Iron	125	1992	JJ-22	JJ-20	HNG FILE PG 33
JP-338	Airport Rd.	769	16	Ductile Iron	125	1992	JJ-30	JJ-203	HNG FILE PG 32
JP-339	Airport Rd.	1,410	16	Ductile Iron	125	1992	JJ-203	JJ-22	HNG FILE PG 33
JP-335	Airport Road	1,474	16	Ductile Iron	125	1992	JJ-20	JJ-10	HNG FILE PG 33
CP-267	Cascade Cr. Road	10	8	Ductile Iron	125	1992	CJ-220	CJ-221	W-138
CP-505	Davidoff St.	244	16	Ductile Iron	125	1992	J-36	CJ-229	W-138
CP-429	Davidoff st.	250	16	Ductile Iron	125	1992	CJ-229	CJ-224	W-138
CP-265	Halibut Pt. Road	1,092	16	Ductile Iron	125	1992	CJ-34	CJ-220	W-138
CP-266	Halibut Pt. Road	902	16	Ductile Iron	125	1992	CJ-220	CJ-222	W-138
CP-428	Halibut Pt. Road	372	16	Ductile Iron	125	1992	CJ-222	J-36	W-138
SP-324	Lance Dr.	633	6	Ductile Iron	125	1992	SJ-169	SJ-213	W-134
JP-100	Lifesaver Dr.	88	10	Asbestos Cement	125	1992	JJ-30	JJ-97	HNG FILE
JP-142	Lifesaver Dr.	53	8	Cast iron	100	1992	JJ-30	JJ-138	HNG FILE
SP-427	Sawmill Cr. Road	1,034	12	Ductile Iron	125	1992	SJ-216	SJ-228	W-133
CP-170	Seward St.	680	12	Ductile Iron	125	1992	CJ-123	CJ-127	S-180
SP-327	Knutson Dr.	252	8	Ductile Iron	125	1993	SJ-180	SJ-217	M-244
SP-328	Knutson Dr.	692	6	Ductile Iron	125	1993	SJ-217	SJ-218	M-244
SP-329	Knutson Dr.	355	6	Ductile Iron	125	1993	SJ-218	SJ-219	M-244
SP-330	Knutson Dr.	341	6	Ductile Iron	125	1993	SJ-219	SJ-217	M-244
HP-264	Off Kinkroft Way	447	6	Ductile Iron	125	1993	HJ-195	HJ-223	FLAT FILE PG 25

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-306	Andrew Hope St.	627	8	Ductile Iron	125	1994	CJ-207	CJ-210	FLAT FILE PG 37
CP-307	Andrew Hope St.	442	8	Ductile Iron	125	1994	CJ-210	CJ-211	FLAT FILE PG 37
CP-311	Joseph St.	303	6	Ductile Iron	125	1994	CJ-209	CJ-210	FLAT FILE PG 37
CP-316	Joseph St.	241	6	Ductile Iron	125	1994	CJ-256	CJ-209	FLAT FILE PG 37
CP-309	Off Yaw Dr.	481	12	Ductile Iron	125	1994	CJ-208	CJ-256	FLAT FILE PG 37
CP-310	Rudolph Walton Cir	320	6	Ductile Iron	125	1994	CJ-209	CJ-212	FLAT FILE PG 37
SP-439	Burkhart St.	381	8	Ductile Iron	125	1995	SJ-168	SJ-234	FLAT FILE PG 41
SP-416	Kiksadi Ct.	319	6	Ductile Iron	125	1995	SJ-235	SJ-236	
SP-415	Vitskari St.	54	8	Ductile Iron	125	1995	SJ-235	SJ-237	FLAT FILE PG 41
SP-440	Vitskari St.	141	8	Ductile Iron	125	1995	SJ-234	SJ-235	FLAT FILE PG 41
CP-278	Charteris St.	976	8	Ductile Iron	125	1996	CJ-242	CJ-200	
CP-281	Georgeson loop	773	8	Ductile Iron	125	1996	CJ-199	CJ-198	
CP-282	Georgeson loop	639	8	Ductile Iron	125	1996	CJ-198	CJ-270	FLAT FILE PG 28
CP-276	Georgeson loop	765	8	Ductile Iron	125	1996	CJ-199	CJ-195	
CP-280	Georgeson loop	18	8	Ductile Iron	125	1996	CJ-195	CJ-200	
CP-284	Johnston St.	866	8	Ductile Iron	125	1996	CJ-197	CJ-243	FLAT FILE PG 28
CP-283	Mills St.	350	8	Ductile Iron	125	1996	CJ-198	CJ-197	
CP-279	Mills St.	461	8	Ductile Iron	125	1996	CJ-198	CJ-201	
CP-275	Mills St.	19	8	Ductile Iron	125	1996	CJ-201	CJ-200	
CP-105	Monastery St.	209	2	HDPE	150	1996	CJ-269	CJ-89	W-137
CP-399	Tlingit Way	400	2	HDPE	150	1996	CJ-120	CJ-177	W-137
CP-270	Donna Dr.	260	6	Ductile Iron	125	1997	CJ-196	CJ-241	FLAT FILE PG 27
CP-409	Kaasda Heen Cir.	278	6	Ductile Iron	125	1998	CJ-184	CJ-185	
CP-62	NE of Fergisun Loop	429	12	Ductile Iron	125	1998	CJ-263	CT-2	
SP-319	Smith St.	1,045	8	HDPE	150	1998	SJ-258	SJ-163	FLAT FILE PG 39
HP-375	Circle E.	440	8	Ductile Iron	125	1999	HJ-17	HJ-157	
CP-313	Indian River Road	350	8	Ductile Iron	125	2000	CJ-208	CJ-253	FLAT FILE PG 37
CP-314	Indian River Road	850	8	Ductile Iron	125	2000	CJ-253	CJ-254	
SP-426	Blueberry lane	554	4	Ductile Iron	125	2001	SJ-226	SJ-227	
SP-422	Cedar Beach Rd.	1,148	8	HDPE	150	2001	SJ-194	SJ-201	
SP-413	Lilian Dr.	1,161	6	Ductile Iron	125	2001	SJ-260	SJ-259	W-136
JP-219	Alice loop	283	8	Ductile Iron	125	2002	JJ-214	JJ-125	
JP-366	Alice loop	508	8	Ductile Iron	125	2002	JJ-208	JJ-214	
JP-210	Charcoal Dr.	245	8	Ductile Iron	125	2002	JJ-120	JJ-208	
JP-364	Charcoal Dr.	265	8	Ductile Iron	125	2002	JJ-22	JJ-120	
HP-333	Granite Cr. Road	1,558	8	HDPE	150	2002	HJ-264	HJ-12	
CP-195	Maksostoff St.	154	8	HDPE	150	2002	CJ-133	CJ-129	FLAT FILE PG 35
SP-411	Marys Court	451	6	Ductile Iron	125	2002	SJ-262	SJ-264	
CP-318	Naomi Kanosh Lane	550	8	Ductile Iron	125	2002	CJ-254	CJ-257	W-135
SP-412	Off Price St.	269	6	HDPE	150	2002	SJ-261	SJ-263	
SP-322	Price St.	706	8	HDPE	150	2002	SJ-167	SJ-261	
SP-323	Price St.	376	8	HDPE	150	2002	SJ-261	SJ-262	
CP-304	John Brady Dr.	772	12	Ductile Iron	125	2004	CJ-204	CJ-251	
CP-303	Off Metlakatla	802	12	Ductile Iron	125	2004	CJ-252	CJ-204	
JP-337	Seward Ave.	2,004	12	Ductile Iron	125	2004	JJ-53	JJ-37	
JP-84	Tongass Dr.	1,167	12	Ductile Iron	125	2004	JJ-92	JJ-20	
SP-441	Beardslee Way	398	8	HDPE	150	2005	SJ-158	SJ-258	
SP-442	Beardslee Way	504	8	HDPE	150	2005	SJ-258	SJ-261	
CP-61	Davidoff St.	548	8	Ductile Iron	125	2005	CJ-224	CJ-51	FLAT FILE PG 28
CP-317	Heab Didrickson St.	648	8	Ductile Iron	125	2005	CJ-255	CJ-257	
CP-315	Yaw DrIve	668	12	Ductile Iron	125	2005	CJ-253	CJ-255	
CP-502	Davidoff St.	570	8	HDPE	150	2006	CJ-56	CJ-52	CIP W4
SP-506	Eliason Lp.	287	8	HDPE	150	2006	SJ-304	SJ-305	
SP-507	Eliason Lp.	616	8	HDPE	150	2006	SJ-305	SJ-306	
SP-504	Eliason Lp.	45	8	HDPE	150	2006	SJ-303	HSPMP-11	
CP-396	Off Lake St.	661	8	HDPE	150	2006	CJ-70	CJ-174	
SP-508	Versa Pl.	635	8	HDPE	150	2006	SJ-305	SJ-307	FLAT FILE SH 9 OF 11
SP-502	Vitskari St.	184	8	HDPE	150	2006	SJ-237	SJ-302	
SP-505	Vitskari St.	118	8	HDPE	150	2006	HSPMP-11	SJ-304	
SP-503	Vitskari St.	263	8	HDPE	150	2006	SJ-302	SJ-303	
JP-400	Sitka Channel	1,636	16	HDPE	150	2009	JJ-53	CJ-101	
CP-503	Halibut Pt. Road	250	16	HDPE	150	2010	CJ-304	CJ-303	CIP W3
HP-406	Cushing St.	93	16	HDPE	150	2010	HJ-304	HJ-303	W-32

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
HP-409	Cushing St.	608	16	HDPE	150	2010	HT-3	HJ-305	W-32
HP-405	Emmons St.	860	16	HDPE	150	2010	HJ-303	HJ-302	W-32
HP-500	Halibut Pt. Road	364	12	Ductile Iron	130	2010	J-35	HJ-164	CIP W3
HP-42	Kramer Ave.	589	16	HDPE	150	2010	HJ-30	HJ-31	M-177
HP-403	Kramer Ave.	274	16	HDPE	150	2010	HJ-301	HJ-300	W-32
HP-404	Kramer Ave.	711	16	HDPE	150	2010	HJ-302	HJ-301	W-32
HP-410	Kramer Ave.	2,589	8	HDPE	150	2010	HJ-306	HT-3	W-32
CP-172	Etolin Way	359	8	HDPE	150	2012	CJ-127	CJ-136	
CP-117	Monastery St.	363	8	HDPE	150	2012	CJ-248	CJ-137	W-107
CP-190	Monastery St.	290	8	HDPE	150	2012	CJ-135	CJ-136	W-107
CP-295	Sawmill Cr. Road	10	8	HDPE	150	2012	CJ-138	CJ-248	W-107
CP-501	Hollywood Wy.	264	8	HDPE	150	2014	CJ-300	CJ-301	FLAT FILE SH 15 OF 21
CP-110	Monastery St.	555	12	HDPE	150	2014	CJ-248	CJ-89	W-33
CP-173	Monastery St.	240	8	HDPE	150	2014	CJ-136	CJ-137	W-107
CP-114	Baranof St.	401	12	HDPE	150	2015	CJ-90	CJ-139	W-132
CP-180	Jeff Davis St.	265	16	HDPE	150	2017	CJ-149	CJ-250	W-22
CP-202	Jeff Davis St.	305	16	HDPE	150	2017	CJ-251	CJ-150	W-22
CP-299	Jeff Davis St.	159	16	HDPE	150	2017	CJ-250	CJ-150	W-22
CP-305	Jeff Davis St.	473	16	HDPE	150	2017	CJ-251	CJ-151	W-22
CP-108	Lake St.	731	12	HDPE	150	2018	CJ-88	CJ-125	CIP W-8
SP-501	Eagle Wy.	627	8	HDPE	150	2018	SJ-300	SJ-301	W-18
CP-197	American St.	140	6	Ductile Iron	125		CJ-132	CJ-134	
CP-167	American St.	170	6	Ductile Iron	125		CJ-122	CJ-134	
CP-141	Andrews St.	534	6	Cast iron	100		CJ-110	CJ-247	W-86
CP-400	Barracks St.	186	6	Ductile Iron	125		CJ-121	CJ-178	
CP-177	Biorka St.	676	6	Ductile Iron	125		CJ-140	CJ-147	
CP-41	Cascade Cr. Drive	284	12	Cast iron	100		CJ-37	CJ-38	W-63, W-104
CP-43	Cascade Cr. Drive	132	12	Cast iron	100		CJ-36	CPRV-1	W-63, W-104
CP-42	Cascade Cr. Drive	30	12	Cast iron	100		CPRV-1	CJ-37	W-63, W-104
SP-419	Chirikov Dr.	508	10	Ductile Iron	125		SJ-267	SJ-266	
CP-301	Crescent Dr.	313	8	Ductile Iron	125		CJ-250	CJ-206	
HP-18	Darrin Dr.	884	6	Cast iron	100		HJ-18	HJ-19	
CP-142	DeArmond St.	406	6	Cast iron	100		CJ-247	CJ-111	W-86
CP-294	DeArmond St.	175	6	Cast iron	100		CJ-247	CJ-115	
CP-432	Gibson Pl	569	4	Ductile Iron	125		CJ-229	CJ-230	
CP-129	Halibut Pt. Road	623	8	Cast iron	100		CJ-93	CJ-92	
CP-59	Halibut Pt. Road	363	8	Ductile Iron	125		CJ-41	CJ-43	W-109
HP-381	Halibut Pt. Road	90	4	Ductile Iron	125		HJ-160	HJ-161	
JP-78	Harbor Dr.	149	10	Cast iron	100		JJ-77	JJ-10	
JP-77	Harbor Dr.	202	10	Ductile Iron	125		JJ-76	JJ-77	
JP-348	Harbor Dr.	1,008	16	Ductile Iron	125		JJ-1	JJ-9	
CP-103	Hirst St.	335	6	Cast iron	100		CJ-87	CJ-86	
CP-402	Hirst St.	99	6	Cast iron	100		CJ-86	CJ-180	
CP-291	Kashevaroff St.	420	8	Ductile Iron	125		CJ-57	CJ-245	
CP-99	Kincaid St.	257	6	Cast iron	100		CJ-85	CJ-84	FLAT FILE PG 36
JP-349	Lifesaver Dr.	911	10	Asbestos Cement	125		JJ-98	JJ-109	
JP-101	Livesaver Dr.	86	10	Asbestos Cement	125		JJ-97	JJ-98	
CP-60	Mills St.	354	6	Cast iron	100		CJ-197	CJ-56	
CP-104	Monastery St.	390	6	Cast iron	100		CJ-86	CJ-85	
CP-96	Monastery St.	190	8	Ductile Iron	125		CJ-80	CJ-81	
CP-98	Monastery St.	794	6	Cast iron	100		CJ-81	CJ-85	
JP-370	Off Alice loop	690	8	Ductile Iron	125		JJ-214	JJ-210	
HP-378	Off Circle E	330	6	Ductile Iron	125		HJ-158	HJ-159	
CP-302	Off Crescent Dr.	634	8	Ductile Iron	125		CJ-206	CJ-205	
CP-297	Off Park St.	300	4	Ductile Iron	125		CJ-249	CJ-148	
JP-34	Off Seward Ave.	320	8	Asbestos Cement	125		JJ-33	JJ-34	
JP-152	Off Seward Ave.	274	8	Ductile Iron	125		JJ-33	JJ-147	
JP-353	Off Seward Ave.	689	8	Ductile Iron	125		JJ-159	JJ-34	
JP-153	Off Seward Ave.	59	8	Ductile Iron	125		JJ-147	JJ-148	
JP-154	Off Seward Ave.	339	8	Asbestos Cement	125		JJ-148	JJ-149	
JP-155	Off Seward Ave.	275	8	Asbestos Cement	125		JJ-149	JJ-150	
JP-156	Off Seward Ave.	216	8	HDPE	150		JJ-150	JJ-151	
JP-354	Off Seward Ave.	548	8	Asbestos Cement	125		JJ-34	JJ-151	

TABLE 2
SITKA WATER SYSTEM PIPE INVENTORY
BY DATE OF PIPE

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-397	Off Verstovia St.	300	6	Ductile Iron	125		CJ-72	CJ-175	
SP-509	Sawmill Cr. Road	10,500	12	Ductile Iron	125		SJ-228	SJ-229	
JP-363	Seward Ave.	603	10	Cast iron	100		JJ-76	JJ-73	
CP-394	Sigtnaka Way	261	6	Cast iron	100		CJ-100	CJ-172	
CP-395	Sigtnaka Way	627	4	Ductile Iron	125		CJ-172	CJ-173	

TABLE 3
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE MATERIAL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
JP-340	Lifesaver Dr.	672	10	Asbestos Cement	125	1970-1980s	JJ-118	JJ-98	
JP-100	Lifesaver Dr.	88	10	Asbestos Cement	125	1992	JJ-30	JJ-97	HNG FILE
JP-349	Lifesaver Dr.	911	10	Asbestos Cement	125		JJ-98	JJ-109	
JP-101	Livesaver Dr.	86	10	Asbestos Cement	125		JJ-97	JJ-98	
JP-34	Off Seward Ave.	320	8	Asbestos Cement	125		JJ-33	JJ-34	
JP-154	Off Seward Ave.	339	8	Asbestos Cement	125		JJ-148	JJ-149	
JP-155	Off Seward Ave.	275	8	Asbestos Cement	125		JJ-149	JJ-150	
JP-354	Off Seward Ave.	548	8	Asbestos Cement	125		JJ-34	JJ-151	
CP-49	H.P.R at Cascade Ave.	33	8	Cast iron	100	1963	CJ-267	CJ-40	W-96
CP-57	Halibut Pt. Road	437	8	Cast iron	100	1963	CJ-302	CJ-41	W-96
CP-171	Lake St.	334	12	Cast iron	100	1965	CJ-127	CJ-126	S-53
CP-119	Lake St.	312	12	Cast iron	100	1965	CJ-126	CJ-125	S-53
CP-192	Lake St.	268	12	Cast iron	100	1965	CJ-128	CJ-127	S-53
CP-120	Halibut Pt. Road	159	16	Cast iron	100	1966	CJ-125	CJ-119	S-177
CP-115	Sawmill Cr. Road	768	16	Cast iron	100	1966	CJ-139	CJ-148	S-177
CP-207	Sawmill Cr. Road	176	18	Cast iron	100	1966	TJ-8	CJ-154	S177
CP-109	Sawmill Cr. Road	513	16	Cast iron	100	1966	CJ-125	CJ-138	S-177
CP-179	Sawmill Cr. Road	676	16	Cast iron	100	1966	CJ-148	CJ-149	S-177
CP-206	Sawmill Cr. Road	237	18	Cast iron	100	1966	CJ-149	TJ-8	S-177
CP-116	Sawmill Cr. Road	285	16	Cast iron	100	1966	CJ-139	CJ-138	S-177
JP-207	Airport Rd.	223	8	Cast iron	100	1967	JJ-205	JJ-206	M-52
JP-209	Airport Rd.	243	6	Cast iron	100	1967	JJ-206	JJ-207	M-52
JP-208	Airport Rd.	133	8	Cast iron	100	1967	JJ-206	JJ-203	M-52
JP-206	Airport Rd.	403	8	Cast iron	100	1967	JJ-138	JJ-205	M-52
JP-351	Airport Rd.	800	8	Cast iron	100	1967	JJ-144	JJ-141	M-52
JP-352	Airport Rd.	432	8	Cast iron	100	1967	JJ-141	JJ-138	M-52
CP-298	Biorka St.	631	8	Cast iron	100	1967	CJ-147	CJ-271	W-88
JP-350	Off Seward Ave.	351	8	Cast iron	100	1967	JJ-147	JJ-144	M-52
CP-296	Merrill Street	868	6	Cast iron	100	1967, 1975	CJ-91	CJ-249	W-94, S-93
CP-56	Charteris St.	390	14	Cast iron	100	1968	CJ-48	CJ-224	W-46
CP-54	Charteris St.	437	14	Cast iron	100	1968	CJ-243	CJ-48	W-46
CP-277	Charteris St.	342	14	Cast iron	100	1968	CJ-47	CJ-243	W-46, W-47
CP-500	DeGroff St.	203	10	Cast iron	100	1968	CJ-89	CJ-300	W-34
CP-106	DeGroff St.	188	10	Cast iron	100	1968	CJ-300	CJ-88	W-34
CP-73	Edgecumbe Dr.	470	12	Cast iron	100	1968	CJ-58	CJ-61	W-43
CP-64	Edgecumbe Dr.	1,082	12	Cast iron	100	1968	CJ-56	CJ-57	W-43
CP-65	Edgecumbe Dr.	784	12	Cast iron	100	1968	CJ-57	CJ-58	W-43
CP-63	Edgecumbe Dr.	1,077	12	Cast iron	100	1968	CJ-48	CJ-56	W-45
CP-182	Finn Alley	573	8	Cast iron	100	1968	CJ-145	CJ-144	W-20
CP-332	Georgeson loop	781	14	Cast iron	100	1968	CJ-263	CJ-270	W-47
CP-83	Halibut Pt. Rd.	667	14	Cast iron	100	1968	CJ-63	CJ-92	W-40
CP-74	Halibut Pt. Road	367	14	Cast iron	100	1968	CJ-55	CJ-63	W-40
CP-200	Harbor Dr.	567	12	Cast iron	100	1968	CJ-130	CJ-129	W-24
CP-157	Katlian Ave	267	12	Cast iron	100	1968	CJ-105	CJ-106	W-25
CP-159	Katlian Ave	362	12	Cast iron	100	1968	CJ-107	CJ-108	W-26
CP-158	Katlian Ave	443	12	Cast iron	100	1968	CJ-106	CJ-107	W-25
CP-161	Katlian Ave	389	12	Cast iron	100	1968	CJ-108	CJ-131	W-25
CP-153	Katlian Ave.	511	12	Cast iron	100	1968	CJ-102	CJ-104	W-31
CP-130	Katlian Ave.	655	12	Cast iron	100	1968	CJ-92	CJ-100	W-32
CP-131	Katlian Ave.	224	12	Cast iron	100	1968	CJ-100	CJ-101	W-32
CP-132	Katlian Ave.	1,021	12	Cast iron	100	1968	CJ-101	CJ-102	W-31, W-32
CP-155	Katlian Ave.	243	12	Cast iron	100	1968	CJ-104	CJ-105	W-31
CP-82	Lake St.	296	10	Cast iron	100	1968	CJ-70	CJ-71	W-37
CP-101	Lake St.	708	10	Cast iron	100	1968	CJ-83	CJ-71	W-37, W-36
CP-102	Lake St.	404	10	Cast iron	100	1968	CJ-84	CJ-87	W-34
CP-100	Lake St.	980	10	Cast iron	100	1968	CJ-82	CJ-83	W-36, W-35
CP-107	Lake St.	173	10	Cast iron	100	1968	CJ-88	CJ-87	W-34
CP-285	Lake St.	433	10	Cast iron	100	1968	CJ-82	CJ-84	W-35
CP-136	Marine St.	270	10	Cast iron	100	1968	CJ-98	CJ-112	W-28
CP-145	Marine St.	380	10	Cast iron	100	1968	CJ-116	CJ-120	W-27
CP-144	Marine St.	628	10	Cast iron	100	1968	CJ-116	CJ-112	W-28
CP-163	Marine St.	700	10	Cast iron	100	1968	CJ-121	CJ-120	W-26
CP-138	New Archangel St.	228	8	Cast iron	100	1968	CJ-112	CJ-111	W-30

TABLE 3
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE MATERIAL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-140	New Archangel St.	263	8	Cast iron	100	1968	CJ-110	CJ-103	W-30
CP-137	New Archangel St.	258	8	Cast iron	100	1968	CJ-112	CJ-113	W-30
CP-139	New Archangel St.	237	8	Cast iron	100	1968	CJ-111	CJ-110	W-30
CP-169	Observatory St.	459	8	Cast iron	100	1968	CJ-123	CJ-124	W-23
CP-134	O'Cain St.	222	6	Cast iron	100	1968	CJ-103	CJ-99	W-29
CP-160	Off Katlian Ave	116	10	Cast iron	100	1968	CJ-108	CJ-109	W-26
CP-199	Off Lincoln St.	503	12	Cast iron	100	1968	CJ-131	CJ-130	W-24
CP-156	off of Erler St.	404	12	Cast iron	100	1968	CJ-105	CJ-115	W-27
CP-135	Osprey St.	730	6	Cast iron	100	1968	CJ-99	CJ-98	W-29
CP-80	Peterson St.	151	10	Cast iron	100	1968	CJ-70	CJ-68	W-37
CP-79	Peterson St.	722	10	Cast iron	100	1968	CJ-61	CJ-68	W-41
CP-72	Peterson St.	505	10	Cast iron	100	1968	CJ-246	CJ-61	W-41
CP-293	Peterson St.	192	10	Cast iron	100	1968	CJ-246	CJ-55	W-41
CP-162	Seward St.	220	10	Cast iron	100	1968	CJ-109	CJ-121	W-26
CP-113	DeGroff St.	897	6	Cast iron	100	1970	CJ-90	CJ-148	W-9
CP-111	DeGroff St.	345	6	Cast iron	100	1970	CJ-89	CJ-90	W-10
CP-112	Baranof St.	207	6	Cast iron	100	1971	CJ-90	CJ-91	W-11
CP-312	Indian River Road	1,374	18	Cast iron	100	1971	CJ-208	CJ-155	FLAT FILE PG 37
CP-308	Indian River Road	452	18	Cast iron	100	1971	CJ-207	CJ-208	FLAT FILE PG 37
CP-407	Indian River Road	840	18	Cast iron	100	1971	CJ-154	CJ-184	FLAT FILE PG 37
CP-408	Indian River Road	875	18	Cast iron	100	1971	CJ-184	CJ-207	FLAT FILE PG 37
CP-47	Dodge Cir.	738	12	Cast iron	100	1972	CJ-35	CJ-36	W-64, W-104
CP-51	Edgecumbe Dr.	420	12	Cast iron	100	1972	CJ-45	CJ-44	W-62, W-109
CP-50	Edgecumbe Dr.	1,047	12	Cast iron	100	1972	CJ-38	CJ-44	W-104, W-64
CP-40	Edgecumbe Dr.	2,041	12	Cast iron	100	1972	CJ-38	CJ-39	W-65, W-63, W-104
CP-346	Edgecumbe Dr.	50	12	Cast iron	100	1972	CPMP-1	CJ-272	W-62, W-109
CP-336	Edgecumbe Dr.	147	12	Cast iron	100	1972	CJ-272	CJ-45	W-62, W-109
CP-430	Edgecumbe Dr.	227	12	Cast iron	100	1972	CJ-48	CJ-230	W-62, W-104
CP-431	Edgecumbe Dr.	126	12	Cast iron	100	1972	CJ-230	CPMP-1	W-62, W-109
SP-229	Sawmill Cr. Road	683	14	Cast iron	100	1972	SJ-177	SJ-178	W-67
SP-236	Sawmill Cr. Road	941	14	Cast iron	100	1972	SJ-179	SJ-180	W-66
CP-209	Sawmill Cr. Road	2,406	14	Cast iron	100	1972	CJ-154	SJ-156	W-72
SP-212	Sawmill Cr. Road	1,044	14	Cast iron	100	1972	SJ-156	SJ-162	W-70
SP-223	Sawmill Cr. Road	550	14	Cast iron	100	1972	SJ-172	SJ-173	W-68
SP-221	Sawmill Cr. Road	511	14	Cast iron	100	1972	SJ-170	SJ-172	W-68
SP-235	Sawmill Cr. Road	512	14	Cast iron	100	1972	SJ-178	SJ-179	W-66
SP-417	Sawmill Cr. Road	213	14	Cast iron	100	1972	SJ-173	SJ-267	W-68
SP-418	Sawmill Cr. Road	1,417	14	Cast iron	100	1972	SJ-267	SJ-177	W-68, W-67
SP-214	Sawmill Cr. Road	591	14	Cast iron	100	1972	SJ-162	SJ-300	W-70
SP-500	Sawmill Cr. Road	310	14	Cast iron	100	1972	SJ-300	SJ-165	W-70
CP-175	Baranof St.	179	6	Cast iron	100	1975	CJ-141	CJ-140	W-106
HP-43	Halibut Pt Road	325	12	Cast iron	100	1977	HJ-30	HJ-32	W-60
HP-40	Halibut Pt. Road	790	12	Cast iron	100	1977	HJ-28	HJ-29	W-58
HP-6	Halibut Pt. Road	226	12	Cast iron	100	1977	HJ-6	HJ-265	W-92
HP-39	Halibut Pt. Road	872	12	Cast iron	100	1977	HJ-27	HJ-28	W-58
HP-20	Halibut Pt. Road	1,165	12	Cast iron	100	1977	HJ-20	HJ-21	W-55
HP-7	Halibut Pt. Road	1,727	12	Cast iron	100	1977	HJ-6	HJ-8	W-92
HP-10	Halibut Pt. Road	688	12	Cast iron	100	1977	HJ-10	HJ-11	W-50
HP-35	Halibut Pt. Road	461	12	Cast iron	100	1977	HJ-21	HJ-24	W-55
HP-38	Halibut Pt. Road	1,433	12	Cast iron	100	1977	HJ-26	HJ-27	W-57
HP-16	Halibut Pt. Road	546	12	Cast iron	100	1977	HJ-14	HJ-17	W-53
HP-9	Halibut Pt. Road	1,551	12	Cast iron	100	1977	HJ-8	HJ-10	W-93
HP-13	Halibut Pt. Road	1,334	12	Cast iron	100	1977	HJ-14	HJ-12	W-52
HP-12	Halibut Pt. Road	394	12	Cast iron	100	1977	HJ-12	HJ-13	W-52
HP-11	Halibut Pt. Road	1,396	12	Cast iron	100	1977	HJ-11	HJ-13	W-51
HP-334	Halibut Pt. Road	637	6	Cast iron	100	1977	HJ-7	HJ-265	W-92
HP-376	Halibut Pt. Road	294	12	Cast iron	100	1977	HJ-17	HJ-158	W-54
HP-377	Halibut Pt. Road	432	12	Cast iron	100	1977	HJ-158	HJ-18	W-54
HP-379	Halibut Pt. Road	155	12	Cast iron	100	1977	HJ-18	HJ-160	W-54
HP-380	Halibut Pt. Road	455	12	Cast iron	100	1977	HJ-160	HJ-20	W-54
HP-386	Halibut Pt. Road	607	12	Cast iron	100	1977	HJ-164	HJ-26	W-56
HP-388	Halibut Pt. Road	1,066	12	Cast iron	100	1977	HJ-29	HJ-166	W-59
HP-389	Halibut Pt. Road	610	12	Cast iron	100	1977	HJ-166	HJ-30	W-60

TABLE 3
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE MATERIAL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-45	Halibut Pt. Road	524	12	Cast iron	100	1977	CJ-303	CJ-34	W-60, W-61
CP-504	Halibut Pt. Road	459	12	Cast iron	100	1977	HJ-32	CJ-304	W-60, W-61
HP-385	Halibut Pt. Road	434	12	Cast iron	100	1977	HJ-24	J-35	W-56
CP-46	West of Dodge Cir.	589	12	Cast iron	100	1977	CJ-34	CJ-35	W-61, W-104
HP-5	Halibut Pt. Road	972	12	Cast iron	100	1989	HJ-5	HJ-6	W-92
JP-142	Lifesaver Dr.	53	8	Cast iron	100	1992	JJ-30	JJ-138	HNG FILE
CP-141	Andrews St.	534	6	Cast iron	100		CJ-110	CJ-247	W-86
CP-41	Cascade Cr. Drive	284	12	Cast iron	100		CJ-37	CJ-38	W-63, W-104
CP-43	Cascade Cr. Drive	132	12	Cast iron	100		CJ-36	CPRV-1	W-63, W-104
CP-42	Cascade Cr. Drive	30	12	Cast iron	100		CPRV-1	CJ-37	W-63, W-104
HP-18	Darrin Dr.	884	6	Cast iron	100		HJ-18	HJ-19	
CP-142	DeArmond St.	406	6	Cast iron	100		CJ-247	CJ-111	W-86
CP-294	DeArmond St.	175	6	Cast iron	100		CJ-247	CJ-115	
CP-129	Halibut Pt. Road	623	8	Cast iron	100		CJ-93	CJ-92	
JP-78	Harbor Dr.	149	10	Cast iron	100		JJ-77	JJ-10	
CP-103	Hirst St.	335	6	Cast iron	100		CJ-87	CJ-86	
CP-402	Hirst St.	99	6	Cast iron	100		CJ-86	CJ-180	
CP-99	Kincaid St.	257	6	Cast iron	100		CJ-85	CJ-84	FLAT FILE PG 36
CP-60	Mills St.	354	6	Cast iron	100		CJ-197	CJ-56	
CP-104	Monastery St.	390	6	Cast iron	100		CJ-86	CJ-85	
CP-98	Monastery St.	794	6	Cast iron	100		CJ-81	CJ-85	
JP-363	Seward Ave.	603	10	Cast iron	100		JJ-76	JJ-73	
CP-394	Sigtnaka Way	261	6	Cast iron	100		CJ-100	CJ-172	
CP-292	Kimsham st.	524	2	Copper	140	1980	CJ-58	CJ-246	W-115
CP-178	Park St.	235	6	Ductile Iron	125	1967	CJ-147	CJ-148	
CP-343	Charteris St.	68	6	Ductile Iron	125	1968	CJ-270	CJ-47	W-47
CP-193	Harbor Dr.	738	12	Ductile Iron	125	1968	CJ-128	CJ-129	W-24
CP-133	New Archangel St.	239	8	Ductile Iron	125	1968	CJ-102	CJ-103	W-30
CP-118	Oja Way	499	6	Ductile Iron	125	1969	CJ-137	CJ-126	W-131
JP-9	Harbor Dr.	145	16	Ductile Iron	125	1970s Early	JJ-9	JJ-10	
SP-220	Sawmill Cr. Road	628	14	Ductile Iron	125	1972	SJ-170	SJ-165	W-69
CP-393	Wachusetts Wt.	826	6	Ductile Iron	125	1974	CJ-58	CJ-171	W-128
CP-184	Baranof St.	189	6	Ductile Iron	125	1975	CJ-142	CJ-141	W-106
CP-187	Baranof St.	318	6	Ductile Iron	125	1975	CJ-142	CJ-143	W-106
CP-176	Baranof St.	231	6	Ductile Iron	125	1975	CJ-140	CJ-139	W-106
CP-75	Brady St.	316	8	Ductile Iron	125	1975	CJ-63	CJ-64	W-109
CP-81	Cascade St.	1,008	8	Ductile Iron	125	1975	CJ-65	CJ-68	W-109
CP-76	Gavin St.	202	8	Ductile Iron	125	1975	CJ-64	CJ-65	W-109
CP-122	Halibut Pt. Road	388	8	Ductile Iron	125	1975	CJ-113	CJ-98	W-109
CP-70	Halibut Pt. Road	426	8	Ductile Iron	125	1975	CJ-53	CJ-245	W-109
CP-123	Halibut Pt. Road	98	8	Ductile Iron	125	1975	CJ-98	CJ-97	W-109
CP-127	Halibut Pt. Road	431	8	Ductile Iron	125	1975	CJ-95	CJ-93	W-109
CP-121	Halibut Pt. Road	1,116	8	Ductile Iron	125	1975	CJ-119	CJ-113	W-109
CP-125	Halibut Pt. Road	230	8	Ductile Iron	125	1975	CJ-97	CJ-95	W-109
CP-71	Halibut Pt. Road	406	8	Ductile Iron	125	1975	CJ-54	CJ-55	W-109
CP-68	Halibut Pt. Road	1,518	8	Ductile Iron	125	1975	CJ-43	CJ-52	W-109
CP-69	Halibut Pt. Road	672	8	Ductile Iron	125	1975	CJ-52	CJ-53	W-109
CP-290	Halibut Pt. Road	547	8	Ductile Iron	125	1975	CJ-54	CJ-245	W-109
HP-15	Shuler Dr.	458	6	Ductile Iron	125	1975	HJ-14	HJ-16	W-105
CP-97	Sirstad St.	1,242	8	Ductile Iron	125	1975	CJ-81	CJ-72	W-103
CP-84	Verstovia Ave.	304	8	Ductile Iron	125	1975	CJ-71	CJ-72	W-103
SP-224	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-173	SJ-174	W-98
SP-227	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-176	SJ-174	W-98
SP-225	Wolff Dr.	591	6	Ductile Iron	125	1975-Post	SJ-174	SJ-175	
SP-226	Wolff Dr.	412	6	Ductile Iron	125	1975-Post	SJ-175	SJ-176	W-98
SP-325	Jamestown Dr.	474	8	Ductile Iron	125	1977	SJ-178	SJ-214	S-124, S-125
SP-326	Jamestown Dr.	573	8	Ductile Iron	125	1977	SJ-214	SJ-215	S-124, S-125
SP-435	Lance Dr.	323	6	Ductile Iron	125	1978	SJ-168	SJ-232	S-128
CP-58	Shelikof Way	561	6	Ductile Iron	125	1978	CJ-223	CJ-42	S-123
CP-271	Shelikof Way	10	6	Ductile Iron	125	1978	CJ-222	CJ-223	S-123
CP-272	Shelikof Way	54	6	Ductile Iron	125	1978	CJ-223	CJ-41	S-123
HP-373	Valhalla Dr.	229	6	Ductile Iron	125	1978	HJ-155	HJ-9	W-108
HP-374	Valhalla Dr.	141	6	Ductile Iron	125	1978	HJ-9	HJ-156	W-108

TABLE 3
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE MATERIAL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
HP-8	Viking Way	295	6	Ductile Iron	125	1978	HJ-8	HJ-9	W-108
CP-95	A Street	372	6	Ductile Iron	125	1979	CJ-79	CJ-73	S-130
CP-89	Charles St.	165	10	Ductile Iron	125	1979	CJ-75	CJ-77	S-130
CP-300	Charles St.	400	6	Ductile Iron	125	1979	CJ-75	CJ-62	S-130
CP-77	Gavin St.	439	6	Ductile Iron	125	1979	CJ-65	CJ-66	W-110
CP-506	Halibut Pt. Road	52	6	Ductile Iron	125	1979	J-36	CJ-43	
SP-245	Islander Dr.	1,086	6	Ductile Iron	125	1979	SJ-188	SJ-189	W-111, 112, 113
SP-433	Lance Dr.	291	6	Ductile Iron	125	1979	SJ-168	SJ-231	S-129
SP-434	Lance Dr.	523	6	Ductile Iron	125	1979	SJ-231	SJ-170	S-129
CP-78	Moller Ave.	422	6	Ductile Iron	125	1979	CJ-66	CJ-67	W-110
CP-94	Monastery St.	344	8	Ductile Iron	125	1979	CJ-79	CJ-80	S-130
CP-93	Monastery St.	254	8	Ductile Iron	125	1979	CJ-74	CJ-79	S-130
CP-91	Pherson St.	373	8	Ductile Iron	125	1979	CJ-62	CJ-77	S-130
CP-92	Pherson St.	350	8	Ductile Iron	125	1979	CJ-62	CJ-80	S-130
CP-85	Verstovia Ave.	545	10	Ductile Iron	125	1979	CJ-72	CJ-73	S-130
CP-86	Verstovia Ave.	214	10	Ductile Iron	125	1979	CJ-73	CJ-74	S-130
CP-87	Verstovia Ave.	277	10	Ductile Iron	125	1979	CJ-74	CJ-75	S-130
CP-53	Wortman Loop	710	6	Ductile Iron	125	1979	CJ-242	CJ-46	S-115
CP-52	Wortman Loop	934	6	Ductile Iron	125	1979	CJ-44	CJ-46	S-114
CP-126	Crabapple Dr.	450	6	Ductile Iron	125	1980	CJ-95	CJ-96	W-117
CP-181	Etolin St.	410	8	Ductile Iron	125	1980	CJ-150	CJ-145	W-116
CP-405	Etolin St.	321	8	Ductile Iron	125	1980	CJ-145	CJ-183	W-116
CP-406	Etolin St.	473	6	Ductile Iron	125	1980	CJ-183	CJ-142	W-116
CP-185	Oja St.	552	6	Ductile Iron	125	1980	CJ-141	CJ-146	W-116
CP-186	Park St.	242	6	Ductile Iron	125	1980	CJ-146	CJ-147	W-116
SP-248	Sawmill Cr. Road	1,428	12	Ductile Iron	125	1980	SJ-191	SJ-192	W-118
SP-246	Sawmill Cr. Road	1,354	12	Ductile Iron	125	1980	SJ-186	SJ-190	W-118
SP-249	Sawmill Cr. Road	4	12	Ductile Iron	125	1980	SJ-192	SJ-196	W-118
SP-242	Sawmill Cr. Road	1,246	14	Ductile Iron	125	1980	SJ-183	SJ-186	W-118
SP-331	Sawmill Cr. Road	776	8	Ductile Iron	125	1980	SJ-196	SJ-216	W-118
SP-420	Sawmill Cr. Road	78	14	Ductile Iron	125	1980	SJ-180	SJ-194	W-118
SP-421	Sawmill Cr. Road	101	14	Ductile Iron	125	1980	SJ-194	SJ-183	W-118
SP-424	Sawmill Cr. Road	1,843	12	Ductile Iron	125	1980	SJ-190	SJ-226	W-118
SP-425	Sawmill Cr. Road	625	12	Ductile Iron	125	1980	SJ-226	SJ-191	W-118
SP-243	Shotgun Alley	800	8	Ductile Iron	125	1980	SJ-186	SJ-187	W-118
SP-244	Shotgun Alley	1,051	8	Ductile Iron	125	1980	SJ-187	SJ-188	W-118
SP-436	Lance Dr.	592	6	Ductile Iron	125	1981	SJ-232	SJ-169	S-133
HP-31	Nicole Dr.	275	10	Ductile Iron	125	1981	HJ-21	HJ-221	W-122
HP-22	Nicole Dr.	182	10	Ductile Iron	125	1981	HJ-221	HJ-22	W-122
HP-24	Patterson Way	364	6	Ductile Iron	125	1981	HJ-22	HJ-23	W-122
HP-23	Somer Dr.	257	6	Ductile Iron	125	1981	HJ-221	HJ-223	W-122
CP-154	Kaagwaantaan St.	1,414	8	Ductile Iron	125	1982	CJ-104	CJ-109	S-135
CP-67	Furuhelm St.	620	8	Ductile Iron	125	1983	CJ-59	CJ-60	S-136
HP-290	Harbor Mtn. Rd.	10	18	Ductile Iron	125	1983	HT-1	HJ-15	W-121
HP-14	Harbor Mtn. Road	2,372	18	Ductile Iron	125	1983	HJ-14	HJ-15	W-121
CP-66	Kimsham St.	406	8	Ductile Iron	125	1983	CJ-58	CJ-60	S-136
SP-213	Smith St.	447	8	Ductile Iron	125	1983	SJ-162	SJ-163	FLAT FILE PG 39
CP-392	Tilson St.	466	6	Ductile Iron	125	1983	CJ-60	CJ-170	S-136
JP-62	Off Seward Ave.	92	6	Ductile Iron	125	1984	JJ-61	JJ-62	S-154
JP-57	Off Seward Ave.	156	10	Ductile Iron	125	1984	JJ-56	JJ-57	S-154
JP-59	Off Seward Ave.	157	8	Ductile Iron	125	1984	JJ-58	JJ-59	S-154
JP-61	Off Seward Ave.	132	6	Ductile Iron	125	1984	JJ-60	JJ-61	S-154
JP-60	Off Seward Ave.	222	10	Ductile Iron	125	1984	JJ-58	JJ-60	S-154
JP-58	Off Seward Ave.	90	10	Ductile Iron	125	1984	JJ-57	JJ-58	S-154
JP-67	Seward Ave.	72	6	Ductile Iron	125	1984	JJ-66	JJ-67	S-154
JP-222	Seward Ave.	31	12	Ductile Iron	125	1984	JJ-215	JJ-73	S-154
JP-66	Seward Ave.	54	6	Ductile Iron	125	1984	JJ-65	JJ-66	S-154
JP-357	Seward Ave.	301	10	Ductile Iron	125	1984	JJ-215	JJ-70	S-154
JP-358	Seward Ave.	590	12	Ductile Iron	125	1984	JJ-70	JJ-65	S-154
JP-359	Seward Ave.	165	12	Ductile Iron	125	1984	JJ-65	JJ-56	S-154
JP-360	Seward Ave.	454	12	Ductile Iron	125	1984	JJ-56	JJ-53	S-154
JP-362	Seward Ave.	129	6	Ductile Iron	125	1984	JJ-227	JJ-215	S-154
JP-355	Tongass Dr.	671	12	Ductile Iron	125	1984	JJ-53	JJ-92	S-154

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
JP-139	Alice loop	123	12	Ductile Iron	125	1985	JJ-130	JJ-135	W-124
JP-367	Alice loop	676	8	Ductile Iron	125	1985	JJ-125	JJ-130	W-124
JP-368	Alice loop	564	8	Ductile Iron	125	1985	JJ-130	JJ-127	W-124
JP-369	Alice loop	699	8	Ductile Iron	125	1985	JJ-127	JJ-125	W-124
SP-238	Anna Dr.	365	8	Ductile Iron	125	1985	SJ-181	SJ-182	S-151
SP-239	Anna Dr.	394	6	Ductile Iron	125	1985	SJ-181	SJ-185	S-151
SP-237	Anna Dr.	176	8	Ductile Iron	125	1985	SJ-180	SJ-181	S-151
CP-404	Kelly St.	237	6	Ductile Iron	125	1985	CJ-152	CJ-182	S-146, SH 9
CP-189	Lincoln St.	284	8	Ductile Iron	125	1985	CJ-143	CJ-135	S-147, SH 52
CP-198	Lincoln St.	515	10	Ductile Iron	125	1985	CJ-132	CJ-131	S-147
CP-196	Lincoln St.	204	10	Ductile Iron	125	1985	CJ-133	CJ-132	S-147
CP-191	Lincoln St.	293	8	Ductile Iron	125	1985	CJ-135	CJ-128	S-147, SH 51
CP-188	Lincoln St.	651	8	Ductile Iron	125	1985	CJ-143	CJ-144	S-147, SH 52
CP-201	Lincoln St.	364	8	Ductile Iron	125	1985	CJ-144	CJ-151	S-147, SH 53
CP-203	Lincoln St.	1,104	6	Ductile Iron	125	1985	CJ-151	CJ-152	S-146, SH 9
CP-194	Lincoln St.	623	10	Ductile Iron	125	1985	CJ-128	CJ-133	S-147
CP-403	Lincoln St.	106	6	Ductile Iron	125	1985	CJ-144	CJ-181	S-147, SH 53
CP-204	Metlakatla St.	650	6	Ductile Iron	125	1985	CJ-152	CJ-153	S-146, SH 9
JP-216	Off Alice Loop	534	8	Ductile Iron	125	1985	JJ-210	JJ-212	
JP-213	Off Alice loop	104	8	Ductile Iron	125	1985	JJ-209	JJ-210	
JP-212	Off Alice loop	216	8	Ductile Iron	125	1985	JJ-208	JJ-209	
SP-423	Rands Dr.	429	6	Ductile Iron	125	1985	SJ-187	SJ-225	S-145
HP-384	Barker St.	330	6	Ductile Iron	125	1986	HJ-162	HJ-163	S-150
SP-217	Burkhart St.	660	6	Ductile Iron	125	1986	SJ-166	SJ-168	S-164
HP-382	Halibut Pt. Road	210	6	Ductile Iron	125	1986	HJ-24	HJ-162	S-150
SP-215	Price St.	362	12	Ductile Iron	125	1986	SJ-260	SJ-166	S-164
SP-320	Price St.	114	12	Ductile Iron	125	1986	SJ-260	SJ-259	S-164
SP-321	Price St.	136	12	Ductile Iron	125	1986	SJ-259	SJ-165	S-164
HP-383	Ross St.	377	6	Ductile Iron	125	1986	HJ-162	HJ-25	S-150
CP-168	Seward St.	140	10	Ductile Iron	125	1986	CJ-122	CJ-123	S-149
CP-165	Seward St.	190	10	Ductile Iron	125	1986	CJ-121	CJ-122	S-149
CP-150	Erler St.	256	10	Ductile Iron	125	1987	CJ-118	CJ-117	S-157
CP-151	Erler St.	417	10	Ductile Iron	125	1987	CJ-118	CJ-119	S-157
CP-146	Erler St.	271	10	Ductile Iron	125	1987	CJ-116	CJ-117	S-157
CP-143	Erler St.	220	10	Ductile Iron	125	1987	CJ-115	CJ-116	S-157
HP-4	Halibut Pt. Road	519	12	Ductile Iron	125	1987	HJ-4	HJ-5	S-159
SP-438	Jarvis St	450	8	Ductile Iron	125	1987	SJ-233	SJ-157	S-155
SP-288	Jarvis St.	593	8	Ductile Iron	125	1987	SJ-158	SJ-159	S-155
SP-211	Jarvis St.	642	8	Ductile Iron	125	1987	SJ-157	SJ-158	S-155
SP-437	Jarvis St.	251	8	Ductile Iron	125	1987	SJ-156	SJ-233	
CP-287	Kashevaroff St.	328	8	Ductile Iron	125	1987	CJ-59	CJ-203	FLAT FILE PG 29
CP-288	Kashevaroff St.	240	6	Ductile Iron	125	1987	CJ-59	CJ-244	
CP-289	Kashevaroff St.	165	6	Ductile Iron	125	1987	CJ-244	CJ-202	
HP-390	Sand dollar Dr.	794	6	Ductile Iron	125	1987	HJ-166	HJ-167	FLAT FILE PG 26
SP-222	Sawmill Cr. Road	24	12	Ductile Iron	125	1987	SJ-172	TJ-4	W-125, SH 2
SP-241	Sawmill Cr. Road	15	12	Ductile Iron	125	1987	SJ-183	TJ-3	W-125
SP-280	Sawmill Cr. Road	30	12	Ductile Iron	125	1987	SJ-192	TJ-2	W-125
SP-410	Harvest Way	295	6	Ductile Iron	125	1988	SJ-167	SJ-265	WW-730
CP-149	Hemlock St.	755	6	Ductile Iron	125	1988	CJ-114	CJ-118	W-130
CP-128	Lakeview Dr.	1,327	6	Ductile Iron	125	1988	CJ-93	CJ-94	W-127
CP-124	Lakeview Dr.	657	6	Ductile Iron	125	1988	CJ-97	CJ-94	W-127
SP-216	Price St.	344	12	Ductile Iron	125	1988	SJ-166	SJ-167	FLAT FILE PG 39
HP-387	Bahovec Ct.	476	6	Ductile Iron	125	1989	HJ-164	HJ-165	FLAT FILE PG 25
CP-398	Buhrt Cir.	278	6	Ductile Iron	125	1989	CJ-76	CJ-176	S-163
CP-48	Cascade Cr. Drive	643	8	Ductile Iron	125	1989	CJ-36	CJ-196	S-158
CP-268	Cascade Cr. Road	54	8	Ductile Iron	125	1989	CJ-221	CJ-40	S-158
CP-269	Cascade Cr. Road	279	8	Ductile Iron	125	1989	CJ-196	CJ-221	S-158
CP-88	Charles St.	581	8	Ductile Iron	125	1989	CJ-75	CJ-76	S-163
HP-1	Halibut Pt. Road	418	12	Ductile Iron	125	1989	HJ-1	HJ-2	Flat files
HP-3	Halibut Pt. Road	4,413	12	Ductile Iron	125	1989	HJ-3	HJ-4	Flat files
HP-2	Halibut Pt. Road	683	12	Ductile Iron	125	1989	HJ-2	HJ-3	Flat files
HP-371	Halibut Pt. Road	67	10	Ductile Iron	125	1989	HJ-2	HJ-153	Flat files
HP-372	Halibut Pt. Road	238	6	Ductile Iron	125	1989	HJ-153	HJ-154	Flat files

TABLE 3
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE MATERIAL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-401	Off Lincoln St.	164	4	Ductile Iron	125	1989	CJ-134	CJ-179	S-179
CP-90	Pherson St.	802	8	Ductile Iron	125	1989	CJ-77	CJ-78	S-163
CP-148	Spruce St.	136	6	Ductile Iron	125	1989	CJ-114	CJ-113	W-129
CP-147	Spruce St.	571	6	Ductile Iron	125	1989	CJ-117	CJ-114	W-129
JP-20	Airport Rd.	252	16	Ductile Iron	125	1992	JJ-22	JJ-20	HNG FILE PG 33
JP-338	Airport Rd.	769	16	Ductile Iron	125	1992	JJ-30	JJ-203	HNG FILE PG 32
JP-339	Airport Rd.	1,410	16	Ductile Iron	125	1992	JJ-203	JJ-22	HNG FILE PG 33
JP-335	Airport Road	1,474	16	Ductile Iron	125	1992	JJ-20	JJ-10	HNG FILE PG 33
CP-267	Cascade Cr. Road	10	8	Ductile Iron	125	1992	CJ-220	CJ-221	W-138
CP-505	Davidoff St.	244	16	Ductile Iron	125	1992	J-36	CJ-229	W-138
CP-429	Davidoff st.	250	16	Ductile Iron	125	1992	CJ-229	CJ-224	W-138
CP-265	Halibut Pt. Road	1,092	16	Ductile Iron	125	1992	CJ-34	CJ-220	W-138
CP-266	Halibut Pt. Road	902	16	Ductile Iron	125	1992	CJ-220	CJ-222	W-138
CP-428	Halibut Pt. Road	372	16	Ductile Iron	125	1992	CJ-222	J-36	W-138
SP-324	Lance Dr.	633	6	Ductile Iron	125	1992	SJ-169	SJ-213	W-134
SP-427	Sawmill Cr. Road	1,034	12	Ductile Iron	125	1992	SJ-216	SJ-228	W-133
CP-170	Seward St.	680	12	Ductile Iron	125	1992	CJ-123	CJ-127	S-180
SP-327	Knutson Dr.	252	8	Ductile Iron	125	1993	SJ-180	SJ-217	M-244
SP-328	Knutson Dr.	692	6	Ductile Iron	125	1993	SJ-217	SJ-218	M-244
SP-329	Knutson Dr.	355	6	Ductile Iron	125	1993	SJ-218	SJ-219	M-244
SP-330	Knutson Dr.	341	6	Ductile Iron	125	1993	SJ-219	SJ-217	M-244
HP-264	Off Kinkroft Way	447	6	Ductile Iron	125	1993	HJ-195	HJ-223	FLAT FILE PG 25
CP-306	Andrew Hope St.	627	8	Ductile Iron	125	1994	CJ-207	CJ-210	FLAT FILE PG 37
CP-307	Andrew Hope St.	442	8	Ductile Iron	125	1994	CJ-210	CJ-211	FLAT FILE PG 37
CP-311	Joseph St.	303	6	Ductile Iron	125	1994	CJ-209	CJ-210	FLAT FILE PG 37
CP-316	Joseph St.	241	6	Ductile Iron	125	1994	CJ-256	CJ-209	FLAT FILE PG 37
CP-309	Off Yaw Dr.	481	12	Ductile Iron	125	1994	CJ-208	CJ-256	FLAT FILE PG 37
CP-310	Rudolph Walton Cir	320	6	Ductile Iron	125	1994	CJ-209	CJ-212	FLAT FILE PG 37
SP-439	Burkhart St.	381	8	Ductile Iron	125	1995	SJ-168	SJ-234	FLAT FILE PG 41
SP-416	Kiksadi Ct.	319	6	Ductile Iron	125	1995	SJ-235	SJ-236	
SP-415	Vitskari St.	54	8	Ductile Iron	125	1995	SJ-235	SJ-237	FLAT FILE PG 41
SP-440	Vitskari St.	141	8	Ductile Iron	125	1995	SJ-234	SJ-235	FLAT FILE PG 41
CP-278	Charteris St.	976	8	Ductile Iron	125	1996	CJ-242	CJ-200	
CP-281	Georgeson loop	773	8	Ductile Iron	125	1996	CJ-199	CJ-198	
CP-282	Georgeson loop	639	8	Ductile Iron	125	1996	CJ-198	CJ-270	FLAT FILE PG 28
CP-276	Georgeson loop	765	8	Ductile Iron	125	1996	CJ-199	CJ-195	
CP-280	Georgeson loop	18	8	Ductile Iron	125	1996	CJ-195	CJ-200	
CP-284	Johnston St.	866	8	Ductile Iron	125	1996	CJ-197	CJ-243	FLAT FILE PG 28
CP-283	Mills St.	350	8	Ductile Iron	125	1996	CJ-198	CJ-197	
CP-279	Mills St.	461	8	Ductile Iron	125	1996	CJ-198	CJ-201	
CP-275	Mills St.	19	8	Ductile Iron	125	1996	CJ-201	CJ-200	
CP-270	Donna Dr.	260	6	Ductile Iron	125	1997	CJ-196	CJ-241	FLAT FILE PG 27
CP-409	Kaasda Heen Cir.	278	6	Ductile Iron	125	1998	CJ-184	CJ-185	
CP-62	NE of Fergisun Loop	429	12	Ductile Iron	125	1998	CJ-263	CT-2	
HP-375	Circle E.	440	8	Ductile Iron	125	1999	HJ-17	HJ-157	
CP-313	Indian River Road	350	8	Ductile Iron	125	2000	CJ-208	CJ-253	FLAT FILE PG 37
CP-314	Indian River Road	850	8	Ductile Iron	125	2000	CJ-253	CJ-254	
SP-426	Blueberry lane	554	4	Ductile Iron	125	2001	SJ-226	SJ-227	
SP-413	Lilian Dr.	1,161	6	Ductile Iron	125	2001	SJ-260	SJ-259	W-136
JP-219	Alice loop	283	8	Ductile Iron	125	2002	JJ-214	JJ-125	
JP-366	Alice loop	508	8	Ductile Iron	125	2002	JJ-208	JJ-214	
JP-210	Charcoal Dr.	245	8	Ductile Iron	125	2002	JJ-120	JJ-208	
JP-364	Charcoal Dr.	265	8	Ductile Iron	125	2002	JJ-22	JJ-120	
SP-411	Marys Court	451	6	Ductile Iron	125	2002	SJ-262	SJ-264	
CP-318	Naomi Kanosh Lane	550	8	Ductile Iron	125	2002	CJ-254	CJ-257	W-135
CP-304	John Brady Dr.	772	12	Ductile Iron	125	2004	CJ-204	CJ-251	
CP-303	Off Metlakatla	802	12	Ductile Iron	125	2004	CJ-252	CJ-204	
JP-337	Seward Ave.	2,004	12	Ductile Iron	125	2004	JJ-53	JJ-37	
JP-84	Tongass Dr.	1,167	12	Ductile Iron	125	2004	JJ-92	JJ-20	
CP-61	Davidoff St.	548	8	Ductile Iron	125	2005	CJ-224	CJ-51	FLAT FILE PG 28
CP-317	Heab Didrickson St.	648	8	Ductile Iron	125	2005	CJ-255	CJ-257	
CP-315	Yaw Drive	668	12	Ductile Iron	125	2005	CJ-253	CJ-255	
HP-500	Halibut Pt. Road	364	12	Ductile Iron	130	2010	J-35	HJ-164	CIP W3

TABLE 3
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE MATERIAL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-197	American St.	140	6	Ductile Iron	125		CJ-132	CJ-134	
CP-167	American St.	170	6	Ductile Iron	125		CJ-122	CJ-134	
CP-400	Barracks St.	186	6	Ductile Iron	125		CJ-121	CJ-178	
CP-177	Biorka St.	676	6	Ductile Iron	125		CJ-140	CJ-147	
SP-419	Chirikov Dr.	508	10	Ductile Iron	125		SJ-267	SJ-266	
CP-301	Crescent Dr.	313	8	Ductile Iron	125		CJ-250	CJ-206	
CP-432	Gibson Pl	569	4	Ductile Iron	125		CJ-229	CJ-230	
CP-59	Halibut Pt. Road	363	8	Ductile Iron	125		CJ-41	CJ-43	W-109
HP-381	Halibut Pt. Road	90	4	Ductile Iron	125		HJ-160	HJ-161	
JP-77	Harbor Dr.	202	10	Ductile Iron	125		JJ-76	JJ-77	
JP-348	Harbor Dr.	1,008	16	Ductile Iron	125		JJ-1	JJ-9	
CP-291	Kashevaroff St.	420	8	Ductile Iron	125		CJ-57	CJ-245	
CP-96	Monastery St.	190	8	Ductile Iron	125		CJ-80	CJ-81	
JP-370	Off Alice loop	690	8	Ductile Iron	125		JJ-214	JJ-210	
HP-378	Off Circle E	330	6	Ductile Iron	125		HJ-158	HJ-159	
CP-302	Off Crescent Dr.	634	8	Ductile Iron	125		CJ-206	CJ-205	
CP-297	Off Park St.	300	4	Ductile Iron	125		CJ-249	CJ-148	
JP-152	Off Seward Ave.	274	8	Ductile Iron	125		JJ-33	JJ-147	
JP-353	Off Seward Ave.	689	8	Ductile Iron	125		JJ-159	JJ-34	
JP-153	Off Seward Ave.	59	8	Ductile Iron	125		JJ-147	JJ-148	
CP-397	Off Verstovia St.	300	6	Ductile Iron	125		CJ-72	CJ-175	
SP-509	Sawmill Cr. Road	10,500	12	Ductile Iron	125		SJ-228	SJ-229	
CP-395	Sigtnaka Way	627	4	Ductile Iron	125		CJ-172	CJ-173	
CP-105	Monastery St.	209	2	HDPE	150	1996	CJ-269	CJ-89	W-137
CP-399	Tlingit Way	400	2	HDPE	150	1996	CJ-120	CJ-177	W-137
SP-319	Smith St.	1,045	8	HDPE	150	1998	SJ-258	SJ-163	FLAT FILE PG 39
SP-422	Cedar Beach Rd.	1,148	8	HDPE	150	2001	SJ-194	SJ-201	
HP-333	Granite Cr. Road	1,558	8	HDPE	150	2002	HJ-264	HJ-12	
CP-195	Maksostoff St.	154	8	HDPE	150	2002	CJ-133	CJ-129	FLAT FILE PG 35
SP-412	Off Price St.	269	6	HDPE	150	2002	SJ-261	SJ-263	
SP-322	Price St.	706	8	HDPE	150	2002	SJ-167	SJ-261	
SP-323	Price St.	376	8	HDPE	150	2002	SJ-261	SJ-262	
SP-441	Beardslee Way	398	8	HDPE	150	2005	SJ-158	SJ-258	
SP-442	Beardslee Way	504	8	HDPE	150	2005	SJ-258	SJ-261	
CP-502	Davidoff St.	570	8	HDPE	150	2006	CJ-56	CJ-52	CIP W4
SP-506	Eliason Lp.	287	8	HDPE	150	2006	SJ-304	SJ-305	
SP-507	Eliason Lp.	616	8	HDPE	150	2006	SJ-305	SJ-306	
SP-504	Eliason Lp.	45	8	HDPE	150	2006	SJ-303	HSPMP-11	
CP-396	Off Lake St.	661	8	HDPE	150	2006	CJ-70	CJ-174	
SP-508	Versa Pl.	635	8	HDPE	150	2006	SJ-305	SJ-307	FLAT FILE SH 9 OF 11
SP-502	Vitskari St.	184	8	HDPE	150	2006	SJ-237	SJ-302	
SP-505	Vitskari St.	118	8	HDPE	150	2006	HSPMP-11	SJ-304	
SP-503	Vitskari St.	263	8	HDPE	150	2006	SJ-302	SJ-303	
JP-400	Sitka Channel	1,636	16	HDPE	150	2009	JJ-53	CJ-101	
CP-503	Halibut Pt. Road	250	16	HDPE	150	2010	CJ-304	CJ-303	CIP W3
HP-406	Cushing St.	93	16	HDPE	150	2010	HJ-304	HJ-303	W-32
HP-409	Cushing St.	608	16	HDPE	150	2010	HT-3	HJ-305	W-32
HP-405	Emmons St.	860	16	HDPE	150	2010	HJ-303	HJ-302	W-32
HP-42	Kramer Ave.	589	16	HDPE	150	2010	HJ-30	HJ-31	M-177
HP-403	Kramer Ave.	274	16	HDPE	150	2010	HJ-301	HJ-300	W-32
HP-404	Kramer Ave.	711	16	HDPE	150	2010	HJ-302	HJ-301	W-32
HP-410	Kramer Ave.	2,589	8	HDPE	150	2010	HJ-306	HT-3	W-32
CP-172	Etolin Way	359	8	HDPE	150	2012	CJ-127	CJ-136	
CP-117	Monastery St.	363	8	HDPE	150	2012	CJ-248	CJ-137	W-107
CP-190	Monastery St.	290	8	HDPE	150	2012	CJ-135	CJ-136	W-107
CP-295	Sawmill Cr. Road	10	8	HDPE	150	2012	CJ-138	CJ-248	W-107
CP-501	Hollywood Wy.	264	8	HDPE	150	2014	CJ-300	CJ-301	FLAT FILE SH 15 OF 21
CP-110	Monastery St.	555	12	HDPE	150	2014	CJ-248	CJ-89	W-33
CP-173	Monastery St.	240	8	HDPE	150	2014	CJ-136	CJ-137	W-107
CP-114	Baranof St.	401	12	HDPE	150	2015	CJ-90	CJ-139	W-132
CP-180	Jeff Davis St.	265	16	HDPE	150	2017	CJ-149	CJ-250	W-22
CP-202	Jeff Davis St.	305	16	HDPE	150	2017	CJ-251	CJ-150	W-22
CP-299	Jeff Davis St.	159	16	HDPE	150	2017	CJ-250	CJ-150	W-22

TABLE 3
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE MATERIAL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-305	Jeff Davis St.	473	16	HDPE	150	2017	CJ-251	CJ-151	W-22
CP-108	Lake St.	731	12	HDPE	150	2018	CJ-88	CJ-125	CIP W-8
SP-501	Eagle Wy.	627	8	HDPE	150	2018	SJ-300	SJ-301	W-18
JP-156	Off Seward Ave.	216	8	HDPE	150		JJ-150	JJ-151	
JP-262	O'Connell Bridge	1,360	12	Steel	125	1980	CJ-130	JJ-1	FLAT FILE PG 35

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-40	Edgecumbe Dr.	2,041	12	Cast iron	100	1972	CJ-38	CJ-39	W-65, W-63, W-104
CP-41	Cascade Cr. Drive	284	12	Cast iron	100		CJ-37	CJ-38	W-63, W-104
CP-42	Cascade Cr. Drive	30	12	Cast iron	100		CPRV-1	CJ-37	W-63, W-104
CP-43	Cascade Cr. Drive	132	12	Cast iron	100		CJ-36	CPRV-1	W-63, W-104
CP-45	Halibut Pt. Road	524	12	Cast iron	100	1977	CJ-303	CJ-34	W-60, W-61
CP-46	West of Dodge Cir.	589	12	Cast iron	100	1977	CJ-34	CJ-35	W-61, W-104
CP-47	Dodge Cir.	738	12	Cast iron	100	1972	CJ-35	CJ-36	W-64, W-104
CP-48	Cascade Cr. Drive	643	8	Ductile Iron	125	1989	CJ-36	CJ-196	S-158
CP-49	H.P.R at Cascade Ave.	33	8	Cast iron	100	1963	CJ-267	CJ-40	W-96
CP-50	Edgecumbe Dr.	1,047	12	Cast iron	100	1972	CJ-38	CJ-44	W-104, W-64
CP-51	Edgecumbe Dr.	420	12	Cast iron	100	1972	CJ-45	CJ-44	W-62, W-109
CP-52	Wortman Loop	934	6	Ductile Iron	125	1979	CJ-44	CJ-46	S-114
CP-53	Wortman Loop	710	6	Ductile Iron	125	1979	CJ-242	CJ-46	S-115
CP-54	Charteris St.	437	14	Cast iron	100	1968	CJ-243	CJ-48	W-46
CP-56	Charteris St.	390	14	Cast iron	100	1968	CJ-48	CJ-224	W-46
CP-57	Halibut Pt. Road	437	8	Cast iron	100	1963	CJ-302	CJ-41	W-96
CP-58	Shelikof Way	561	6	Ductile Iron	125	1978	CJ-223	CJ-42	S-123
CP-59	Halibut Pt. Road	363	8	Ductile Iron	125		CJ-41	CJ-43	W-109
CP-60	Mills St.	354	6	Cast iron	100		CJ-197	CJ-56	
CP-61	Davidoff St.	548	8	Ductile Iron	125	2005	CJ-224	CJ-51	FLAT FILE PG 28
CP-62	NE of Fergisun Loop	429	12	Ductile Iron	125	1998	CJ-263	CT-2	
CP-63	Edgecumbe Dr.	1,077	12	Cast iron	100	1968	CJ-48	CJ-56	W-45
CP-64	Edgecumbe Dr.	1,082	12	Cast iron	100	1968	CJ-56	CJ-57	W-43
CP-65	Edgecumbe Dr.	784	12	Cast iron	100	1968	CJ-57	CJ-58	W-43
CP-66	Kimsham St.	406	8	Ductile Iron	125	1983	CJ-58	CJ-60	S-136
CP-67	Furuhelm St.	620	8	Ductile Iron	125	1983	CJ-59	CJ-60	S-136
CP-68	Halibut Pt. Road	1,518	8	Ductile Iron	125	1975	CJ-43	CJ-52	W-109
CP-69	Halibut Pt. Road	672	8	Ductile Iron	125	1975	CJ-52	CJ-53	W-109
CP-70	Halibut Pt. Road	426	8	Ductile Iron	125	1975	CJ-53	CJ-245	W-109
CP-71	Halibut Pt. Road	406	8	Ductile Iron	125	1975	CJ-54	CJ-55	W-109
CP-72	Peterson St.	505	10	Cast iron	100	1968	CJ-246	CJ-61	W-41
CP-73	Edgecumbe Dr.	470	12	Cast iron	100	1968	CJ-58	CJ-61	W-43
CP-74	Halibut Pt. Road	367	14	Cast iron	100	1968	CJ-55	CJ-63	W-40
CP-75	Brady St.	316	8	Ductile Iron	125	1975	CJ-63	CJ-64	W-109
CP-76	Gavin St.	202	8	Ductile Iron	125	1975	CJ-64	CJ-65	W-109
CP-77	Gavin St.	439	6	Ductile Iron	125	1979	CJ-65	CJ-66	W-110
CP-78	Moller Ave.	422	6	Ductile Iron	125	1979	CJ-66	CJ-67	W-110
CP-79	Peterson St.	722	10	Cast iron	100	1968	CJ-61	CJ-68	W-41
CP-80	Peterson St.	151	10	Cast iron	100	1968	CJ-70	CJ-68	W-37
CP-81	Cascade St.	1,008	8	Ductile Iron	125	1975	CJ-65	CJ-68	W-109
CP-82	Lake St.	296	10	Cast iron	100	1968	CJ-70	CJ-71	W-37
CP-83	Halibut Pt. Rd.	667	14	Cast iron	100	1968	CJ-63	CJ-92	W-40
CP-84	Verstovia Ave.	304	8	Ductile Iron	125	1975	CJ-71	CJ-72	W-103
CP-85	Verstovia Ave.	545	10	Ductile Iron	125	1979	CJ-72	CJ-73	S-130
CP-86	Verstovia Ave.	214	10	Ductile Iron	125	1979	CJ-73	CJ-74	S-130
CP-87	Verstovia Ave.	277	10	Ductile Iron	125	1979	CJ-74	CJ-75	S-130
CP-88	Charles St.	581	8	Ductile Iron	125	1989	CJ-75	CJ-76	S-163
CP-89	Charles St.	165	10	Ductile Iron	125	1979	CJ-75	CJ-77	S-130
CP-90	Pherson St.	802	8	Ductile Iron	125	1989	CJ-77	CJ-78	S-163
CP-91	Pherson St.	373	8	Ductile Iron	125	1979	CJ-62	CJ-77	S-130
CP-92	Pherson St.	350	8	Ductile Iron	125	1979	CJ-62	CJ-80	S-130
CP-93	Monastery St.	254	8	Ductile Iron	125	1979	CJ-74	CJ-79	S-130
CP-94	Monastery St.	344	8	Ductile Iron	125	1979	CJ-79	CJ-80	S-130
CP-95	A Street	372	6	Ductile Iron	125	1979	CJ-79	CJ-73	S-130
CP-96	Monastery St.	190	8	Ductile Iron	125		CJ-80	CJ-81	
CP-97	Sirstad St.	1,242	8	Ductile Iron	125	1975	CJ-81	CJ-72	W-103
CP-98	Monastery St.	794	6	Cast iron	100		CJ-81	CJ-85	
CP-99	Kincaid St.	257	6	Cast iron	100		CJ-85	CJ-84	FLAT FILE PG 36
CP-100	Lake St.	980	10	Cast iron	100	1968	CJ-82	CJ-83	W-36, W-35
CP-101	Lake St.	708	10	Cast iron	100	1968	CJ-83	CJ-71	W-37, W-36
CP-102	Lake St.	404	10	Cast iron	100	1968	CJ-84	CJ-87	W-34
CP-103	Hirst St.	335	6	Cast iron	100		CJ-87	CJ-86	
CP-104	Monastery St.	390	6	Cast iron	100		CJ-86	CJ-85	

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-105	Monastery St.	209	2	HDPE	150	1996	CJ-269	CJ-89	W-137
CP-106	DeGroff St.	188	10	Cast iron	100	1968	CJ-300	CJ-88	W-34
CP-107	Lake St.	173	10	Cast iron	100	1968	CJ-88	CJ-87	W-34
CP-108	Lake St.	731	12	HDPE	150	2018	CJ-88	CJ-125	CIP W-8
CP-109	Sawmill Cr. Road	513	16	Cast iron	100	1966	CJ-125	CJ-138	S-177
CP-110	Monastery St.	555	12	HDPE	150	2014	CJ-248	CJ-89	W-33
CP-111	DeGroff St.	345	6	Cast iron	100	1970	CJ-89	CJ-90	W-10
CP-112	Baranof St.	207	6	Cast iron	100	1971	CJ-90	CJ-91	W-11
CP-113	DeGroff St.	897	6	Cast iron	100	1970	CJ-90	CJ-148	W-9
CP-114	Baranof St.	401	12	HDPE	150	2015	CJ-90	CJ-139	W-132
CP-115	Sawmill Cr. Road	768	16	Cast iron	100	1966	CJ-139	CJ-148	S-177
CP-116	Sawmill Cr. Road	285	16	Cast iron	100	1966	CJ-139	CJ-138	S-177
CP-117	Monastery St.	363	8	HDPE	150	2012	CJ-248	CJ-137	W-107
CP-118	Oja Way	499	6	Ductile Iron	125	1969	CJ-137	CJ-126	W-131
CP-119	Lake St.	312	12	Cast iron	100	1965	CJ-126	CJ-125	S-53
CP-120	Halibut Pt. Road	159	16	Cast iron	100	1966	CJ-125	CJ-119	S-177
CP-121	Halibut Pt. Road	1,116	8	Ductile Iron	125	1975	CJ-119	CJ-113	W-109
CP-122	Halibut Pt. Road	388	8	Ductile Iron	125	1975	CJ-113	CJ-98	W-109
CP-123	Halibut Pt. Road	98	8	Ductile Iron	125	1975	CJ-98	CJ-97	W-109
CP-124	Lakeview Dr.	657	6	Ductile Iron	125	1988	CJ-97	CJ-94	W-127
CP-125	Halibut Pt. Road	230	8	Ductile Iron	125	1975	CJ-97	CJ-95	W-109
CP-126	Crabapple Dr.	450	6	Ductile Iron	125	1980	CJ-95	CJ-96	W-117
CP-127	Halibut Pt. Road	431	8	Ductile Iron	125	1975	CJ-95	CJ-93	W-109
CP-128	Lakeview Dr.	1,327	6	Ductile Iron	125	1988	CJ-93	CJ-94	W-127
CP-129	Halibut Pt. Road	623	8	Cast iron	100		CJ-93	CJ-92	
CP-130	Katlian Ave.	655	12	Cast iron	100	1968	CJ-92	CJ-100	W-32
CP-131	Katlian Ave.	224	12	Cast iron	100	1968	CJ-100	CJ-101	W-32
CP-132	Katlian Ave.	1,021	12	Cast iron	100	1968	CJ-101	CJ-102	W-31, W-32
CP-133	New Archangel St.	239	8	Ductile Iron	125	1968	CJ-102	CJ-103	W-30
CP-134	O'Cain St.	222	6	Cast iron	100	1968	CJ-103	CJ-99	W-29
CP-135	Osprey St.	730	6	Cast iron	100	1968	CJ-99	CJ-98	W-29
CP-136	Marine St.	270	10	Cast iron	100	1968	CJ-98	CJ-112	W-28
CP-137	New Archangel St.	258	8	Cast iron	100	1968	CJ-112	CJ-113	W-30
CP-138	New Archangel St.	228	8	Cast iron	100	1968	CJ-112	CJ-111	W-30
CP-139	New Archangel St.	237	8	Cast iron	100	1968	CJ-111	CJ-110	W-30
CP-140	New Archangel St.	263	8	Cast iron	100	1968	CJ-110	CJ-103	W-30
CP-141	Andrews St.	534	6	Cast iron	100		CJ-110	CJ-247	W-86
CP-142	DeArmond St.	406	6	Cast iron	100		CJ-247	CJ-111	W-86
CP-143	Erler St.	220	10	Ductile Iron	125	1987	CJ-115	CJ-116	S-157
CP-144	Marine St.	628	10	Cast iron	100	1968	CJ-116	CJ-112	W-28
CP-145	Marine St.	380	10	Cast iron	100	1968	CJ-116	CJ-120	W-27
CP-146	Erler St.	271	10	Ductile Iron	125	1987	CJ-116	CJ-117	S-157
CP-147	Spruce St.	571	6	Ductile Iron	125	1989	CJ-117	CJ-114	W-129
CP-148	Spruce St.	136	6	Ductile Iron	125	1989	CJ-114	CJ-113	W-129
CP-149	Hemlock St.	755	6	Ductile Iron	125	1988	CJ-114	CJ-118	W-130
CP-150	Erler St.	256	10	Ductile Iron	125	1987	CJ-118	CJ-117	S-157
CP-151	Erler St.	417	10	Ductile Iron	125	1987	CJ-118	CJ-119	S-157
CP-153	Katlian Ave.	511	12	Cast iron	100	1968	CJ-102	CJ-104	W-31
CP-154	Kaagwaantaan St.	1,414	8	Ductile Iron	125	1982	CJ-104	CJ-109	S-135
CP-155	Katlian Ave.	243	12	Cast iron	100	1968	CJ-104	CJ-105	W-31
CP-156	off of Erler St.	404	12	Cast iron	100	1968	CJ-105	CJ-115	W-27
CP-157	Katlian Ave	267	12	Cast iron	100	1968	CJ-105	CJ-106	W-25
CP-158	Katlian Ave	443	12	Cast iron	100	1968	CJ-106	CJ-107	W-25
CP-159	Katlian Ave	362	12	Cast iron	100	1968	CJ-107	CJ-108	W-26
CP-160	Off Katlian Ave	116	10	Cast iron	100	1968	CJ-108	CJ-109	W-26
CP-161	Katlian Ave	389	12	Cast iron	100	1968	CJ-108	CJ-131	W-25
CP-162	Seward St.	220	10	Cast iron	100	1968	CJ-109	CJ-121	W-26
CP-163	Marine St.	700	10	Cast iron	100	1968	CJ-121	CJ-120	W-26
CP-165	Seward St.	190	10	Ductile Iron	125	1986	CJ-121	CJ-122	S-149
CP-167	American St.	170	6	Ductile Iron	125		CJ-122	CJ-134	
CP-168	Seward St.	140	10	Ductile Iron	125	1986	CJ-122	CJ-123	S-149
CP-169	Observatory St.	459	8	Cast iron	100	1968	CJ-123	CJ-124	W-23
CP-170	Seward St.	680	12	Ductile Iron	125	1992	CJ-123	CJ-127	S-180

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-171	Lake St.	334	12	Cast iron	100	1965	CJ-127	CJ-126	S-53
CP-172	Etolin Way	359	8	HDPE	150	2012	CJ-127	CJ-136	
CP-173	Monastery St.	240	8	HDPE	150	2014	CJ-136	CJ-137	W-107
CP-175	Baranof St.	179	6	Cast iron	100	1975	CJ-141	CJ-140	W-106
CP-176	Baranof St.	231	6	Ductile Iron	125	1975	CJ-140	CJ-139	W-106
CP-177	Biorka St.	676	6	Ductile Iron	125		CJ-140	CJ-147	
CP-178	Park St.	235	6	Ductile Iron	125	1967	CJ-147	CJ-148	
CP-179	Sawmill Cr. Road	676	16	Cast iron	100	1966	CJ-148	CJ-149	S-177
CP-180	Jeff Davis St.	265	16	HDPE	150	2017	CJ-149	CJ-250	W-22
CP-181	Etolin St.	410	8	Ductile Iron	125	1980	CJ-150	CJ-145	W-116
CP-182	Finn Alley	573	8	Cast iron	100	1968	CJ-145	CJ-144	W-20
CP-184	Baranof St.	189	6	Ductile Iron	125	1975	CJ-142	CJ-141	W-106
CP-185	Oja St.	552	6	Ductile Iron	125	1980	CJ-141	CJ-146	W-116
CP-186	Park St.	242	6	Ductile Iron	125	1980	CJ-146	CJ-147	W-116
CP-187	Baranof St.	318	6	Ductile Iron	125	1975	CJ-142	CJ-143	W-106
CP-188	Lincoln St.	651	8	Ductile Iron	125	1985	CJ-143	CJ-144	S-147, SH 52
CP-189	Lincoln St.	284	8	Ductile Iron	125	1985	CJ-143	CJ-135	S-147, SH 52
CP-190	Monastery St.	290	8	HDPE	150	2012	CJ-135	CJ-136	W-107
CP-191	Lincoln St.	293	8	Ductile Iron	125	1985	CJ-135	CJ-128	S-147, SH 51
CP-192	Lake St.	268	12	Cast iron	100	1965	CJ-128	CJ-127	S-53
CP-193	Harbor Dr.	738	12	Ductile Iron	125	1968	CJ-128	CJ-129	W-24
CP-194	Lincoln St.	623	10	Ductile Iron	125	1985	CJ-128	CJ-133	S-147
CP-195	Maksostoff St.	154	8	HDPE	150	2002	CJ-133	CJ-129	FLAT FILE PG 35
CP-196	Lincoln St.	204	10	Ductile Iron	125	1985	CJ-133	CJ-132	S-147
CP-197	American St.	140	6	Ductile Iron	125		CJ-132	CJ-134	
CP-198	Lincoln St.	515	10	Ductile Iron	125	1985	CJ-132	CJ-131	S-147
CP-199	Off Lincoln St.	503	12	Cast iron	100	1968	CJ-131	CJ-130	W-24
CP-200	Harbor Dr.	567	12	Cast iron	100	1968	CJ-130	CJ-129	W-24
CP-201	Lincoln St.	364	8	Ductile Iron	125	1985	CJ-144	CJ-151	S-147, SH 53
CP-202	Jeff Davis St.	305	16	HDPE	150	2017	CJ-251	CJ-150	W-22
CP-203	Lincoln St.	1,104	6	Ductile Iron	125	1985	CJ-151	CJ-152	S-146, SH 9
CP-204	Metlakatla St.	650	6	Ductile Iron	125	1985	CJ-152	CJ-153	S-146, SH 9
CP-206	Sawmill Cr. Road	237	18	Cast iron	100	1966	CJ-149	TJ-8	S-177
CP-207	Sawmill Cr. Road	176	18	Cast iron	100	1966	TJ-8	CJ-154	S177
CP-209	Sawmill Cr. Road	2,406	14	Cast iron	100	1972	CJ-154	SJ-156	W-72
CP-265	Halibut Pt. Road	1,092	16	Ductile Iron	125	1992	CJ-34	CJ-220	W-138
CP-266	Halibut Pt. Road	902	16	Ductile Iron	125	1992	CJ-220	CJ-222	W-138
CP-267	Cascade Cr. Road	10	8	Ductile Iron	125	1992	CJ-220	CJ-221	W-138
CP-268	Cascade Cr. Road	54	8	Ductile Iron	125	1989	CJ-221	CJ-40	S-158
CP-269	Cascade Cr. Road	279	8	Ductile Iron	125	1989	CJ-196	CJ-221	S-158
CP-270	Donna Dr.	260	6	Ductile Iron	125	1997	CJ-196	CJ-241	FLAT FILE PG 27
CP-271	Shelikof Way	10	6	Ductile Iron	125	1978	CJ-222	CJ-223	S-123
CP-272	Shelikof Way	54	6	Ductile Iron	125	1978	CJ-223	CJ-41	S-123
CP-275	Mills St.	19	8	Ductile Iron	125	1996	CJ-201	CJ-200	
CP-276	Georgeson loop	765	8	Ductile Iron	125	1996	CJ-199	CJ-195	
CP-277	Charteris St.	342	14	Cast iron	100	1968	CJ-47	CJ-243	W-46, W-47
CP-278	Charteris St.	976	8	Ductile Iron	125	1996	CJ-242	CJ-200	
CP-279	Mills St.	461	8	Ductile Iron	125	1996	CJ-198	CJ-201	
CP-280	Georgeson loop	18	8	Ductile Iron	125	1996	CJ-195	CJ-200	
CP-281	Georgeson loop	773	8	Ductile Iron	125	1996	CJ-199	CJ-198	
CP-282	Georgeson loop	639	8	Ductile Iron	125	1996	CJ-198	CJ-270	FLAT FILE PG 28
CP-283	Mills St.	350	8	Ductile Iron	125	1996	CJ-198	CJ-197	
CP-284	Johnston St.	866	8	Ductile Iron	125	1996	CJ-197	CJ-243	FLAT FILE PG 28
CP-285	Lake St.	433	10	Cast iron	100	1968	CJ-82	CJ-84	W-35
CP-287	Kashevaroff St.	328	8	Ductile Iron	125	1987	CJ-59	CJ-203	FLAT FILE PG 29
CP-288	Kashevaroff St.	240	6	Ductile Iron	125	1987	CJ-59	CJ-244	
CP-289	Kashevaroff St.	165	6	Ductile Iron	125	1987	CJ-244	CJ-202	
CP-290	Halibut Pt. Road	547	8	Ductile Iron	125	1975	CJ-54	CJ-245	W-109
CP-291	Kashevaroff St.	420	8	Ductile Iron	125		CJ-57	CJ-245	
CP-292	Kimsham st.	524	2	Copper	140	1980	CJ-58	CJ-246	W-115
CP-293	Peterson St.	192	10	Cast iron	100	1968	CJ-246	CJ-55	W-41
CP-294	DeArmond St.	175	6	Cast iron	100		CJ-247	CJ-115	
CP-295	Sawmill Cr. Road	10	8	HDPE	150	2012	CJ-138	CJ-248	W-107

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
CP-296	Merrill Street	868	6	Cast iron	100	1967, 1975	CJ-91	CJ-249	W-94, S-93
CP-297	Off Park St.	300	4	Ductile Iron	125		CJ-249	CJ-148	
CP-298	Biorka St.	631	8	Cast iron	100	1967	CJ-147	CJ-271	W-88
CP-299	Jeff Davis St.	159	16	HDPE	150	2017	CJ-250	CJ-150	W-22
CP-300	Charles St.	400	6	Ductile Iron	125	1979	CJ-75	CJ-62	S-130
CP-301	Crescent Dr.	313	8	Ductile Iron	125		CJ-250	CJ-206	
CP-302	Off Crescent Dr.	634	8	Ductile Iron	125		CJ-206	CJ-205	
CP-303	Off Metlakatla	802	12	Ductile Iron	125	2004	CJ-252	CJ-204	
CP-304	John Brady Dr.	772	12	Ductile Iron	125	2004	CJ-204	CJ-251	
CP-305	Jeff Davis St.	473	16	HDPE	150	2017	CJ-251	CJ-151	W-22
CP-306	Andrew Hope St.	627	8	Ductile Iron	125	1994	CJ-207	CJ-210	FLAT FILE PG 37
CP-307	Andrew Hope St.	442	8	Ductile Iron	125	1994	CJ-210	CJ-211	FLAT FILE PG 37
CP-308	Indian River Road	452	18	Cast iron	100	1971	CJ-207	CJ-208	FLAT FILE PG 37
CP-309	Off Yaw Dr.	481	12	Ductile Iron	125	1994	CJ-208	CJ-256	FLAT FILE PG 37
CP-310	Rudolph Walton Cir	320	6	Ductile Iron	125	1994	CJ-209	CJ-212	FLAT FILE PG 37
CP-311	Joseph St.	303	6	Ductile Iron	125	1994	CJ-209	CJ-210	FLAT FILE PG 37
CP-312	Indian River Road	1,374	18	Cast iron	100	1971	CJ-208	CJ-155	FLAT FILE PG 37
CP-313	Indian River Road	350	8	Ductile Iron	125	2000	CJ-208	CJ-253	FLAT FILE PG 37
CP-314	Indian River Road	850	8	Ductile Iron	125	2000	CJ-253	CJ-254	
CP-315	Yaw DrIve	668	12	Ductile Iron	125	2005	CJ-253	CJ-255	
CP-316	Joseph St.	241	6	Ductile Iron	125	1994	CJ-256	CJ-209	FLAT FILE PG 37
CP-317	Heab Didrickson St.	648	8	Ductile Iron	125	2005	CJ-255	CJ-257	
CP-318	Naomi Kanosh Lane	550	8	Ductile Iron	125	2002	CJ-254	CJ-257	W-135
CP-332	Georgeson loop	781	14	Cast iron	100	1968	CJ-263	CJ-270	W-47
CP-336	Edgecumbe Dr.	147	12	Cast iron	100	1972	CJ-272	CJ-45	W-62, W-109
CP-343	Charteris St.	68	6	Ductile Iron	125	1968	CJ-270	CJ-47	W-47
CP-346	Edgecumbe Dr.	50	12	Cast iron	100	1972	CPMP-1	CJ-272	W-62, W-109
CP-392	Tilson St.	466	6	Ductile Iron	125	1983	CJ-60	CJ-170	S-136
CP-393	Wachusetts Wt.	826	6	Ductile Iron	125	1974	CJ-58	CJ-171	W-128
CP-394	Sigtnaka Way	261	6	Cast iron	100		CJ-100	CJ-172	
CP-395	Sigtnaka Way	627	4	Ductile Iron	125		CJ-172	CJ-173	
CP-396	Off Lake St.	661	8	HDPE	150	2006	CJ-70	CJ-174	
CP-397	Off Verstovia St.	300	6	Ductile Iron	125		CJ-72	CJ-175	
CP-398	Buhrt Cir.	278	6	Ductile Iron	125	1989	CJ-76	CJ-176	S-163
CP-399	Tlingit Way	400	2	HDPE	150	1996	CJ-120	CJ-177	W-137
CP-400	Barracks St.	186	6	Ductile Iron	125		CJ-121	CJ-178	
CP-401	Off Lincoln St.	164	4	Ductile Iron	125	1989	CJ-134	CJ-179	S-179
CP-402	Hirst St.	99	6	Cast iron	100		CJ-86	CJ-180	
CP-403	Lincoln St.	106	6	Ductile Iron	125	1985	CJ-144	CJ-181	S-147, SH 53
CP-404	Kelly St.	237	6	Ductile Iron	125	1985	CJ-152	CJ-182	S-146, SH 9
CP-405	Etolin St.	321	8	Ductile Iron	125	1980	CJ-145	CJ-183	W-116
CP-406	Etolin St.	473	6	Ductile Iron	125	1980	CJ-183	CJ-142	W-116
CP-407	Indian River Road	840	18	Cast iron	100	1971	CJ-154	CJ-184	FLAT FILE PG 37
CP-408	Indian River Road	875	18	Cast iron	100	1971	CJ-184	CJ-207	FLAT FILE PG 37
CP-409	Kaasda Heen Cir.	278	6	Ductile Iron	125	1998	CJ-184	CJ-185	
CP-428	Halibut Pt. Road	372	16	Ductile Iron	125	1992	CJ-222	J-36	W-138
CP-429	Davidoff st.	250	16	Ductile Iron	125	1992	CJ-229	CJ-224	W-138
CP-430	Edgecumbe Dr.	227	12	Cast iron	100	1972	CJ-48	CJ-230	W-62, W-104
CP-431	Edgecumbe Dr.	126	12	Cast iron	100	1972	CJ-230	CPMP-1	W-62, W-109
CP-432	Gibson Pl	569	4	Ductile Iron	125		CJ-229	CJ-230	
CP-500	DeGroff St.	203	10	Cast iron	100	1968	CJ-89	CJ-300	W-34
CP-501	Hollywood Wy.	264	8	HDPE	150	2014	CJ-300	CJ-301	FLAT FILE SH 15 OF 21
CP-502	Davidoff St.	570	8	HDPE	150	2006	CJ-56	CJ-52	CIP W4
CP-503	Halibut Pt. Road	250	16	HDPE	150	2010	CJ-304	CJ-303	CIP W3
CP-504	Halibut Pt. Road	459	12	Cast iron	100	1977	HJ-32	CJ-304	W-60, W-61
CP-505	Davidoff St.	244	16	Ductile Iron	125	1992	J-36	CJ-229	W-138
CP-506	Halibut Pt. Road	52	6	Ductile Iron	125	1979	J-36	CJ-43	
HP-1	Halibut Pt. Road	418	12	Ductile Iron	125	1989	HJ-1	HJ-2	Flat files
HP-2	Halibut Pt. Road	683	12	Ductile Iron	125	1989	HJ-2	HJ-3	Flat files
HP-3	Halibut Pt. Road	4,413	12	Ductile Iron	125	1989	HJ-3	HJ-4	Flat files
HP-4	Halibut Pt. Road	519	12	Ductile Iron	125	1987	HJ-4	HJ-5	S-159
HP-5	Halibut Pt. Road	972	12	Cast iron	100	1989	HJ-5	HJ-6	W-92
HP-6	Halibut Pt. Road	226	12	Cast iron	100	1977	HJ-6	HJ-265	W-92

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
HP-7	Halibut Pt. Road	1,727	12	Cast iron	100	1977	HJ-6	HJ-8	W-92
HP-8	Viking Way	295	6	Ductile Iron	125	1978	HJ-8	HJ-9	W-108
HP-9	Halibut Pt. Road	1,551	12	Cast iron	100	1977	HJ-8	HJ-10	W-93
HP-10	Halibut Pt. Road	688	12	Cast iron	100	1977	HJ-10	HJ-11	W-50
HP-11	Halibut Pt. Road	1,396	12	Cast iron	100	1977	HJ-11	HJ-13	W-51
HP-12	Halibut Pt. Road	394	12	Cast iron	100	1977	HJ-12	HJ-13	W-52
HP-13	Halibut Pt. Road	1,334	12	Cast iron	100	1977	HJ-14	HJ-12	W-52
HP-14	Harbor Mtn. Road	2,372	18	Ductile Iron	125	1983	HJ-14	HJ-15	W-121
HP-15	Shuler Dr.	458	6	Ductile Iron	125	1975	HJ-14	HJ-16	W-105
HP-16	Halibut Pt. Road	546	12	Cast iron	100	1977	HJ-14	HJ-17	W-53
HP-18	Darrin Dr.	884	6	Cast iron	100		HJ-18	HJ-19	
HP-20	Halibut Pt. Road	1,165	12	Cast iron	100	1977	HJ-20	HJ-21	W-55
HP-22	Nicole Dr.	182	10	Ductile Iron	125	1981	HJ-221	HJ-22	W-122
HP-23	Somer Dr.	257	6	Ductile Iron	125	1981	HJ-221	HJ-223	W-122
HP-24	Patterson Way	364	6	Ductile Iron	125	1981	HJ-22	HJ-23	W-122
HP-31	Nicole Dr.	275	10	Ductile Iron	125	1981	HJ-21	HJ-221	W-122
HP-35	Halibut Pt. Road	461	12	Cast iron	100	1977	HJ-21	HJ-24	W-55
HP-38	Halibut Pt. Road	1,433	12	Cast iron	100	1977	HJ-26	HJ-27	W-57
HP-39	Halibut Pt. Road	872	12	Cast iron	100	1977	HJ-27	HJ-28	W-58
HP-40	Halibut Pt. Road	790	12	Cast iron	100	1977	HJ-28	HJ-29	W-58
HP-42	Kramer Ave.	589	16	HDPE	150	2010	HJ-30	HJ-31	M-177
HP-43	Halibut Pt Road	325	12	Cast iron	100	1977	HJ-30	HJ-32	W-60
HP-264	Off Kinkroft Way	447	6	Ductile Iron	125	1993	HJ-195	HJ-223	FLAT FILE PG 25
HP-290	Harbor Mtn. Rd.	10	18	Ductile Iron	125	1983	HT-1	HJ-15	W-121
HP-333	Granite Cr. Road	1,558	8	HDPE	150	2002	HJ-264	HJ-12	
HP-334	Halibut Pt. Road	637	6	Cast iron	100	1977	HJ-7	HJ-265	W-92
HP-371	Halibut Pt. Road	67	10	Ductile Iron	125	1989	HJ-2	HJ-153	Flat files
HP-372	Halibut Pt. Road	238	6	Ductile Iron	125	1989	HJ-153	HJ-154	Flat files
HP-373	Valhalla Dr.	229	6	Ductile Iron	125	1978	HJ-155	HJ-9	W-108
HP-374	Valhalla Dr.	141	6	Ductile Iron	125	1978	HJ-9	HJ-156	W-108
HP-375	Circle E.	440	8	Ductile Iron	125	1999	HJ-17	HJ-157	
HP-376	Halibut Pt. Road	294	12	Cast iron	100	1977	HJ-17	HJ-158	W-54
HP-377	Halibut Pt. Road	432	12	Cast iron	100	1977	HJ-158	HJ-18	W-54
HP-378	Off Circle E	330	6	Ductile Iron	125		HJ-158	HJ-159	
HP-379	Halibut Pt. Road	155	12	Cast iron	100	1977	HJ-18	HJ-160	W-54
HP-380	Halibut Pt. Road	455	12	Cast iron	100	1977	HJ-160	HJ-20	W-54
HP-381	Halibut Pt. Road	90	4	Ductile Iron	125		HJ-160	HJ-161	
HP-382	Halibut Pt. Road	210	6	Ductile Iron	125	1986	HJ-24	HJ-162	S-150
HP-383	Ross St.	377	6	Ductile Iron	125	1986	HJ-162	HJ-25	S-150
HP-384	Barker St.	330	6	Ductile Iron	125	1986	HJ-162	HJ-163	S-150
HP-385	Halibut Pt. Road	434	12	Cast iron	100	1977	HJ-24	J-35	W-56
HP-386	Halibut Pt. Road	607	12	Cast iron	100	1977	HJ-164	HJ-26	W-56
HP-387	Bahovec Ct.	476	6	Ductile Iron	125	1989	HJ-164	HJ-165	FLAT FILE PG 25
HP-388	Halibut Pt. Road	1,066	12	Cast iron	100	1977	HJ-29	HJ-166	W-59
HP-389	Halibut Pt. Road	610	12	Cast iron	100	1977	HJ-166	HJ-30	W-60
HP-390	Sand dollar Dr.	794	6	Ductile Iron	125	1987	HJ-166	HJ-167	FLAT FILE PG 26
HP-403	Kramer Ave.	274	16	HDPE	150	2010	HJ-301	HJ-300	W-32
HP-404	Kramer Ave.	711	16	HDPE	150	2010	HJ-302	HJ-301	W-32
HP-405	Emmons St.	860	16	HDPE	150	2010	HJ-303	HJ-302	W-32
HP-406	Cushing St.	93	16	HDPE	150	2010	HJ-304	HJ-303	W-32
HP-409	Cushing St.	608	16	HDPE	150	2010	HT-3	HJ-305	W-32
HP-410	Kramer Ave.	2,589	8	HDPE	150	2010	HJ-306	HT-3	W-32
HP-500	Halibut Pt. Road	364	12	Ductile Iron	130	2010	J-35	HJ-164	CIP W3
JP-9	Harbor Dr.	145	16	Ductile Iron	125	1970s Early	JJ-9	JJ-10	
JP-20	Airport Rd.	252	16	Ductile Iron	125	1992	JJ-22	JJ-20	HNG FILE PG 33
JP-34	Off Seward Ave.	320	8	Asbestos Cement	125		JJ-33	JJ-34	
JP-57	Off Seward Ave.	156	10	Ductile Iron	125	1984	JJ-56	JJ-57	S-154
JP-58	Off Seward Ave.	90	10	Ductile Iron	125	1984	JJ-57	JJ-58	S-154
JP-59	Off Seward Ave.	157	8	Ductile Iron	125	1984	JJ-58	JJ-59	S-154
JP-60	Off Seward Ave.	222	10	Ductile Iron	125	1984	JJ-58	JJ-60	S-154
JP-61	Off Seward Ave.	132	6	Ductile Iron	125	1984	JJ-60	JJ-61	S-154
JP-62	Off Seward Ave.	92	6	Ductile Iron	125	1984	JJ-61	JJ-62	S-154
JP-66	Seward Ave.	54	6	Ductile Iron	125	1984	JJ-65	JJ-66	S-154

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
JP-67	Seward Ave.	72	6	Ductile Iron	125	1984	JJ-66	JJ-67	S-154
JP-77	Harbor Dr.	202	10	Ductile Iron	125		JJ-76	JJ-77	
JP-78	Harbor Dr.	149	10	Cast iron	100		JJ-77	JJ-10	
JP-84	Tongass Dr.	1,167	12	Ductile Iron	125	2004	JJ-92	JJ-20	
JP-100	Lifesaver Dr.	88	10	Asbestos Cement	125	1992	JJ-30	JJ-97	HNG FILE
JP-101	Lifesaver Dr.	86	10	Asbestos Cement	125		JJ-97	JJ-98	
JP-139	Alice loop	123	12	Ductile Iron	125	1985	JJ-130	JJ-135	W-124
JP-142	Lifesaver Dr.	53	8	Cast iron	100	1992	JJ-30	JJ-138	HNG FILE
JP-152	Off Seward Ave.	274	8	Ductile Iron	125		JJ-33	JJ-147	
JP-153	Off Seward Ave.	59	8	Ductile Iron	125		JJ-147	JJ-148	
JP-154	Off Seward Ave.	339	8	Asbestos Cement	125		JJ-148	JJ-149	
JP-155	Off Seward Ave.	275	8	Asbestos Cement	125		JJ-149	JJ-150	
JP-156	Off Seward Ave.	216	8	HDPE	150		JJ-150	JJ-151	
JP-206	Airport Rd.	403	8	Cast iron	100	1967	JJ-138	JJ-205	M-52
JP-207	Airport Rd.	223	8	Cast iron	100	1967	JJ-205	JJ-206	M-52
JP-208	Airport Rd.	133	8	Cast iron	100	1967	JJ-206	JJ-203	M-52
JP-209	Airport Rd.	243	6	Cast iron	100	1967	JJ-206	JJ-207	M-52
JP-210	Charcoal Dr.	245	8	Ductile Iron	125	2002	JJ-120	JJ-208	
JP-212	Off Alice loop	216	8	Ductile Iron	125	1985	JJ-208	JJ-209	
JP-213	Off Alice loop	104	8	Ductile Iron	125	1985	JJ-209	JJ-210	
JP-216	Off Alice Loop	534	8	Ductile Iron	125	1985	JJ-210	JJ-212	
JP-219	Alice loop	283	8	Ductile Iron	125	2002	JJ-214	JJ-125	
JP-222	Seward Ave.	31	12	Ductile Iron	125	1984	JJ-215	JJ-73	S-154
JP-262	O'Connell Bridge	1,360	12	Steel	125	1980	CJ-130	JJ-1	FLAT FILE PG 35
JP-335	Airport Road	1,474	16	Ductile Iron	125	1992	JJ-20	JJ-10	HNG FILE PG 33
JP-337	Seward Ave.	2,004	12	Ductile Iron	125	2004	JJ-53	JJ-37	
JP-338	Airport Rd.	769	16	Ductile Iron	125	1992	JJ-30	JJ-203	HNG FILE PG 32
JP-339	Airport Rd.	1,410	16	Ductile Iron	125	1992	JJ-203	JJ-22	HNG FILE PG 33
JP-340	Lifesaver Dr.	672	10	Asbestos Cement	125	1970-1980s	JJ-118	JJ-98	
JP-348	Harbor Dr.	1,008	16	Ductile Iron	125		JJ-1	JJ-9	
JP-349	Lifesaver Dr.	911	10	Asbestos Cement	125		JJ-98	JJ-109	
JP-350	Off Seward Ave.	351	8	Cast iron	100	1967	JJ-147	JJ-144	M-52
JP-351	Airport Rd.	800	8	Cast iron	100	1967	JJ-144	JJ-141	M-52
JP-352	Airport Rd.	432	8	Cast iron	100	1967	JJ-141	JJ-138	M-52
JP-353	Off Seward Ave.	689	8	Ductile Iron	125		JJ-159	JJ-34	
JP-354	Off Seward Ave.	548	8	Asbestos Cement	125		JJ-34	JJ-151	
JP-355	Tongass Dr.	671	12	Ductile Iron	125	1984	JJ-53	JJ-92	S-154
JP-357	Seward Ave.	301	10	Ductile Iron	125	1984	JJ-215	JJ-70	S-154
JP-358	Seward Ave.	590	12	Ductile Iron	125	1984	JJ-70	JJ-65	S-154
JP-359	Seward Ave.	165	12	Ductile Iron	125	1984	JJ-65	JJ-56	S-154
JP-360	Seward Ave.	454	12	Ductile Iron	125	1984	JJ-56	JJ-53	S-154
JP-362	Seward Ave.	129	6	Ductile Iron	125	1984	JJ-227	JJ-215	S-154
JP-363	Seward Ave.	603	10	Cast iron	100		JJ-76	JJ-73	
JP-364	Charcoal Dr.	265	8	Ductile Iron	125	2002	JJ-22	JJ-120	
JP-366	Alice loop	508	8	Ductile Iron	125	2002	JJ-208	JJ-214	
JP-367	Alice loop	676	8	Ductile Iron	125	1985	JJ-125	JJ-130	W-124
JP-368	Alice loop	564	8	Ductile Iron	125	1985	JJ-130	JJ-127	W-124
JP-369	Alice loop	699	8	Ductile Iron	125	1985	JJ-127	JJ-125	W-124
JP-370	Off Alice loop	690	8	Ductile Iron	125		JJ-214	JJ-210	
JP-400	Sitka Channel	1,636	16	HDPE	150	2009	JJ-53	CJ-101	
SP-211	Jarvis St.	642	8	Ductile Iron	125	1987	SJ-157	SJ-158	S-155
SP-212	Sawmill Cr. Road	1,044	14	Cast iron	100	1972	SJ-156	SJ-162	W-70
SP-213	Smith St.	447	8	Ductile Iron	125	1983	SJ-162	SJ-163	FLAT FILE PG 39
SP-214	Sawmill Cr. Road	591	14	Cast iron	100	1972	SJ-162	SJ-300	W-70
SP-215	Price St.	362	12	Ductile Iron	125	1986	SJ-260	SJ-166	S-164
SP-216	Price St.	344	12	Ductile Iron	125	1988	SJ-166	SJ-167	FLAT FILE PG 39
SP-217	Burkhart St.	660	6	Ductile Iron	125	1986	SJ-166	SJ-168	S-164
SP-220	Sawmill Cr. Road	628	14	Ductile Iron	125	1972	SJ-170	SJ-165	W-69
SP-221	Sawmill Cr. Road	511	14	Cast iron	100	1972	SJ-170	SJ-172	W-68
SP-222	Sawmill Cr. Road	24	12	Ductile Iron	125	1987	SJ-172	TJ-4	W-125, SH 2
SP-223	Sawmill Cr. Road	550	14	Cast iron	100	1972	SJ-172	SJ-173	W-68
SP-224	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-173	SJ-174	W-98
SP-225	Wolff Dr.	591	6	Ductile Iron	125	1975-Post	SJ-174	SJ-175	

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-226	Wolff Dr.	412	6	Ductile Iron	125	1975-Post	SJ-175	SJ-176	W-98
SP-227	Wolff Dr.	311	6	Ductile Iron	125	1975	SJ-176	SJ-174	W-98
SP-229	Sawmill Cr. Road	683	14	Cast iron	100	1972	SJ-177	SJ-178	W-67
SP-235	Sawmill Cr. Road	512	14	Cast iron	100	1972	SJ-178	SJ-179	W-66
SP-236	Sawmill Cr. Road	941	14	Cast iron	100	1972	SJ-179	SJ-180	W-66
SP-237	Anna Dr.	176	8	Ductile Iron	125	1985	SJ-180	SJ-181	S-151
SP-238	Anna Dr.	365	8	Ductile Iron	125	1985	SJ-181	SJ-182	S-151
SP-239	Anna Dr.	394	6	Ductile Iron	125	1985	SJ-181	SJ-185	S-151
SP-241	Sawmill Cr. Road	15	12	Ductile Iron	125	1987	SJ-183	TJ-3	W-125
SP-242	Sawmill Cr. Road	1,246	14	Ductile Iron	125	1980	SJ-183	SJ-186	W-118
SP-243	Shotgun Alley	800	8	Ductile Iron	125	1980	SJ-186	SJ-187	W-118
SP-244	Shotgun Alley	1,051	8	Ductile Iron	125	1980	SJ-187	SJ-188	W-118
SP-245	Islander Dr.	1,086	6	Ductile Iron	125	1979	SJ-188	SJ-189	W-111, 112, 113
SP-246	Sawmill Cr. Road	1,354	12	Ductile Iron	125	1980	SJ-186	SJ-190	W-118
SP-248	Sawmill Cr. Road	1,428	12	Ductile Iron	125	1980	SJ-191	SJ-192	W-118
SP-249	Sawmill Cr. Road	4	12	Ductile Iron	125	1980	SJ-192	SJ-196	W-118
SP-280	Sawmill Cr. Road	30	12	Ductile Iron	125	1987	SJ-192	TJ-2	W-125
SP-288	Jarvis St.	593	8	Ductile Iron	125	1987	SJ-158	SJ-159	S-155
SP-319	Smith St.	1,045	8	HDPE	150	1998	SJ-258	SJ-163	FLAT FILE PG 39
SP-320	Price St.	114	12	Ductile Iron	125	1986	SJ-260	SJ-259	S-164
SP-321	Price St.	136	12	Ductile Iron	125	1986	SJ-259	SJ-165	S-164
SP-322	Price St.	706	8	HDPE	150	2002	SJ-167	SJ-261	
SP-323	Price St.	376	8	HDPE	150	2002	SJ-261	SJ-262	
SP-324	Lance Dr.	633	6	Ductile Iron	125	1992	SJ-169	SJ-213	W-134
SP-325	Jamestown Dr.	474	8	Ductile Iron	125	1977	SJ-178	SJ-214	S-124, S-125
SP-326	Jamestown Dr.	573	8	Ductile Iron	125	1977	SJ-214	SJ-215	S-124, S-125
SP-327	Knutson Dr.	252	8	Ductile Iron	125	1993	SJ-180	SJ-217	M-244
SP-328	Knutson Dr.	692	6	Ductile Iron	125	1993	SJ-217	SJ-218	M-244
SP-329	Knutson Dr.	355	6	Ductile Iron	125	1993	SJ-218	SJ-219	M-244
SP-330	Knutson Dr.	341	6	Ductile Iron	125	1993	SJ-219	SJ-217	M-244
SP-331	Sawmill Cr. Road	776	8	Ductile Iron	125	1980	SJ-196	SJ-216	W-118
SP-410	Harvest Way	295	6	Ductile Iron	125	1988	SJ-167	SJ-265	WW-730
SP-411	Marys Court	451	6	Ductile Iron	125	2002	SJ-262	SJ-264	
SP-412	Off Price St.	269	6	HDPE	150	2002	SJ-261	SJ-263	
SP-413	Lilian Dr.	1,161	6	Ductile Iron	125	2001	SJ-260	SJ-259	W-136
SP-415	Vitskari St.	54	8	Ductile Iron	125	1995	SJ-235	SJ-237	FLAT FILE PG 41
SP-416	Kiksadi Ct.	319	6	Ductile Iron	125	1995	SJ-235	SJ-236	
SP-417	Sawmill Cr. Road	213	14	Cast iron	100	1972	SJ-173	SJ-267	W-68
SP-418	Sawmill Cr. Road	1,417	14	Cast iron	100	1972	SJ-267	SJ-177	W-68, W-67
SP-419	Chirikov Dr.	508	10	Ductile Iron	125		SJ-267	SJ-266	
SP-420	Sawmill Cr. Road	78	14	Ductile Iron	125	1980	SJ-180	SJ-194	W-118
SP-421	Sawmill Cr. Road	101	14	Ductile Iron	125	1980	SJ-194	SJ-183	W-118
SP-422	Cedar Beach Rd.	1,148	8	HDPE	150	2001	SJ-194	SJ-201	
SP-423	Rands Dr.	429	6	Ductile Iron	125	1985	SJ-187	SJ-225	S-145
SP-424	Sawmill Cr. Road	1,843	12	Ductile Iron	125	1980	SJ-190	SJ-226	W-118
SP-425	Sawmill Cr. Road	625	12	Ductile Iron	125	1980	SJ-226	SJ-191	W-118
SP-426	Blueberry lane	554	4	Ductile Iron	125	2001	SJ-226	SJ-227	
SP-427	Sawmill Cr. Road	1,034	12	Ductile Iron	125	1992	SJ-216	SJ-228	W-133
SP-433	Lance Dr.	291	6	Ductile Iron	125	1979	SJ-168	SJ-231	S-129
SP-434	Lance Dr.	523	6	Ductile Iron	125	1979	SJ-231	SJ-170	S-129
SP-435	Lance Dr.	323	6	Ductile Iron	125	1978	SJ-168	SJ-232	S-128
SP-436	Lance Dr.	592	6	Ductile Iron	125	1981	SJ-232	SJ-169	S-133
SP-437	Jarvis St.	251	8	Ductile Iron	125	1987	SJ-156	SJ-233	
SP-438	Jarvis St	450	8	Ductile Iron	125	1987	SJ-233	SJ-157	S-155
SP-439	Burkhart St.	381	8	Ductile Iron	125	1995	SJ-168	SJ-234	FLAT FILE PG 41
SP-440	Vitskari St.	141	8	Ductile Iron	125	1995	SJ-234	SJ-235	FLAT FILE PG 41
SP-441	Beardslee Way	398	8	HDPE	150	2005	SJ-158	SJ-258	
SP-442	Beardslee Way	504	8	HDPE	150	2005	SJ-258	SJ-261	
SP-500	Sawmill Cr. Road	310	14	Cast iron	100	1972	SJ-300	SJ-165	W-70
SP-501	Eagle Wy.	627	8	HDPE	150	2018	SJ-300	SJ-301	W-18
SP-502	Vitskari St.	184	8	HDPE	150	2006	SJ-237	SJ-302	
SP-503	Vitskari St.	263	8	HDPE	150	2006	SJ-302	SJ-303	
SP-504	Eliason Lp.	45	8	HDPE	150	2006	SJ-303	HSPMP-11	

TABLE 4
SITKA WATER SYSTEM PIPE INVENTORY
BY PIPE LABEL

Label	Street Name	Length (ft)	Diameter (in)	Material	Hazen-Williams "C"	Date of Pipe	Start Node	Stop Node	Drawing Location
SP-505	Vitskari St.	118	8	HDPE	150	2006	HSPMP-11	SJ-304	
SP-506	Eliason Lp.	287	8	HDPE	150	2006	SJ-304	SJ-305	
SP-507	Eliason Lp.	616	8	HDPE	150	2006	SJ-305	SJ-306	
SP-508	Versa Pl.	635	8	HDPE	150	2006	SJ-305	SJ-307	FLAT FILE SH 9 OF 11
SP-509	Sawmill Cr. Road	10,500	12	Ductile Iron	125		SJ-228	SJ-229	

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Appendix B
Water System Modeling Results

TABLE 1 PRESSSURES AND FLOWS
FLOW CONTROL VALVE SETPOINT 2,200 GPM
AND AVERAGE DAILY DEMAND OF 2,200 GPM

FCV Setpoint Flow at UV Facility	2,200	gpm			
Areawide Water Demand	2,200	gpm	Average Daily Demand (ADD)	3.2	MGD

Location and Resulting Pressure	Node Number	Node Elevation	ADD of 2,200 GPM	ADD plus Flow w/ 20 PSI at end of HPR	ADD plus Flow w/ 20 PSI at end of Japonski Island	ADD plus Flow w/ 20 PSI at Sawmill Cove	ADD Plus 3,500 GPM Demand at Lake St. and Lincoln St.	ADD Plus 1,500 GPM Demand at Shotgun Alley and SMCR	ADD Plus 1,500 GPM Demand at Upper Granite Creek
		FT	PSI	PSI	PSI	PSI	PSI	PSI	PSI
End of Halibut Point Road (HPR)	HJ-1	25	83	1643 GPM	83	83	83	83	72
End of Japonski Island	JJ-150	23	87	86	1559 GPM	83	44	80	87
End of Sawmill Creek Road (SMCR)	SJ-229	82	86	86	78	1306	45	54	86
Upper Granite Creek Rd.	HJ-264	117	43	31	43	43	43	43	11
Lake St. and Lincoln St.	CJ-128	21	87	87	80	84	44	81	87
Jarvis St. and SMCR	SJ-156	24	87	87	80	78	47	72	87
Upper Jarvis St.	SJ-159	75	65	65	57	55	24	48	65
Upper Lance Dr.	SJ-213	182	18	18	11	7	-22	0	18
Upper Jamestown Dr.	SJ-215	153	31	31	23	14	-10	4	31
Shotgun Alley and SMCR	SJ-186	142	36	35	28	16	-5	4	35
Shotgun Alley and SMCR Hydrant			29[4]						

Water Tank and Reservoir		Water Elevation	Water Tank and Reservoir Outflows						
		FT	GPM						
Gavan 1.2 MG Tank		224	-424	-406	611	329	1707	575	-407
Harbor Mountain 0.75 MG Tank		211	0	1266	0	0	0	0	1130
Whitcomb 1.0 MG Tank		392	447	807	971	790	1815	948	800

		Elevation	Hydraulic Grade						
		FT	FT						
UV Facility		35	240[1]	240	223	227	150	222	240

1. At 240' HGL, exit pressure from UV Facility is 89 psi.
2. Reported pressue at surface elevation. Assume surface elevation is +6 ft above node's elevation.
3. Positive flow is tank outflow.
4. Data Logger for 8/13/2021, 3:45 PM

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TABLE 2 PRESSSURES AND FLOWS
FLOW CONTROL VALVE SETPOINT 3,400 GPM
AND MAX DAY DEMAND OF 3,400 GPM

FCV Setpoint Flow at UV Facility	3,400	gpm			
Areawide Water Demand	3,400	gpm	Max Day Demand (MDD)	4.9	MGD

Location and Resulting Pressure	Node Number	Node Elevation	MDD of 3,400 GPM	MDD plus Flow w/ 20 PSI at end of HPR	MDD plus Flow w/ 20 PSI at end of Japonski Island	MDD plus Flow w/ 20 PSI at Sawmill Cove	MDD Plus 3,500 GPM Demand at Lake St. and Lincoln St.	MDD Plus 1,500 GPM Demand at Shotgun Alley and SMCR	MDD Plus 1,500 GPM Demand at Upper Granite Creek
		FT	PSI	PSI	PSI	PSI	PSI	PSI	PSI
End of Halibut Point Road (HPR)	HJ-1	25	82	1625	82	82	81	82	71
End of Japonski Island	JJ-150	23	88	88	1620	84	52	82	88
End of Sawmill Creek Road (SMCR)	SJ-229	82	88	88	80	1313	52	52	88
Upper Granite Creek Rd.	HJ-264	117	42	31	42	42	42	42	11
Lake St. and Lincoln St.	CJ-128	21	89	89	82	84	52	82	89
Jarvis St. and SMCR	SJ-156	24	90	90	83	78	54	73	90
Upper Jarvis St.	SJ-159	75	68	68	60	54	32	49	68
Upper Lance Dr.	SJ-213	182	21	21	14	6	-14	0	21
Upper Jamestown Dr.	SJ-215	153	33	33	26	13	-2	4	33
Shotgun Alley and SMCR	SJ-186	142	38	38	31	14	2	3	38

Water Tank and Reservoir		Water Elevation	Water Tank and Reservoir Outflows						
		FT	GPM						
Gavan 1.2 MG Tank		224	-460	-439	567	272	1624	494	-440
Harbor Mountain 0.75 MG Tank		211	0	1338	0	0	0	0	1220
Whitcomb 1.0 MG Tank		392	475	740	1068	898	1891	1021	735
CIP W141 - Sitka HS Tank		285	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CIP W142 - Keet Gooshi Heen ES Tank		240	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Booster Station			Flow and Head						
			GPM @ FT						
CIP W114 - 1719 Sawmill Creek Rd.			N/A	N/A	N/A	N/A	N/A	N/A	N/A
CIP W140.1 - 1819 Sawmill Creek Rd.			N/A	N/A	N/A	N/A	N/A	N/A	N/A
CIP W143 - 101 Knutson Dr.			N/A	N/A	N/A	N/A	N/A	N/A	N/A

		Elevation	Hydraulic Grade						
		FT	FT						
UV Facility		35	259[1]	259	243	244	177	238	259

1. At 259' HGL, exit pressure from UV Facility is 97 psi.
2. Reported pressue at surface elevation. Assume surface elevation is +6 ft above node's elevation.
3. Positive flow is tank outflow.

CRW ENGINEERING GROUP, LLC

TABLE 3 PRESSSURES AND FLOWS
FLOW CONTROL VALVE SETPOINT 3,400 GPM
AND MAX DAY DEMAND OF 3,400 GPM
WITH CAPITAL IMPROVEMENT PROJECTS

FCV Setpoint Flow at UV Facility	3,400	gpm			
Areawide Water Demand	3,400	gpm	Max Day Demand (MDD)	4.9	MGD

Location and Resulting Pressure	Node Number	Node Elevation	MDD of 3,400 GPM	MDD Plus 3,500 GPM Demand at Lake St. and Lincoln St. w/ 1719 Sawmill Creek Rd. Booster Station	MDD Plus 3,500 GPM Demand at Lake St. and Lincoln St. w/ 1819 Sawmill Creek Rd. Booster Station	MDD Plus 3,500 GPM Demand at Lake St. and Lincoln St. w/ 101 Knutson Dr. Booster Station	MDD Plus 3,500 GPM Demand at Lake St. and Lincoln St. w/ Additional 1 MG Water Storage	MDD Plus 3,500 GPM Demand at Lake St. and Lincoln St. w/ Additional 2 MG Water Storage	MDD Plus 1,500 GPM Demand at Shotgun Alley and SMCR w/ 1719 Sawmill Creek Rd. Booster Station	MDD Plus 1,500 GPM Demand at Shotgun Alley and SMCR w/ 1819 Sawmill Creek Rd. Booster Station	MDD Plus 1,500 GPM Demand at Shotgun Alley and SMCR w/ 101 Knutson Dr. Booster Station	MDD Plus 1,500 GPM Demand at Shotgun Alley and SMCR w/ Additional 1 MG Water Storage	MDD Plus 1,500 GPM Demand at Shotgun Alley and SMCR w/ Additional 2 MG Water Storage
		FT	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI
End of Halibut Point Road (HPR)	HJ-1	25	82	81	81	81	82	82	82	82	82	82	82
End of Japonski Island	JJ-150	23	88	52	52	51	79	79	82	82	82	88	88
End of Sawmill Creek Road (SMCR)	SJ-229	82	88	89	89	51	80	80	82	85	58	59	59
Upper Granite Creek Rd.	HJ-264	117	42	42	42	42	42	42	42	42	42	42	42
Lake St. and Lincoln St.	CJ-128	21	89	51	51	50	79	79	82	82	82	89	89
Jarvis St. and SMCR	SJ-156	24	90	54	54	53	82	82	73	73	73	80	80
Upper Jarvis St.	SJ-159	75	68	32	32	31	60	60	49	49	49	55	56
Upper Lance Dr.	SJ-213	182	21	-15	-15	-16	13	13	0	0	0	6	7
Upper Jamestown Dr.	SJ-215	153	33	35	-3	34	25	26	33	4	33	10	10
Shotgun Alley and SMCR	SJ-186	142	38	40	40	38	30	30	32	35	36	9	9

Water Tank and Reservoir		Water Elevation	Water Tank and Reservoir Outflows										
		FT	GPM										
Gavan 1.2 MG Tank		224	-460	1624	1624	1469	-2	-49	494	494	494	-509	-514
Harbor Mountain 0.75 MG Tank		211	0	0	0	0	0	0	0	0	0	0	0
Whitcomb 1.0 MG Tank		392	475	1843	1845	2097	827	822	1003	1021	1003	300	287
CIP W141 - Sitka HS Tank		285	N/A	N/A	N/A	N/A	2690	1414	N/A	N/A	N/A	1724	898
CIP W142 - Keet Gooshi Heen ES Tank		240	N/A	N/A	N/A	N/A	N/A	1327	N/A	N/A	N/A	N/A	843

Booster Station			Flow and Head										
			GPM @ FT										
CIP W114 - 1719 Sawmill Creek Rd.			N/A	310 @ 87'	N/A	N/A	N/A	N/A	1810 @ 69'	N/A	N/A	N/A	N/A
CIP W140.1 - 1819 Sawmill Creek Rd.			N/A	N/A	284 @ 87'	N/A	N/A	N/A	N/A	1784 @ 76'	N/A	N/A	N/A
CIP W143 - 101 Knutson Dr.			N/A	N/A	N/A	119 @ 86'	N/A	N/A	N/A	N/A	1619 @ 68'	N/A	N/A

		Elevation	Hydraulic Grade										
		FT	FT										
UV Facility		35	259[1]	176	176	174	241	253	238	238	238	253	253

1. At 259' HGL, exit pressure from UV Facility is 97 psi.
2. Reported pressue at surface elevation. Assume surface elevation is +6 ft above node's elevation.
3. Positive flow is tank outflow.

CRW ENGINEERING GROUP, LLC

TABLE 4 PRESSSURES AND FLOWS
FLOW CONTROL VALVE SETPOINT 3,850 GPM
AND PEAK HOURLY DEMAND OF 6,150 GPM
WITH CAPITAL IMPROVEMENT PROJECTS

FCV Setpoint Flow at UV Facility	3,850	gpm			
Areawide Water Demand	6,150	gpm	Peak Hourly Demand (PHD)	8.9	MGD

Location and Resulting Pressure	Node Number	Node Elevation	PHD of 6,150 GPM	PHD plus Flow w/ 20 PSI at end of HPR	PHD plus Flow w/ 20 PSI at end of Japonski Island	PHD plus Flow w/ 20 PSI at Sawmill Cove	PHD Plus 3,500 GPM Demand at Lake St. and Lincoln St.	PHD Plus 1,500 GPM Demand at Shotgun Alley and SMCR	PHD Plus 1,500 GPM Demand at Upper Granite Creek	PHD w/ 1719 Sawmill Creek Rd. Booster Station	PHD w/ 1819 Sawmill Creek Rd. Booster Station	PHD w/ 101 Knutson Dr. Booster Station	PHD w/ 1 MG Water Storage	PHD w/ Additional 2 MG Water Storage
		FT	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI
End of Halibut Point Road (HPR)	HJ-1	25	77	1548 GPM	77	77	77	77	70	77	77	77	77	77
End of Japonski Island	JJ-150	23	79	79	1258 GPM	71	2	58	79	79	79	79	87	87
End of Sawmill Creek Road (SMCR)	SJ-229	82	73	73	56	1000 GPM	-2	17	73	80	87	74	82	82
Upper Granite Creek Rd.	HJ-264	117	38	30	38	38	38	38	9	38	38	38	38	38
Lake St. and Lincoln St.	CJ-128	21	81	81	63	72	3	59	81	80	80	80	89	89
Jarvis St. and SMCR	SJ-156	24	79	79	62	66	4	46	79	79	79	79	88	88
Upper Jarvis St.	SJ-159	75	57	57	40	42	-18	21	57	56	56	56	65	65
Upper Lance Dr.	SJ-213	182	9	9	-8	-7	-66	-30	9	9	9	9	18	18
Upper Jamestown Dr.	SJ-215	153	21	21	4	2	-54	-29	21	35	21	33	29	30
Shotgun Alley and SMCR	SJ-186	142	25	25	9	4	-49	-31	25	39	39	38	34	34
Shotgun Alley and SMCR Hydrant			22[4]											
Water Tank and Reservoir		Water Elevation	Water Tank and Reservoir Outflows											
		FT	GPM											
Gavan 1.2 MG Tank		224	781	783	1486	1191	2711	1619	783	779	779	779	-406	-413
Harbor Mountain 0.75 MG Tank		211	28	1533	45	37	89	49	1490	24	24	24	10	9
Whitcomb 1.0 MG Tank		392	1501	1537	2052	1806	3010	2151	1536	1490	1489	1489	852	838
CIP W141 - Sitka HS Tank		285	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1859	970
CIP W142 - Keet Gooshi Heen ES Tank		240	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	911
Booster Station			Flow and Head											
			GPM @ FT											
CIP W114 - 1719 Sawmill Creek Rd.			N/A	N/A	N/A	N/A	N/A	N/A	N/A	556 @ 32'	N/A	N/A	N/A	N/A
CIP W140.1 - 1819 Sawmill Creek Rd.			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	508 @ 33'	N/A	N/A	N/A
CIP W143 - 101 Knutson Dr.			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	215 @ 28'	N/A	N/A
		Elevation	Hydraulic Grade											
		FT	FT											
UV Facility		35	242[1]	242	203	220	69	187	242	244	244	244	263	263

1. At 242' exit pressure from UV Facility is 90 psi.
2. Reported pressue at surface elevation. Assume surface elevation is +10 ft above node's elevation.
3. Positive flow is tank outflow.
4. Data Logger for week of 8/11/2021, 5:45 AM

CRW ENGINEERING GROUP, LLC

SITKA WATER SYSTEM
HYDRANT FLOW TEST RESULTS
2021

Test Date	Flow Hydrant	Residual Hydrant			Geodetic/Sawmill Creek Hydrant CJ-149		Shotgun Ally/Sawmill Creek Hydrant SJ-186		Measured Flow Rate at Flow Hydrant	Model Predicted Flow at 20 psi (GPM) when SFCV-1 is at SCADA Flow	Model Predicted Flow at 20 psi when SFCV-1 is at 2500GPM Flow [2]	SCADA Blue Lake Control Valve Setting	Tank Level			Pumps	Whitcomb PRV Vault		Whitcomb Pump Station		Harbor Mountain	
	Location	Location	Static Pressure	Residual Pressure	Static Pressure	Residual Pressure	Static Pressure	Residual Pressure					Harbor Mountain	Gavan	Whitcomb	Status	PT3, System Pressure	FT4, 12" Flow meter	FT2, 2" flow to HPR	FT1, 10" flow to HPR	Harbor Mountain Tank Inlet Pressure	Harbor Mountain Actuator Valve (open/closed)
			PSI	PSI	PSI	PSI	PSI	PSI	GPM	GPM	GPM	GPM	FT	FT	FT	ON/OFF	PSI	GPM	GPM	GPM	PSI	OPEN/CLOSED
4/27/2021	Price St & Beadslee Way SJ-261				69.1 69.9	69.1 62.7	23.9 32.3	23.9 18.6	1190	776	1104	1745.7	19.3	41.349	31.359	Pressure Pumps On Whitcomb Pumps Off	36.927	97.796	47.095	34.378	15.635	Closed
		Price and Marys Court SJ-262	59 62.6	44 47.2																		
		Jarvis and Beardslee SJ-158	64 63.8	52 50.1																		
		Price and Molly Lane SJ-167 +16' elevation	78 71.9	65 57.9																		
4/27/2021	601 Alice Loop JJ-130				69.1 71.0	69.1 65.1	23.9 33.5	23.9 27.6	1325	1532	1836	2038	19.3	40.8	30.482	Pressure Pumps On Whitcomb Pumps Off	32.775	267.8	54.78	190.629	13.9	Closed
		750 Alice Loop JJ-125	86 89.3	68 58.6																		
		709 Alice Loop JJ-127	84 89.3	66 56.8																		
4/27/2021	1190 Seward Ave JJ-37				69.1 70.0	69.1 62.4	23.9 32.4	23.9 24.8	1350	1287	2056	1816.831	19.3	40.97	30.514	Pressure Pumps On Whitcomb Pumps Off	34.554	159.876	52.42	138.915	14.673	Closed
		Tongass & Seward JJ-53	78 82.1	73 65.9																		
4/27/2021	4702 HPR HJ-5				69.3 72.0	69.3 71.8	23.9 34.5	23.9 34.2	1060	734	736	2178	19.3	41.1	30.158	Pressure Pumps On Whitcomb Pumps Off	35.397	631.6	62.08	550.7	16.4	Closed
		4750 HPR HJ-4	76 76.9	45 32.6																		
		4620 HPR HJ-6	76 71.3	45 29.0																		
4/27/2021	4702 HPR HJ-5				69.3 72.0	69.3 72.0	23.9 34.5	23.9 34.5	1300	1245	1245	2185.84	19.3	41.1	30.115	Pressure Pumps On Whitcomb Pumps Off	35	628.84	61.842	552.145	11.8	Open
		4750 HPR HJ-4	71.9	58 45.9																		
		4620 HPR HJ-6	66.3	62 43.2																		
4/27/2021	301 Granite Creek HJ-264				69.3 71.8	69.3 71.7	23.9 34.3	23.9 34.1	760	719	721	2157	19.3	40.8	30.297	Pressure Pumps On Whitcomb Pumps Off	36.363	107.4	46.6	41.443	0	Closed
		3804 HPR HJ-12	78 79.1	68 61.6																		
		120 Granite Creek Rd HJ-12 + 45'	66 59.7	48 42.2																		
4/27/2021	Baranof & Lincoln CJ-143				69.2 69.7	69.2 60.2	23.9 32.1	23.9 22.6	1405	1153	1983	1721.161	19.3	40.989	31.031	Pressure Pumps On Whitcomb Pumps Off	36.561	74.6	44.835	21.005	15.354	Closed
		Etolin & Baranof CJ-142	82 79.7	76 69.8																		
		Finn Alley & Lincoln CJ-144	84 86.3	75 76.4																		
		Monastery & Lincoln CJ-135	84 86.4	72 76.7																		
4/27/2021	112 Jamestown Dr. SJ-214				68.7 70.4	68.8 67.8	23.9 32.8	23.9 24.4	700	557	660	1875.859	19.3	41.509	31.225	Pressure Pumps On Whitcomb Pumps Off	38.402	65.378	43.327	1.355	15.591	Closed
		121 Jamestown Dr. SJ-215	32 28.1	22 17.8																		
		102 Jamestown Dr. SJ-178	84 83.1	78 74.7																		
4/27/2021	GPIP, East of UV Plant PW-FH5 (Operator Map) SJ-229				67.2 72.3	67.3 68.0	23.9 34.8	24 18.0	1000	828	885	2218	19.3	41.4	31.313	Pressure Pumps On Whitcomb Pumps Off	36.225	60.6	43.26	0	15.1	Closed
		GPIP, Corner turn 400 South UV Plant (PW-FH4 on Operator Map) SJ-229	84 85.0	48 23.0																		

Notes:
1. Model's static and residual pressures adjusted to approximately match hydrant elevation (Junction elevation + 8 ft).
2. Average Daily Demand (ADD) was applied to model due to low demands on the day of hydrant flow tests.
3. Model does not have layout for GPIP. Purpose of hydrant flow was historical data point for future projects.
4. Acryonym "HPR" = "Halibut Point Road"
5. Top number represents measured pressure in field. Bottom number represents WaterCAD model's pressure.

CRW ENGINEERING GROUP, LLC

BLWTP Data Log

Month	Total MG for month	Average (MG/day)	Yearly Total (MG)	Yearly Average (MGD)	Max MGD for month
2019					
Jan	93.471	3.015	93.471	3.015	3.159
Feb	97.824	3.494	191.295	3.242	3.691
Mar	97.897	3.158	289.192	3.213	3.579
Apr	87.045	2.902	376.237	3.135	3.202
May	89.886	2.900	466.123	3.087	3.202
Jun	91.5	3.050	557.623	3.081	3.697
Jul	117.091	3.777	674.714	3.183	4.363
Aug	125.43	4.046	800.144	3.293	4.506
Sep	102.536	3.418	902.680	3.307	3.979
Oct	87.07	2.809	989.750	3.256	3.018
Nov	86.061	2.869	1,075.811	3.221	3.159
Dec	92.545	2.985	1,168.356	3.201	3.106
2020					
Jan	104.831	3.382	104.831	3.382	4.072
Feb	88.612	3.056	193.443	3.224	3.394
Mar	100.252	3.234	293.695	3.227	3.464
Apr	85.914	2.864	379.609	3.137	3.282
May	83.159	2.683	462.768	3.045	3.114
Jun	76.323	2.544	539.091	2.962	2.708
Jul	95.366	3.076	634.457	2.979	3.655
Aug	109.146	3.521	743.603	3.048	3.700
Sep	93.923	3.131	837.526	3.057	3.544
Oct	84.54	2.727	922.066	3.023	3.628
Nov	75.711	2.524	997.777	2.978	3.278
Dec	74.657	2.408	1,072.434	2.930	2.660

Notes: Meters recorded by CBS water department operators. This sheet is a simplification of raw data and does not include notes or indications of estimations so that Excel functions can be used. Items in red have been manually entered to maintain data.

BLWTP Data Log

OVERALL					
	Maximum	**125.430**	**4.046**	**1,168.356**	**3.382**
	Minimum	**74.657**	**2.408**	**93.471**	**2.930**

	2019	**2020**		**Average**	**Chosen 2019**	**Estimated Design Value (MGD)**	**Units**	**Comments**	
Yearly Total (MG)	1,168	1,072		1,120			MG		
Average Month (MGD)	3.20	2.93		3.07		**3.20 MGD**	MGD	**2,223**	GPM
Maximum Month (MGD)	4.05	3.52		3.78		**4.05 MGD**	MGD	**2,810**	GPM
Max Daily (MGD)	4.51	4.07		4.29					
	August	August							
Peak ratio	1.26	1.20	Peak Ratio	1.23	1.26	**1.26**	Maximum Month / Average Month	Ratio range is 1.10 to 1.40. 1.20 is typical	
Maximum Day	1.41	1.39	Max Day Ratio	1.40	1.41	**4.51**	MGD	Ratio range is 1.60 to 2.20 1.80 is typical. Anchorage uses 1.76.	
						3,129	GPM		
Maximum Hour			Peak Ratio		2.55	**8.16**	MGD	Ratio range is 2.25 to 3.20 Often taken as 1.5 x max day. Anchorage uses 2.0.	
						5,668	GPM		

Source: Metcalf and Eddy, Table 2-8

Peak ratios were selected on the lower side due to:

1. No evidence of strong seasonal demand.
2. Irrigation demands, which frequently drive seasonal peaks are assumed to be minimal.
3. Peak months for metered customers are distributed throughout the year (i.e. they don't appear to be additive)
4. Per capita consumption is 3 to 4 times higher than expected. This suggests that water usage is influenced by factors other than domestic consumption, such as steady state losses.

GD						
3200975	Per Capita Consumption	377	gpc/day	based on	8,500	residents
2,483,975	Deduct metered volume	292	gpc/day	based on	717,000	gpd metered demand
2,483,975	Deduct tank overflow	292	gpc/day	based on	0	gpd reported tank overflow of ~0 gpm

Typical per capita consumption ranges from 65 to 290 gpc / day (with 100 gpd of that max being industrial use.)
Average nationwide is 165 gpc /day. Anchorage ranges from 150 to 175 gpc /day.

Year: 2019 CBS TREATED WATER METER READINGS

TO: FINANCE DEPT. Larry Fitzsimmons (Phone: 747-1801 and Fax: 747-0536)

Fr: Water Dept. Rob Lihou Phone: 747-4074

Mo/Da	4600 SMC SBS Ice Machine	4642 SMC SBS Bunk House #1	4644 SMC SBS Bunk House #2	4600 SMC SBS Meter 2"	4600 SMC SBS Meter 6"	4600 SMC SBS 4" Cannery (X) 7.48	505 Katlian SPC COLD STORAGE	317 Katlian SSS METER 4 INCH	317 Katlian SSS METER 10 INCH	1211 SMC BARANOF LAUNDRY SMC RD.	210 Lake Aspen Hotel 2" Meter	906 HPR SITKA LAUNDRY CENTER
						Read in CF	Read in CF				Add 0 End	
2/1	52,026,100	101,800	2,776,000	8,169,400	403,252,000	387,502	1,310,400	65,634,861	84,959,104	13,083,000	1,278,580	3,675,500
3/1	52,082,600	215,700	2,792,000	8,227,500	403,282,000	387,502	1,576,660	70,999,050	88,940,713	13,120,000	1,322,790	3,725,100
4/2	52,263,900	348,800	2,850,000	8,315,700	403,439,000	387,502	1,917,230	75,753,694	91,051,094	13,162,000	1,391,070	3,767,660
5/2	52,263,900	348,800	2,946,000	8,369,100	403,482,000	387,502	2,299,950	78,942,155	92,703,321	13,162,000	1,472,090	3,855,480
6/1	52,263,900	348,800	2,946,000	8,400,900	403,533,000	387,502	2,641,940	82,003,490	94,153,023	13,251,000	1,558,790	3,957,000
6/30	52,415,800	715,200	3,212,000	8,499,100	404,182,000	409,957	2,999,960	86,023,140	95,815,725	13,301,000	1,678,870	4,113,000
8/1	53,626,000	971,700	3,446,000	8,664,900	412,952,000	734,300	3,510,690	94,945,698	1,463,529	13,356,000	1,826,380	4,280,900
9/1	56,156,100	1,172,200	3,446,000	8,869,800	425,153,000	691,750	3,914,580	2,099,327	7,438,890	13,402,000	1,941,150	4,280,900
9/29	56,738,200	1,340,400	3,750,000	8,974,000	429,596,000	56,802	4,297,510	8,133,385	11,593,521	13,441,000	2,021,450	4,531,100
11/1	*	*	*	*	*	*	4,634,740	14,048,401	11,763,931	13,480,000	2,080,670	4,602,900
12/1	*	*	*	*	*	*	4,930,120	15,203,557	17,730,530	13,517,000	2,136,530	4,665,800
12/31	*	*	*	*	*	*	5,193,380	19,175,878	20,935,986	13,545,000	2,138,500	4,716,200

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Fr: Water Dept. Rob Lihou (Phone: 747-4074

		220 Tongas	204 Signaka	4513 HPR					613 Katlian	1 Lincoln	220 Tongas	224 Lincoln
Mo/Da	Totem Square Inn	Mt. Edg. Hosp.	204 Siginaka Way	HPM 4" Service for Ships	NSRAA (Raw)	NSRAA (Treated)	BEAR Fortress Domestic	BEAR Fortress Sewer	N. Petro Marine 2" Meter	S. Petro Marine 2" Meter	SEARHC 3" Dental Clinic	Luthern Church 1" Meter
	CF				Gallons Used							Add 0 End
1/31	6,078,569	134,057,000	6,645,000	27,520,068	180,996,400	36,420	108,000	238,380	3,174,000	3,763,649	9,936,001	205,390
3/1	6,078,861	134,154,000	6,646,000	27,520,068	179,500,368	36,420	108,000	238,380	3,222,700	4,053,132	10,307,654	208,400
3/31	6,081,424	134,267,000	6,647,000	27,520,068	211,443,680	37,430	164,400	247,680	3,266,400	4,354,486	10,722,224	214,700
5/2	6,085,932	134,434,000	6,648,000	27,590,148	162,020,752	38,050	164,400	254,510	3,283,900	4,637,768	11,154,052	218,230
6/1	6,093,680	134,610,000	6,650,000	28,876,216	239,047,696	38,470	774	262,420	3,329,000	4,892,387	11,518,784	220,670
6/30	6,110,751	134,897,000	6,653,000	30,542,184	98,598,648	38,990	9,995,810	274,340	3,403,400	5,196,780	11,931,593	226,540
8/1	6,131,156	135,202,000	6,655,000	32,105,749	187,218,896	39,700	9,995,810	287,730	3,519,300	5,520,225	12,383,100	235,050
9/1	6,151,149	135,786,000	6,657,000	33,733,504	172,377,328	40,100	9,996,390	302,740	3,610,300	5,803,142	12,838,193	242,290
9/29	6,157,471	136,334,000	6,660,000	34,853,540	190,631,952	40,620	9,999,840	320,880	3,651,300	6,058,858	13,265,439	247,570
11/1	6,161,642	136,929,000	6,664,000	*	196,337,488	41,010	1,530	332,650	3,678,000	6,342,349	13,694,686	250,120
12/1	6,167,323	137,605,000	6,670,000	*	209,589,552	41,350	1,650	335,660	3,696,700	6,657,706	14,130,347	252,350
12/31	6,174,305	138,280,000	6,673,000	*	204,279,584	41,660	*	*	3,714,500	6,952,132	14,536,063	253,660

Totem Square Inn: Read BOTH meters in CF. ADD BOTH METERS. Enter SUM in Totem Square Inn Column.
Number in Totem Square Inn Column is Total CF used since meter installed.
Start Read for Meter usage was 1/7/19 = 619,285 + 5,459,100 = 6,078,385 CF. = 45,466,319 GALLONS.

HPM- ADD the 2" and the 4" together. Total in Meter column.

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Fr: Water Dept. Rob Lihou 747-4074

4" Crescent HBR		4" Sealing Cove HBR		4"	Thomsen HBR	4"	ANB HBR	4"	Eliason HBR	ANB CF
Jan.	111,018,000	Jan.	29,806,000	Jan.	42,111,000	Jan.	31,348,680	Jan.	97,597,531	4,191,000.00
Feb.	112,654,000	Feb.	29,994,000	Feb.	42,721,000	Feb.	32,120,616	Feb.	102,484,409	4,294,200.00
Mar.	114,316,000	Mar.	30,108,000	Mar.	42,983,000	Mar.	32,776,612	Mar.	107,469,872	4,381,900.00
Apr.	116,024,000	Apr.	30,323,000	Apr.	43,038,000	Apr.	33,520,872	Apr.	111,936,533	4,481,400.00
May	117,817,000	May	30,395,000	May	43,201,000	May	33,728,816	May	115,334,021	4,509,200.00
June	119,998,000	June	30,521,000	June	43,370,000	June	34,989,944	June	118,114,362	4,677,800.00
July	122,251,000	July	30,637,000	July	43,717,000	July	35,548,700	July	119,425,893	4,752,500.00
Aug.	124,273,000	Aug.	30,748,000	Aug.	43,944,000	Aug.	36,067,812	Aug.	121,061,196	4,821,900.00
Sept.	126,839,000	Sept.	30,816,000	Sept.	44,178,000	Sept.	36,396,184	Sept.	122,502,405	4,865,800.00
Oct.	128,822,000	Oct.	30,840,000	Oct.	44,330,000	Oct.	36,741,012	Oct.	124,014,620	4,911,900.00
Nov.	130,426,000	Nov.	30,865,000	Nov.	44,474,000	Nov.	37,609,440	Nov.	125,876,055	5,028,000.00
Dec.	131,869,000	Dec.	30,869,000	Dec.	44,730,000	Dec.	38,307,324	Dec.	127,212,940	5,121,300.00

***Cresent, Sealing, Thompsen and Eliason meters are gallons. ANB is CF and is converted to gallons at time of read. Write CF number in "ANB CF". Convert CF to Gals. (CFx7.48). Write GALLONS TOTAL in ANB HBR.

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Fr: Water Dept. Rob Lihou Phone: 747-4074

Mo/Da	4600 SMC SBS Ice Machine	4642 SMC SBS Bunk House #1	4644 SMC SBS Bunk House #2	4600 SMC SBS Meter 2"	4600 SMC SBS Meter 6"	4600 SMC SBS 4" Cannery (X) 7.48	505 Katlian SPC COLD STORAGE	317 Katlian SSS METER 4 INCH	317 Katlian SSS METER 10 INCH	1211 SMC BARANOF LAUNDRY SMC RD.	210 Lake Aspen Hotel 2" Meter	906 HPR SITKA LAUNDRY CENTER
						Read in CF	Read in CF				Add 0 End	
2/1	*	*	*	*	*	*	5,223,820	21,787,460	23,353,989	13,571,000	2,274,660	4,782,500
3/1	*	*	*	*	*	*	5,304,710	26,757,016	26,075,688	13,601,000	2,314,950	4,833,900
4/2	*	*	*	*	*	*	*	ERROR	31,926,845	*	2,348,730	*
5/2	56,764,700	1,443,000	3,808,000	9,025,000	429,750,000	56,802	5,953,490	35,060,893	35,202,250	13,661,000	2,770,110	*
6/1	56,924,000	*	*	9,045,800	429,810,000	*	*	37,944,352	35,512,476	13,693,000	2,439,210	*
6/30	*	*	*	*	*	*	6,680,340	41,526,457	35,955,523	13,720,000	2,517,570	5,053,100
8/1	58,165,200	1,769,700	4,052,000	9,202,000	438,356,000	745,647	7,119,020	48,821,877	35,974,606	13,755,000	2,729,400	*
9/1	59,980,300	1,895,300	4,176,000	9,310,600	445,986,000	488,407	7,487,240	56,767,105	36,001,774	13,780,000	2,858,860	5,218,100
9/29	60,465,700	1,990,900	4,288,000	9,388,200	451,009,000	852,773	7,902,840	62,882,017	38,477,155	13,808,000	2,885,460	5,306,500
11/1	*	*	*	*	*	*	8,315,500	67,358,319	39,600,800	13,836,800	3,083,200	*
12/1	*	*	*	*	*	*	8,477,920	71,199,290	42,253,386	13,861,000	3,147,910	*
12/31												
	56,738,200	1,340,400	3,750,000	8,974,000	429,596,000	56,802	5,193,380	19,175,878	20,935,986	13,545,000	2,138,500	4716200

Year: 2020 CBS TREATED WATER METER READINGS

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Fr: Water Dept. Rob Lihou (Phone: 747-4074

		220 Tongas	204 Signaka	4513 HPR					613 Katlian	1 Lincoln	220 Tongas	224 Lincoln
Mo/Da	Totem Square Inn	Mt. Edg. Hosp.	204 Siginaka Way	HPM 4" Service for Ships	NSRAA (Raw)	NSRAA (Treated)	BEAR Fortress Domestic	BEAR Fortress Sewer	N. Petro Marine 2" Meter	S. Petro Marine 2" Meter	SEARHC 3" Dental Clinic	Luthern Church 1" Meter
	CF				Gallons Used							Add 0 End
1/31	6,189,774	139,064,000	6,679,000	*	207,848,080	41,980	*	*	3,797,200	7,305,271	14,961,552	257,390
3/1	6,198,894	139,779,000	6,683,000	*	375,104,064	*	*	*	3,838,310	7,610,655	15,308,765	259,250
3/31	*	140,554,000	*	*	198,498,432	*	*	*	3,863,600	7,947,877	15,675,768	260,360
5/2	*	141,252,000	6,687,000	*	394,713,344	*	1,750	35,660	3,883,800	8,268,392	16,047,910	260,510
6/1	*	142,063,000	6,688,000	*	394,714,048	*	*	*	3,905,700	8,611,304	16,117,170	262,050
6/30	6,223,762	142,840,000	6,690,000	*	119,077,808	*	*	*	3,938,900	8,872,774	16,779,746	262,980
8/1	6,237,657	143,780,000	6,692,000	*	118,136,872	44,180	*	*	3,986,500	8,978,393	17,190,544	264,560
9/1	6,248,091	144,550,000	6,694,000	*	232,425,134	45,030	*	*	4,050,700	9,037,467	17,520,650	264,970
9/29	6,256,167	145,447,000	6,696,000	*	151,121,536	45,530	4,060	35,889	4,084,300	9,160,173	17,885,470	266,190
11/1	6,261,576	146,495,000	*	*	223,324,976		*	*	4,117,500	9,263,678	18,305,584	266,670
12/1	6,265,131	147,311,000	*	*	149,178,176	46,690	*	*	4,173,500	9,345,214	18,610,778	267,620
12/31												
	6,174,305	138,280,000	6,673,000	34,853,540	204,279,584	41,660	1,650	335,660	3,714,500	6,952,132	14,536,063	253660

Totem Square Inn: Read BOTH meters in CF. ADD BOTH METERS. Enter SUM in Totem Square Inn Column.
Number in Totem Square Inn Column is Total CF used since meter installed.
Start Read for Meter usage was 1/7/19 = 619,285 + 5,459,100 = 6,078,385 CF. = 45,466,319 GALLONS.

HPM- ADD the 2" and the 4" together. Total in Meter column.

Year: 2020 CBS TREATED WATER METER READINGS

TO: FINANCE DEPT. Larry Fitzsimmons (Phone: 747-1801 and Fax: 747-0536)

Fr: Water Dept. Rob Lihou 747-4074

131869000		30869000		44730000		38307324		127212940		5121300
4" Crescent HBR		**4" Sealing Cove HBR**		**4"**	**Thomsen HBR**	**4"**	**ANB HBR**	**4"**	**Eliason HBR**	**ANB CF**
Jan.	133,328,000	Jan.	31,124,000	Jan.	45,140,000	Jan.	39,322,360	Jan.	129,803,058	5,257,000.00
Feb.	*	Feb.	31,137,000	Feb.	45,571,000	Feb.	39,773,404	Feb.	131,991,240	5,317,300.00
Mar.	136,898,000	Mar.	31,174,000	Mar.	45,965,000	Mar.	40,946,268	Mar.	134,919,233	5,474,100.00
Apr.	138,140,000	Apr.	31,236,000	Apr.	46,208,000	Apr.	42,215,624	Apr.	137,635,123	5,643,800.00
May	138,452,010	May	31,337,000	May	46,402,000	May	42,710,800	May	139,594,316	5,710,000.00
June	139,052,000	June	31,467,000	June	46,521,000	June	43,333,884	June	141,355,782	5,793,300.00
July	140,114,000	July	31,581,000	July	47,003,000	July	43,879,924	July	143,080,389	5,866,300.00
Aug.	140,975,000	Aug.	31,673,000	Aug.	47,326,000	Aug.	44,458,128	Aug.	144,420,252	5,943,600.00
Sept.	141,893,000	Sept.	31,801,000	Sept.	47,429,000	Sept.	44,836,616	Sept.	146,001,836	5,994,200.00
Oct.	142,540,000	Oct.	31,838,000	Oct.	47,505,000	Oct.	45,237,544	Oct.	147,769,634	6,047,800.00
Nov.	142,945,000	Nov.	31,863,000	Nov.	47,597,000	Nov.	45,617,528	Nov.	149,164,090	6,098,600.00
Dec.		Dec.		Dec.		Dec.		Dec.		

***Cresent, Sealing, Thompsen and Eliason meters are gallons. ANB is CF and is converted to gallons at time of read. Write CF number in "ANB CF". Convert CF to Gals. (CFx7.48). Write GALLONS TOTAL in ANB HBR.

CBS TREATED WATER METERED USE
(gallons)

	Silver Bay Seafoods Ice Machine	Silver Bay Seafoods Bunk House #1	Silver Bay Seafoods Bunk House #2	Silver Bay Seafoods 2" Meter	Silver Bay Seafoods 6" Meter	Silver Bay Seafoods 4" Meter, Cannery	Seafood Producers Corp. Cold Storage	Sitka Sound Seafood 4" meter	Sitka Sound Seafood 10" meter	Baranof Laundry	Aspen Hotel 2" meter	Sitka Laundry Center
	4600 Sawmill Creek Road	4642 Sawmill Creek Road	4644 Sawmill Creek Road	4600 Sawmill Creek Raod	4600 Sawmill Creek Raod	4600 Sawmill Creek Raod	505 Katlian	317 Katlian	317 Katlian	1211 Sawmill Creak Road	210 Lake	906 Hailbut Point Road
Feb-19	56,500	113,900	16,000	58,100	30,000	0	1,991,625	5,364,189	3,981,609	37,000	44,210	49,600
Mar-19	181,300	133,100	58,000	88,200	157,000	0	2,547,464	4,754,644	2,110,381	42,000	68,280	42,560
Apr-19			96,000	53,400	43,000	0	2,862,746	3,188,461	1,652,227		81,020	87,820
May-19				31,800	51,000	0	2,558,085	3,061,335	1,449,702	89,000	86,700	101,520
Jun-19	151,900	366,400	266,000	98,200	649,000	167,963	2,677,990	4,019,650	1,662,702	50,000	120,080	156,000
Jul-19	1,210,200	256,500	234,000	165,800	8,770,000	2,426,086	3,820,260	8,922,558	5,647,803	55,000	147,510	167,900
Aug-19	2,530,100	200,500		204,900	12,201,000	7,161,726	3,021,097	7,153,628	5,975,361	46,000	114,770	0
Sep-19	582,100	168,200	304,000	104,200	4,443,000	2,730,589	2,864,316	6,034,058	4,154,631	39,000	80,300	250,200
Oct-19							2,522,480	5,915,016	170,410	39,000	59,220	71,800
Nov-19							2,209,442	1,155,156	5,966,599	37,000	55,860	62,900
Dec-19							1,969,185	3,972,321	3,205,456	28,000	1,970	50,400
Jan-20							227,691	2,611,582	2,418,003	26,000	136,160	66,300
Feb-20							605,057	4,969,556	2,721,699	30,000	40,290	51,400
Mar-20								rolled	5,851,157		33,780	
Apr-20	26,500	102,600	58,000	51,000	154,000		4,852,874	8,303,877	3,275,405	60,000		
May-20	159,300			20,800	60,000			2,883,459	310,226	32,000	90,480	
Jun-20							5,436,838	3,582,105	443,047	27,000	78,360	219,200
Jul-20	1,241,200	326,700	244,000	156,200	8,546,000	5,152,561	3,281,326	7,295,420	19,083	35,000	211,830	
Aug-20	1,815,100	125,600	124,000	108,600	7,630,000	5,555,845	2,754,286	7,945,228	27,168	25,000	129,460	165,000
Sep-20	485,400	95,600	112,000	77,600	5,023,000	2,725,458	3,108,688	6,114,912	2,475,381	28,000	26,600	88,400
Oct-20							3,086,697	4,476,302	1,123,645	28,800	197,740	
Nov-20							1,214,902	3,840,971	2,652,586	24,200	64,710	
Dec-20												
Avg Month (gallons)	392,675	103,217	81,167	67,050	2,195,333	1,040,530	2,439,365	4,679,383	3,199,574	40,667	83,007	92,250
Peak Month (gallons)	2,530,100	366,400	304,000	204,900	12,201,000	7,161,726	3,820,260	8,922,558	5,975,361	89,000	147,510	250,200
Average Day (gpd)	12,875	3,384	2,661	2,198	71,978	34,116	79,979	153,422	104,904	1,333	2,722	3,025
Average Day (gpm)	8.9	2.4	1.8	1.5	50.0	23.7	55.5	106.5	72.9	0.9	1.9	2.1
Est. Max Day Factor (as % of Avg Day)	1.7	1.7	1.7	1.7	1.7	1.7	2.2	2.2	2.2	3.9	1.7	3.9
Est. Peak Hour Factor (as % of Avg	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	7.0	3.0	7.0
Maximum Day (gpm)	15	4	3	3	85	40	122	234	160	4	3	8
Maximum Hour (gpm)	27	7	6	5	150	71	222	426	291	6	6	15
JCTIDW	SJ-229	SJ-229	SJ-229	SJ-229	SJ-229	SJ-229	CJ-102	CJ-106	CJ-106	SJ-162	CJ-126	CJ-65

Notes:

Volume for month calculated as the difference between month and preceding months register readings.

Estimated peak hour factors based on limited data for typical residential, commercial, and laundry facilities. Typical peak factor range from Viessman, Warren and Mark Hammer (1985, Water Supply and Pollution Control, Table 4.4 Commercial Water Use. Harper & Row, Publishers, New York) are:

- 1.4 to 3.4 for apartment buildings and hotels;
- 2.6 to 5 for commercial buildings;
- 6.5 to 6.9 for laundries.

Fish plant peak hour factor is based on engineering judgment and review of factors for other industries. A factor of 3 has been estimated for facilities with approximately 24 hour/day operations and 4 for those with operations of 12 to 16 hours/day.

All factors are relative to annual average, which often has periods of low to no flow. While peaking factors may appear high, this is necessary to ensure the maximum day can be met.

Months with zero usage have not been included in the average month value.

Bear Fortress assumed typical 1 GUNIT due to inaccurate meter recordings.

Unit conversion done on Silver Bays Seafoods 4" Meter (Cannery), Seafood Producers Corps Cold Storage, and Totem Square Inn.

CBS TREATED WATER METERED USE
(gallons)

		Totem Square Inn	Mt. Edgecumbe Hospital	USFS	HPM 4" Service for Ships	NSRRA (Treated)	BEAR Fortress Domestic	N. Petro Marine 2" meter	S. Petro Marine 2" meter	SEARHC Dental Clinic 3"	Luthern Church 1" meter	
		201 Katlian	220 Tongass	204 Siginaka Way	4513 Hailbut Point Road	Sawmill Creek	4639 Sawmill Creek	613 Katlian	1 Lincoln	220 Tongass	224 Lincoln	
Feb-19		2,184	97,000	1,000				48,700	289,483	371,653	3,010	
Mar-19		19,171	113,000	1,000		1,010		43,700	301,354	414,570	6,300	
Apr-19		33,720	167,000	1,000	70,080	620		17,500	283,282	431,828	3,530	
May-19		57,955	176,000	2,000	1,286,068	420		45,100	254,619	364,732	2,440	
Jun-19		127,691	287,000	3,000	1,665,968	520		74,400	304,393	412,809	5,870	
Jul-19		152,629	305,000	2,000	1,563,565	710		115,900	323,445	451,507	8,510	
Aug-19		149,548	584,000	2,000	1,627,755	400		91,000	282,917	455,093	7,240	
Sep-19		47,289	548,000	3,000	1,120,036	520		41,000	255,716	427,246	5,280	
Oct-19		31,199	595,000	4,000		390		26,700	283,491	429,247	2,550	
Nov-19		42,494	676,000	6,000		340		18,700	315,357	435,661	2,230	
Dec-19		52,225	675,000	3,000		310		17,800	294,426	405,716	1,310	
Jan-20		115,708	784,000	6,000		320		82,700	353,139	425,489	3,730	
Feb-20		68,218	715,000	4,000				41,110	305,384	347,213	1,860	
Mar-20			775,000					25,290	337,222	367,003	1,110	
Apr-20			698,000	4,000				20,200	320,515	372,142	150	
May-20			811,000	1,000				21,900	342,912	69,260	1,540	
Jun-20		186,013	777,000	2,000				33,200	261,470	662,576	930	
Jul-20		103,935	940,000	2,000		2,200		47,600	105,619	410,798	1,580	
Aug-20		78,046	770,000	2,000		850		64,200	59,074	330,106	410	
Sep-20		60,408	897,000	2,000		500		33,600	122,706	364,820	1,220	
Oct-20		40,459	1,048,000					33,200	103,505	420,114	480	
Nov-20		26,591	816,000			1,160		56,000	81,536	305,194	950	
Dec-20												
Avg Month (gallons)		69,318	417,250	2,833	611,123	463	0	51,933	295,135	418,796	4,333	
Peak Month (gallons)		152,629	784,000	6,000	1,665,968	1,010	0	115,900	353,139	455,093	8,510	
Average Day (gpd)		2,273	13,680	93	20,037	15	0	1,703	9,677	13,731	142	
Average Day (gpm)		1.6	9.5	0.1	13.9	0.0	0.4	1.2	6.7	9.5	0.1	
Est. Max Day Factor (as % of Avg Day)		1.7	1.7	2.8	2.2	2.2	2.2	2.2	2.2	1.7	1.7	
Est. Peak Hour Factor (as % of Avg		3.0	3.0	5.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	
Maximum Day (gpm)		3	16	0.2	31	0.0	1	3	15	16	0.2	
Maximum Hour (gpm)		5	29	0.3	56	0.0	2	5	27	29	0.3	
JCTIDW		CJ-108	JJ-92	CJ-100	HJ-6	SJ-229	SJ-229	CJ-101	CJ-131	JJ-92	CJ-133	
Notes:												

CBS TREATED WATER METERED USE
(gallons)

	Crescent Harbor, 4"	Sealing Cove Harbor, 4"	Thomsen Harbor, 4"	ANB Harbor, 4"	Eliason Harbor, 4"		TOTAL
	330 harbor drive, or 500 lincoln Street	203 Airport Road	617 Katlian	211 Katlian	Siginaka Way		
Feb-19	1,636,000	188,000	610,000	771,936	4,886,878		**20,648,577**
Mar-19	1,662,000	114,000	262,000	655,996	4,985,463		**18,762,493**
Apr-19	1,708,000	215,000	55,000	744,260	4,466,661		**16,262,154**
May-19	1,793,000	72,000	163,000	207,944	3,397,488		**15,251,908**
Jun-19	2,181,000	126,000	169,000	1,261,128	2,780,341		**19,785,005**
Jul-19	2,253,000	116,000	347,000	558,756	1,311,531		**39,333,170**
Aug-19	2,022,000	111,000	227,000	519,112	1,635,303		**46,323,450**
Sep-19	2,566,000	68,000	234,000	328,372	1,441,209		**28,840,262**
Oct-19	1,983,000	24,000	152,000	344,828	1,512,215		**14,166,546**
Nov-19	1,604,000	25,000	144,000	868,428	1,861,435		**15,486,602**
Dec-19	1,443,000	4,000	256,000	697,884	1,336,885		**14,414,888**
Jan-20	1,459,000	255,000	410,000	1,015,036	2,590,118		**12,985,976**
Feb-20		13,000	431,000	451,044	2,188,182		**12,984,013**
Mar-20	3,570,000	37,000	394,000	1,172,864	2,927,993		**15,492,419**
Apr-20	1,242,000	62,000	243,000	1,269,356	2,715,890		**23,831,509**
May-20	312,010	101,000	194,000	495,176	1,959,193		**7,865,256**
Jun-20	599,990	130,000	119,000	623,084	1,761,466		**14,943,279**
Jul-20	1,062,000	114,000	482,000	546,040	1,724,607		**32,051,699**
Aug-20	861,000	92,000	323,000	578,204	1,339,863		**30,904,040**
Sep-20	918,000	128,000	103,000	378,488	1,581,584		**24,952,365**
Oct-20	647,000	37,000	76,000	400,928	1,767,798		**13,487,668**
Nov-20	405,000	25,000	92,000	379,984	1,394,456		**11,381,240**
Dec-20							
Avg Month (gallons)	1,859,167	109,833	252,417	664,473	2,683,794		**21,855,086**
Peak Month (gallons)	2,566,000	255,000	610,000	1,261,128	4,985,463		**55,192,856**
Average Day (gpd)	60,956	3,601	8,276	21,786	87,993		**716,560**
Average Day (gpm)	42.3	2.5	5.7	15.1	61.1		**498**
Est. Max Day Factor (as % of Avg Day)	1.7	1.7	1.7	1.7	1.7		
Est. Peak Hour Factor (as % of Avg	3.0	3.0	3.0	3.0	3.0		
Maximum Day (gpm)	72	4	10	26	104		
Maximum Hour (gpm)	127	8	17	45	183		
JCTIDW	CJ-135	JJ-10	CJ-101	CJ-108	CJ-173		
Notes:							

Appendix C
Wastewater Lift Station Data Sheets

Lift Station Name

Cove Lift Station

Location	

Lift Station Data

Year Constructed	2010
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	6'
Wet Well Lid Elev	19.94
Wet Well Invert Elev	0.55
Wet Well Depth	23.89
Force Main Diameter	4" to 5" HDPE

Electrical Data

Motor Horsepower	6.5
Voltage	480
Phase	3

Pump Data

Date Pumps Installed	2010
Manufacturer	FLYGT
Pump Model	NP3102.095SH
Design Flow Rate	200 GPM
Design Discharge Head	49'
Pump 1 Measured Flow Rate	130 GPM
Date Measured	1-12-21
Pump 2 Measured Flow Rate	130 GPM
Date Measured	1-12-21

Comments

1) 2 pump station

Capital Improvements

Lift Station Name

Old Sitka Rocks Lift Station

Location	

Lift Station Data

Year Constructed		1985
Type		
	Submersible	
	Suction Lift	
	Dry Pit	**X**
Wet Well Diameter		8'
Wet Well Lid Elev		
Wet Well Invert Elev		
Wet Well Depth		30' 9"
Force Main Diameter		

Electrical Data

Motor Horsepower	7.5
Voltage	480
Phase	3

Pump Data

Date Pumps Installed	2010
Manufacturer	Cornell
Pump Model	4NNT-YM
Design Flow Rate	185 gpm
Design Discharge Head	42'
Pump 1 Measured Flow Rate	128
Date Measured	1/13/2003
Pump 2 Measured Flow Rate	122
Date Measured	1/13/2003

Comments

1) 2 Pump Station
2) December 2019 Dry well flooded and used control panel installed above ground.

Capital Improvements

None.

Lift Station Name

Granite Creek Lift Station

Location	

Lift Station Data

Year Constructed	1985	
Type		
	Submersible	
	Suction Lift	
	Dry Pit	X
Wet Well Diameter	8'	
Wet Well Lid Elev		
Wet Well Invert Elev	15.40'	
Wet Well Depth	17' 9"	
Force Main Diameter	5" HDPE	

Electrical Data

Motor Horsepower	#1 Pump 5 hp/#2 pump 2hp
Voltage	480
Phase	3

Pump Data

Date Pumps Installed	
Manufacturer	Cornell
Pump Model	4 NNT-VM
Design Flow Rate	235 gpm
Design Discharge Head	17'
Pump 1 Measured Flow Rate	163
Date Measured	1/13/2003
Pump 2 Measured Flow Rate	165
Date Measured	1/13/2003

Comments

1) Record Drawing From Cove Interceptor (Granite Creek Interceptor to Cove) Sheets 3,10,12
2) 2 Pump Station
3) New knife valves 6/2020

Capital Improvements

None.

Lift Station Name

Halibut Point Lift Station

Location	

Lift Station Data

Year Constructed		1984
Type		
	Submersible	
	Suction Lift	
	Dry Pit	X
Wet Well Diameter		8.0' X 9.0'
Wet Well Lid Elev		18.00'
Wet Well Invert Elev		3.17'
Wet Well Depth		14.83'
Force Main Diameter		10"

Electrical Data

Motor Horsepower	7.5
Voltage	200
Phase	3

Pump Data

Date Pumps Installed	1984
Manufacturer	Cornell
Pump Model	6NHT-VM
Design Flow Rate	650 gpm
Design Discharge Head	20'
Pump 1 Measured Flow Rate	702
Date Measured	2/22/1993
Pump 2 Measured Flow Rate	687
Date Measured	2/22/1993

Comments

1) 2 Pump Station
2) Record Drawings From Granite Creek Interceptor (Granite Creek to City Limits) Sheet 16
3) New generator installed August 2019
4) Communications switched to ethernet November 2020
5) New check valves installed 2020

Capital Improvements

None.

Lift Station Name

Channel Lift Station

Location	

Lift Station Data

Year Constructed	10/2020
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	5'
Wet Well Lid Elev	20.1'
Wet Well Invert Elev	11.73'
Wet Well Depth	11.55'
Force Main Diameter	2" to 4"

Electrical Data

Motor Horsepower	2
Voltage	230
Phase	Single phase in w/ 3 phase pumps (VFD)

Pump Data

Date Pumps Installed	10/2020
Manufacturer	Liberty Pumps
Pump Model	XLSG203M-5
Design Flow Rate	38 GPM
Design Discharge Head	26.5
Pump 1 Measured Flow Rate	44 GPM
Date Measured	10/2020
Pump 2 Measured Flow Rate	42 GPM
Date Measured	10/2020

Comments

1) 2 Pump Station
2) No vehicle access to lift station

Capital Improvements

Lift Station Name

Sandy Beach Lift Station

Location	

Lift Station Data

Year Constructed	1984	
Type		
Submersible		
Suction Lift		
Dry Pit	X	
Wet Well Diameter	14.0' X 9.0'	
Wet Well Lid Elev	24.00'	
Wet Well Invert Elev	2.00'	
Wet Well Depth	22.00'	
Force Main Diameter	12"	

Electrical Data

Motor Horsepower	7.5
Voltage	200
Phase	3

Pump Data

Date Pumps Installed	1984
Manufacturer	Cornell
Pump Model	6 NHT-VM
Design Flow Rate	645 GPM
Design Discharge Head	20'
Pump 1 Measured Flow Rate	445
Date Measured	1/14/2003
Pump 2 Measured Flow Rate	485
Date Measured	1/14/2003
Pump 3 Measured Flow Rate	433
Date Measured	1/14/2003

Comments

1) Record Drawings From Granite Creek Interceptor (Granite Creek to City Limits) Sheet 16
2) 3 Pump Station
3) New generator installed July 2019

Capital Improvements

1) Needs new check valves .

Lift Station Name

Brady Lift Station

Location	

Lift Station Data

Year Constructed		1983
Type		
	Submersible	
	Suction Lift	
	Dry Pit	X
Wet Well Diameter		9'X14' Rectangle
Wet Well Lid Elev		16.0'
Wet Well Invert Elev		
Wet Well Depth		
Force Main Diameter		14"

Electrical Data

Motor Horsepower	25/14
Voltage	460
Phase	3

Pump Data

Date Pumps Installed	1983
Manufacturer	Allis Chalmers
Pump Model	400
Design Flow Rate	2490 High 1620 Low
Design Discharge Head	21'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) Brady Lift Station has three pumps. Halibut Point Road Interceptor 9 of 11.

2) Record Drawings From Lift Station Brady Street Sheets 9,10

3) No VFD Pump runs low and kicks into high with larger flows.

1) Plug valve has failed in the dry pit and there is no way to isolate pumps for maintenance. Plug valve needs to be replaced.

Lift Station Name

Thomsen Harbor Lift Station

Location	

Lift Station Data

Year Constructed	1982
Type	
Submersible	
Suction Lift	
Dry Pit	X
Wet Well Diameter	9.0' X 15.0'
Wet Well Lid Elev	6.51'
Wet Well Invert Elev	-6.7'
Wet Well Depth	13.21'
Force Main Diameter	16" and 12"

Electrical Data

Motor Horsepower	#1 75 on VFD	#2- #3 100
Voltage	460	460
Phase	3	3

Pump Data

Date Pumps Installed	2018	2018
Manufacturer	Flygt	Flygt -Xylem A/C
Pump Model		8X8X17LC NSMV
Design Flow Rate		
Design Discharge Head		
Pump 1 Measured Flow Rate		
Date Measured		
Pump 2 Measured Flow Rate		
Date Measured		

Comments

1) 3 Pump Station
2) Main lift station to pump wastewater from downtown to the wastewater treatment plant.
3) Record Drawings From Lift Stations Thomsen Harbor Sheets 13,14,15,16,27,30,31
4) Drywell flooded Feb 2, 2017. New #1 VFD and #2 and #3 soft starts installed upstairs.

Capital Improvements

1) Needs new knife valves
2) Failed 3-way 16" plug valve in can
3) Need access to clean wet well

Lift Station Name

New Thomsen Harbor Lift Station

Location	

Lift Station Data

Year Constructed	
Type	
Submersible	
Suction Lift	X
Dry Pit	
Wet Well Diameter	
Wet Well Lid Elev	
Wet Well Invert Elev	
Wet Well Depth	
Force Main Diameter	

Electrical Data

Motor Horsepower	1.5	1.5	1.5
Voltage	230	230	230
Phase	1	1	1

Pump Data

Date Pumps Installed		At Old Thompsen	At Crescent Harbor
Manufacturer	ABS	ABS	ABS
Pump Model	Piranha	Piranha	S20
Design Flow Rate	30	30	35
Design Discharge Head			
Pump 1 Measured Flow Rate			
Date Measured			
Pump 2 Measured Flow Rate			
Date Measured			

Comments

1) Small suction lift system to pump waste water from vessel on-board holding tanks.
2) Lift station only has a single pump.

Capital Improvements

None.

Lift Station Name

Blatchley Lift Station

Location	

Lift Station Data

Year Constructed	mid 1990's
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	5.0'
Wet Well Lid Elev	38.0'
Wet Well Invert Elev	31.49'
Wet Well Depth	6.51'
Force Main Diameter	

Electrical Data

Motor Horsepower	1.4
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	mid 1990s
Manufacturer	ABS
Pump Model	Piranha Grinder
Design Flow Rate	30 gpm
Design Discharge Head	8'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) **Small submerisble pump serving the ball field.**
2) **Lift station only has a single pump.**
3) **Record Drawings From Blatchley Jr. High School Sewer Improvement Details Sheet 3.02**

Capital Improvements

None.

Lift Station Name

Monastery Street Lift Station

Location	

Lift Station Data

Year Constructed	2015
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	6' x 6' square
Wet Well Lid Elev	38.3'
Wet Well Invert Elev	24.4'
Wet Well Depth	19.1'
Force Main Diameter	4" P.V.C.

Electrical Data

Motor Horsepower	5.5
Voltage	230
Phase	3 wild leg delta

Pump Data

Date Pumps Installed	2-2015
Manufacturer	Flygt
Pump Model	3102.910 Imp 463
Design Flow Rate	228 GPM
Design Discharge Head	
Pump 1 Measured Flow Rate	230 GPM
Date Measured	1-13-2021
Pump 2 Measured Flow Rate	230 GPM
Date Measured	1-13-2021

Comments

1) Record Drawings From Sirstad St. Lift Station Sheet 31.

Capital Improvements

None.

Lift Station Name

Lake Street Lift Station

Location	

Lift Station Data

Year Constructed	2015
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	8'
Wet Well Lid Elev	44.0'
Wet Well Invert Elev	29.21'
Wet Well Depth	20.0'
Force Main Diameter	4"

Electrical Data

Motor Horsepower	7.2
Voltage	230
Phase	Wild Leg Delta - 3 phase

Pump Data

Date Pumps Installed	2-2015
Manufacturer	Flygt
Pump Model	3102.910 Imp 257
Design Flow Rate	188 GPM
Design Discharge Head	
Pump 1 Measured Flow Rate	182
Date Measured	1/14/2003
Pump 2 Measured Flow Rate	200
Date Measured	1/14/2003

Comments

1) 2 Pump Station

Lift Station Name

Wachusetts Lift Station

Location	

Lift Station Data

Year Constructed	2009	
Type		
	Submersible	X
	Suction Lift	
	Dry Pit	
Wet Well Diameter		
Wet Well Lid Elev		
Wet Well Invert Elev		
Wet Well Depth		
Force Main Diameter	4" A.C.	

Electrical Data

Motor Horsepower	2
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	2009
Manufacturer	ABS
Pump Model	S20
Design Flow Rate	35 gpm
Design Discharge Head	
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) Record Drawings From Wachusetts Street Sewer Sheet 1
2) Pump Station

Capital Improvements

None.

Lift Station Name

Landfill Lift Station

Location	

Lift Station Data

Year Constructed	2017
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	8'
Wet Well Lid Elev	53.1'
Wet Well Invert Elev	40.2'
Wet Well Depth	17.8'
Force Main Diameter	6"

Electrical Data

Motor Horsepower	11
Voltage	230
Phase	3

Pump Data

Date Pumps Installed	2017
Manufacturer	Flygt
Pump Model	FP3127SH
Design Flow Rate	
Design Discharge Head	59 psi
Pump 1 Measured Flow Rate	237
Date Measured	5/2017
Pump 2 Measured Flow Rate	237
Date Measured	5/2017

Comments

1) 2 pump station.
2) Pump seals needing replaced approximately every 4000 hrs of run time.

Capital Improvements

None.

Lift Station Name

Eagle Way Lift Station

Location	

Lift Station Data

Year Constructed	2020	
Type		
	Submersible	X
	Suction Lift	
	Dry Pit	
Wet Well Diameter	8'	
Wet Well Lid Elev	17.90'	
Wet Well Invert Elev	7.15'	
Wet Well Depth	14.9'	
Force Main Diameter	10"	

Electrical Data

Motor Horsepower	30
Voltage	208 to liftstation, 480 to pumps
Phase	3

Pump Data

Date Pumps Installed	10/2020
Manufacturer	FLygt
Pump Model	3171.830-0013 Imp 454
Design Flow Rate	910
Design Discharge Head	69.5
Pump 1 Measured Flow Rate	792
Date Measured	10/2020
Pump 2 Measured Flow Rate	792
Date Measured	10/2020

Comments

1) 2 Pump Station

Capital Improvements

None.

Lift Station Name

Jamestown Lift Station

Location	

Lift Station Data

Year Constructed	1984
Type	
Submersible	
Suction Lift	
Dry Pit	X
Wet Well Diameter	8.0'
Wet Well Lid Elev	19.4'
Wet Well Invert Elev	-0.3'
Wet Well Depth	19.7'
Force Main Diameter	8"

Electrical Data

Motor Horsepower	5 hp
Voltage	208
Phase	3

Pump Data

Date Pumps Installed	April 2015
Manufacturer	Fairbanks Morse
Pump Model	5432 c
Design Flow Rate	580 gpm
Design Discharge Head	21'
Pump 1 Measured Flow Rate	490
Date Measured	1/14/2003 (New Impeller Installed 2009)
Pump 2 Measured Flow Rate	440
Date Measured	1/14/2003 (New Impeller Installed 2009)

Comments

1) Record Drawings From Jamestown Bay Interceptor Jamestown Bay to City Limits Sheet 12,14,23.

Capital Improvements

1) 2 Pump Station

Lift Station Name

East Jamestown Lift Station

Location	

Lift Station Data

Year Constructed	1985
Type	
Submersible	
Suction Lift	
Dry Pit	X
Wet Well Diameter	4.0'
Wet Well Lid Elev	15.8
Wet Well Invert Elev	8.0'
Wet Well Depth	7.8'
Force Main Diameter	4"

Electrical Data

Motor Horsepower	3 - 1750 RPM
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	March 6 1985
Manufacturer	UseMCD L.S. Quincy Compressor
Pump Model	Pneumatic Ejector
Design Flow Rate	50
Design Discharge Head	25
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) **Lift station is only serving one house.**
2) **Record Drawings From Jamestown Bay Interceptor Jamestown Bay to City Limits Sheet 8.2**
3) **1 Pot, 2 Compressors**

Capital Improvements

1) **Plan to replace lift station pumps with a residential grinder pump such as a Barnes Pump.**

Lift Station Name	
Blueberry Lane Lift Station	
Location	

Lift Station Data

Year Constructed	2007
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	8' Diameter
Wet Well Lid Elev	70.0'
Wet Well Invert Elev	59.8'
Wet Well Depth	10.2'
Force Main Diameter	6" Dia HDPE

Electrical Data

Motor Horsepower	18 hp
Voltage	480 v
Phase	3 Phase

Pump Data

Date Pumps Installed	08-2007
Manufacturer	Flygt
Pump Model	Model NP3153 454 Impeller
Design Flow Rate	210 gpm
Design Discharge Head	105'
Pump 1 Measured Flow Rate	262 gpm
Date Measured	8/28/2007
Pump 2 Measured Flow Rate	259 gpm
Date Measured	8'28'2007

Comments

No comments.

Capital Improvements

None.

Lift Station Name

Peace Lane

Location	

Lift Station Data

Year Constructed	2007	
Type		
	Submersible	X
	Suction Lift	
	Dry Pit	
Wet Well Diameter	8' Diameter	
Wet Well Lid Elev	51.0'	
Wet Well Invert Elev	40.6'	
Wet Well Depth	10.4'	
Force Main Diameter	6-inch	

Electrical Data

Motor Horsepower	7.5 HP
Voltage	480 v
Phase	3 Phase

Pump Data

Date Pumps Installed	August, 2007
Manufacturer	Flygt
Pump Model	NP3127 489 Impeller
Design Flow Rate	210 gpm
Design Discharge Head	48'
Pump 1 Measured Flow Rate	242 gpm
Date Measured	8/29/2007
Pump 2 Measured Flow Rate	248 gpm
Date Measured	8/29/2007

Comments

No comments.

Capital Improvements

None.

Lift Station Name

Whale Park Lift Station

Location	

Lift Station Data

Year Constructed		
Type		
	Submersible	X
	Suction Lift	
	Dry Pit	
Wet Well Diameter	29.5"	
Wet Well Lid Elev	82.00'	
Wet Well Invert Elev	74.35'	
Wet Well Depth	7.65'	
Force Main Diameter	1 1/4"	

Electrical Data

Motor Horsepower	1 HP
Voltage	240v
Phase	1 Phase

Pump Data

Date Pumps Installed	August, 2007
Manufacturer	EOne Corporation
Pump Model	Model 1020 Residential Grinder Pump
Design Flow Rate	15 gpm @ 0' TDH, 9 gpm @ 138' TDH
Design Discharge Head	25'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) Lift station only has one pump and handles flows from the Whale Park bathrooms.

Capital Improvements

None.

Lift Station Name

Sawmill Cove Lift Station

Location	

Lift Station Data

Year Constructed	2011
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	8' diameter
Wet Well Lid Elev	20.0'
Wet Well Invert Elev	8.5'
Wet Well Depth	11.5'
Force Main Diameter	6" HDPE

Electrical Data

Motor Horsepower	11 HP
Voltage	480v
Phase	3 Phase

Pump Data

Date Pumps Installed	1/25/2011
Manufacturer	Flygt
Pump Model	NP3127 w/ 248 Impeller
Design Flow Rate	175 gpm
Design Discharge Head	105'
Pump 1 Measured Flow Rate	165 gpm
Date Measured	1/25/2011
Pump 2 Measured Flow Rate	167 gpm
Date Measured	1/25/2011

Comments

No comments.

Capital Improvements

None.

Lift Station Name

Rands Drive Lift Station

Location	

Lift Station Data

Year Constructed	
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	8' diameter
Wet Well Lid Elev	54.85'
Wet Well Invert Elev	39.26'
Wet Well Depth	15.59'
Force Main Diameter	4" HDPE

Electrical Data

Motor Horsepower	20 hp
Voltage	480v
Phase	3 Phase

Pump Data

Date Pumps Installed	08/21/2002
Manufacturer	Ebara
Pump Model	CDL07-7-6102
Design Flow Rate	
Design Discharge Head	
Pump 1 Measured Flow Rate	150 gpm
Date Measured	8/21/2002
Pump 2 Measured Flow Rate	141 gpm
Date Measured	8/21/2002

Comments

1) Pump #2 Replaced 12-2016

Capital Improvements

None.

Lift Station Name

New BIHA Indian River Lift Station

Location	

Lift Station Data

Year Constructed	2008
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	6'
Wet Well Lid Elev	
Wet Well Invert Elev	
Wet Well Depth	9' 6"
Force Main Diameter	

Electrical Data

Motor Horsepower	3
Voltage	480
Phase	3

Pump Data

Date Pumps Installed	2008 (Start Up Day 11/14/08)
Manufacturer	FLYGT
Pump Model	NP3085.092
Design Flow Rate	119 GPM
Design Discharge Head	21'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) 2 pump station

Capital Improvements

None.

Lift Station Name

BIHA Indian River Lift Station

Location	

Lift Station Data

Year Constructed		
Type		
	Submersible	
	Suction Lift	
	Dry Pit	X
Wet Well Diameter	8'	
Wet Well Lid Elev		
Wet Well Invert Elev		
Wet Well Depth	13' 6"	
Force Main Diameter	2 x 4"	

Electrical Data

Motor Horsepower	5 hp
Voltage	480
Phase	3

Pump Data

Date Pumps Installed	New pumps and motors installed January 2018
Manufacturer	Hydronix
Pump Model	40 MP
Design Flow Rate	
Design Discharge Head	
Pump 1 Measured Flow Rate	103
Date Measured	1/15/2003
Pump 2 Measured Flow Rate	101
Date Measured	1/15/2003

Comments

1) 2 Pump Station

Capital Improvements

None.

Lift Station Name

BIHA EOne Indian River Lift Station

Location	

Lift Station Data

Year Constructed	1998
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	
Wet Well Lid Elev	
Wet Well Invert Elev	
Wet Well Depth	
Force Main Diameter	

Electrical Data

Motor Horsepower	2
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	4-2019/ 6-2020
Manufacturer	E-One / Liberty
Pump Model	Extreme/ LSG202
Design Flow Rate	14 gpm
Design Discharge Head	
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

No comments.

Capital Improvements

None.

Lift Station Name

Crescent Lift Station

Location	

Lift Station Data

Year Constructed	2017
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	6'
Wet Well Lid Elev	18.8'
Wet Well Invert Elev	11.0'
Wet Well Depth	12.1'
Force Main Diameter	4"

Electrical Data

Motor Horsepower	3 hp
Voltage	208
Phase	3

Pump Data

Date Pumps Installed	3-2018
Manufacturer	Flygt
Pump Model	3085.070-0057 Imp 463
Design Flow Rate	40 GPM
Design Discharge Head	15'
Pump 1 Measured Flow Rate	111 GPM
Date Measured	03-2018
Pump 2 Measured Flow Rate	110 GPM
Date Measured	03-2018

Comments

1) 2 Pump Station

Capital Improvements

Lift Station Name

Lincoln Street Lift Station

Location	

Lift Station Data

Year Constructed	1982
Type	
Submersible	
Suction Lift	
Dry Pit	X
Wet Well Diameter	14.0'X9.0'
Wet Well Lid Elev	
Wet Well Invert Elev	-2.4'
Wet Well Depth	10' 8-1/2"
Force Main Diameter	14"

Electrical Data

Motor Horsepower	#1 20 on VFD	#2 and #3 14.1 hp low/25 hp high
Voltage	460	460
Phase	3	3

Pump Data

Date Pumps Installed	2011	1982
Manufacturer	Allis Chalmers	Allis Chalmers
Pump Model	NSWV	NSWV
Design Flow Rate		Low 1250 gpm High 2150 gpm
Design Discharge Head		Low 23' High 40'
Pump 1 Measured Flow Rate		
Date Measured		
Pump 2 Measured Flow Rate		
Date Measured		

Comments

1) **Record Drawings From Central Interceptor Sheet 17,34**
2) **3 Pump Station**
3) **Dry well wall leaks**
4) **#1 pump to be replace 02/2021**

Capital Improvements

1) **Needs new knife valves**

Lift Station Name

Lightering Lift Station

Location	

Lift Station Data

Year Constructed		1998
Type		
	Submersible	X
	Suction Lift	
	Dry Pit	
Wet Well Diameter		
Wet Well Lid Elev		
Wet Well Invert Elev		
Wet Well Depth		
Force Main Diameter		

Electrical Data

Motor Horsepower	1.5
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	1998
Manufacturer	ABS
Pump Model	Piranha Grinder
Design Flow Rate	30 gpm
Design Discharge Head	6'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) Small seasonal lift station serving a public restroom.
2) 2 Pump Station

Capital Improvements

None.

Lift Station Name

Castle Hill Lift Station

Location	

Lift Station Data

Year Constructed	1982	
Type		
	Submersible	
	Suction Lift	
	Dry Pit	X
Wet Well Diameter		
Wet Well Lid Elev		
Wet Well Invert Elev		
Wet Well Depth		
Force Main Diameter	4" D.I.P.	

Electrical Data

Motor Horsepower	5
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	January 2003
Manufacturer	HYDROMATIC
Pump Model	40 MP
Design Flow Rate	150 GPM
Design Discharge Head	31'
Pump 1 Measured Flow Rate	156
Date Measured	1/15/2003
Pump 2 Measured Flow Rate	156
Date Measured	1/15/2003

Comments

1) Record Drawings From Central Interceptor Sawmill Creek to Thomsen Harbor Sheet 12,36
2) 2 Pump Station
3) New motors installed November 2019
4) New pumps and check valves to be installed 2021

Capital Improvements

None.

Lift Station Name

Centennial Lift Station	
Location	

Lift Station Data

Year Constructed	
Type	
Submersible	
Suction Lift	
Dry Pit	X
Wet Well Diameter	4'
Wet Well Lid Elev	18.5'
Wet Well Invert Elev	1.2'
Wet Well Depth	17.3'
Force Main Diameter	4"

Electrical Data

Motor Horsepower	3 1750 rpm
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	Late 1991
Manufacturer	HYDR-O-MATIC
Pump Model	40 MP
Design Flow Rate	80 gpm
Design Discharge Head	25'
Pump 1 Measured Flow Rate	60
Date Measured	1/15/2003
Pump 2 Measured Flow Rate	65
Date Measured	1/15/2003

Comments

1) 2 Pump Station
2) Record Drawings From Central Interceptor 20,35

Capital Improvements

None.

Lift Station Name

Sealing Cove Lift Station

Location	

Lift Station Data

Year Constructed	mid 1990's
Type	
Submersible	**X**
Suction Lift	
Dry Pit	
Wet Well Diameter	3'
Wet Well Lid Elev	
Wet Well Invert Elev	
Wet Well Depth	
Force Main Diameter	

Electrical Data

Motor Horsepower	2
Voltage	230
Phase	1

Pump Data

Date Pumps Installed	07-2018
Manufacturer	ABS
Pump Model	Piranha
Design Flow Rate	25 gpm
Design Discharge Head	20'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) 1 Pump Station
2) FY22 planned budget item to rehab Sealing Cove liftstation

Capital Improvements

None.

Lift Station Name

Japonski LS-1 Lift Station

Location	

Lift Station Data

Year Constructed	2012
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	4'
Wet Well Lid Elev	22.0'
Wet Well Invert Elev	9.40'
Wet Well Depth	12.6'
Force Main Diameter	2" HDPE

Electrical Data

Motor Horsepower	2 hp
Voltage	200 v
Phase	3 phase

Pump Data

Date Pumps Installed	2012
Manufacturer	Barnes
Pump Model	SGVF
Design Flow Rate	25 gpm
Design Discharge Head	20'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

Barnes SGVF Recessed Vortex Submersible Grinder Pump

Capital Improvements

Replaced in 2012

Lift Station Name

Japonski LS-2 Lift Station

Location	

Lift Station Data

Year Constructed	2012
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	5'
Wet Well Lid Elev	25.74'
Wet Well Invert Elev	15.04'
Wet Well Depth	10.70'
Force Main Diameter	4"

Electrical Data

Motor Horsepower	2.7 hp
Voltage	200 v
Phase	3 phase

Pump Data

Date Pumps Installed	2012
Manufacturer	Flygt
Pump Model	FP3068.090LT
Design Flow Rate	120 gpm
Design Discharge Head	16.5'
Pump 1 Measured Flow Rate	32 GPM
Date Measured	01-2021
Pump 2 Measured Flow Rate	32 GPM
Date Measured	01-2021

Comments

No comments.

Capital Improvements

Replaced in 2012

Lift Station Name

Japonski LS-3 Lift Station

Location	

Lift Station Data

Year Constructed	2012	
Type		
	Submersible	X
	Suction Lift	
	Dry Pit	
Wet Well Diameter	8'	
Wet Well Lid Elev	18.20'	
Wet Well Invert Elev	6.33'	
Wet Well Depth	11.87'	
Force Main Diameter	4"	

Electrical Data

Motor Horsepower	11 hp
Voltage	200 v
Phase	3 phase

Pump Data

Date Pumps Installed	2012
Manufacturer	Flygt
Pump Model	NP3127.090SH
Design Flow Rate	200 gpm
Design Discharge Head	60.0'
Pump 1 Measured Flow Rate	209 gpm
Date Measured	
Pump 2 Measured Flow Rate	191 gpm
Date Measured	

Comments

Measured pump flows will vary depending on whether the force main is connected to the 10", 16" or both force mains from Thomson Harbor. Pump flow rates will also vary depending on flow rate in the force mains from Thomson Harbor as a result of high heads that will occur during higher flow periods.

Capital Improvements

Replaced in 2012

Lift Station Name

Japonski LS-4 Lift Station

Location	

Lift Station Data

Year Constructed	2012
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	8'
Wet Well Lid Elev	18.00'
Wet Well Invert Elev	4.45'
Wet Well Depth	13.55'
Force Main Diameter	6"

Electrical Data

Motor Horsepower	17 hp
Voltage	200 v
Phase	3 phase

Pump Data

Date Pumps Installed	2012
Manufacturer	Flygt
Pump Model	NP3153.091SH
Design Flow Rate	450 gpm
Design Discharge Head	67.4'
Pump 1 Measured Flow Rate	512 gpm
Date Measured	7/25/2012
Pump 2 Measured Flow Rate	505 gpm
Date Measured	7/25/2012

Comments

1) 2 pump station

Replaced in 2012.

Lift Station Name

Japonski LS-5 Lift Station

Location	

Lift Station Data

Year Constructed	2017
Type	
Submersible	X
Suction Lift	
Dry Pit	
Wet Well Diameter	8'
Wet Well Lid Elev	
Wet Well Invert Elev	
Wet Well Depth	
Force Main Diameter	4"

Electrical Data

Motor Horsepower	11 hp
Voltage	208
Phase	3

Pump Data

Date Pumps Installed	10-2017
Manufacturer	Flygt
Pump Model	3127-390 Imp 248
Design Flow Rate	235 GPM
Design Discharge Head	21'
Pump 1 Measured Flow Rate	226 GPM
Date Measured	1-12-2021
Pump 2 Measured Flow Rate	226 GPM
Date Measured	1-12-2021

Comments

1) 4" discharge and force main is undersized causing excess run times and wear and tear on pumps.

Capital Improvements

Lift Station Name

Japonski LS-6 Lift Station

Location	

Lift Station Data

Year Constructed	2012
Type	
Submersible	**X**
Suction Lift	
Dry Pit	
Wet Well Diameter	8'
Wet Well Lid Elev	15.00'
Wet Well Invert Elev	2.83'
Wet Well Depth	12.17'
Force Main Diameter	6"

Electrical Data

Motor Horsepower	6.5 hp
Voltage	200 v
Phase	3 phase

Pump Data

Date Pumps Installed	2012
Manufacturer	Flygt
Pump Model	NP3102.090.SH
Design Flow Rate	250 gpm
Design Discharge Head	56'
Pump 1 Measured Flow Rate	214 gpm
Date Measured	
Pump 2 Measured Flow Rate	205 gpm
Date Measured	

Comments

1) Run times are approximately 500 hrs per pump per year
2) Significant I&I from upstream

Capital Improvements

Replaced in 2012.

Lift Station Name	
Japonski LS-7 Lift Station	
Location	

Lift Station Data

Year Constructed	2012
Type	
Submersible	**X**
Suction Lift	
Dry Pit	
Wet Well Diameter	5'
Wet Well Lid Elev	19.35'
Wet Well Invert Elev	1.54'
Wet Well Depth	17.81'
Force Main Diameter	6"

Electrical Data

Motor Horsepower	6.5 hp
Voltage	200 v
Phase	3 phase

Pump Data

Date Pumps Installed	10-2019
Manufacturer	Flygt
Pump Model	3102.070 Imp 256
Design Flow Rate	150 GPM
Design Discharge Head	54'
Pump 1 Measured Flow Rate	309 GPM
Date Measured	10-2019
Pump 2 Measured Flow Rate	309 GPM
Date Measured	10-2019

Comments

1) 4 hp pumps were replaced with 6.5 hp pumps. 4 hp pumps were worn out from pumping against the force main.

Capital Improvements

Replaced in 2012

Lift Station Name

Japonski LS-8 Lift Station

Location	

Lift Station Data

Year Constructed		1984
Type		
	Submersible	
	Suction Lift	X
	Dry Pit	
Wet Well Diameter		60"
Wet Well Lid Elev		
Wet Well Invert Elev		
Wet Well Depth		90"
Force Main Diameter		

Electrical Data

Motor Horsepower	1.5
Voltage	208
Phase	3

Pump Data

Date Pumps Installed	1984
Manufacturer	Hydronix
Pump Model	40MP
Design Flow Rate	50 gpm
Design Discharge Head	15'
Pump 1 Measured Flow Rate	
Date Measured	
Pump 2 Measured Flow Rate	
Date Measured	

Comments

1) 2 Pump Station

Capital Improvements

None.

Appendix D
CIP Detailed Cost Estimates

CBS Water CIP Projects

No.	Title	Cost
High Priority		
W-1	Lake / Hirst / Kinkead / Monastery Water Mains*	$2,360,000
W-2	Lincoln Street (Lake to Jeff Davis) Water Mains*	$1,534,000
W-3	Wolff Drive Water and Sewer Mains*	$1,395,000
W-4	Kirkman Way Water Mains*	$381,000
W-5	Lincoln Street (Lake to Katlian) Water Mains*	$1,952,000
W-6	Install Areawide Water Meters (Four) Phase 1	$870,000
W-7	Halibut Point Road Roundabout to Davidoff) Water Mains*	$7,887,000
W-8	Retrofit Hillside Booster Station Backup Power & SCADA	$1,023,000
W-9	WST Siting Study & Construct 1MG Tank (Sitka High School)	$19,149,000
W-10	Repaint Harbor Mountain Tank	$702,000
W-11	Establish Shotgun Alley Pressure Zone	$8,886,000
W-12	Wortman Loop Pump Station Improvements	$1,711,000
W-13	Monastery / Highland / Merrill Water and Sewer Mains*	$1,068,000
W-14	Kimsham / Tilson / Peterson Water and Sewer Mains*	$1,439,000
Medium Priority		
W-15	Construct 1MG WST (Keet Gooshi Heen)	$19,338,000
W-16	Gavan Street and Moller Avenue Water Mains*	$756,000
W-17	Marine / DeArmond / New Archangel / Erler Water Mains*	$1,568,000
W-18	Wortman Loop Water and Sewer Mains*	$1,399,000
W-19	Connect Hillside Pressure Zone to Lance Dr.	$1,774,000
W-20	Install Areawide Water Meters (Three) Phase 2	$870,000
W-21	Halibut Point Rd.1 - Old Harbor Mountain Rd. to Krestof Dr.	$5,270,000
W-22	Install Areawide Water Meters (Three) Phase 3	$870,000
W-23	Princess / Seward / Barracks Water Mains*	$856,000
Low Priority		
W-24	Connect Indian River Rd. to Jarvis St.	$2,619,000
W-25	Anna Drive / Circle Water Mains*	$916,000
W-26	Jamestown Drive Water Mains*	$530,000
W-27	Viking Way Water Mains*	$380,000
W-28	Burkart Street and Lance Drive Water Mains*	$1,980,000
W-29	Install Areawide Water Meters (Two) Phase 4	$662,000
W-30	Halibut Point Rd. 2 - 16" Water Upgrade (Krestof Dr. to Viking Wy.)	$2,799,000
W-31	Granite Creek Rd. Water	$1,483,000
W-32	Kashevaroff St. Water	$798,000
W-33	Connect Benchlands to Harbor Mt. Tank	$6,763,000
W-34	Connect Granite Creek Rd. to Harbor Mt. Rd.	$2,197,000
W-35	Repaint Gavan Tank (2029)	$1,238,000
W-36	Repaint Whitcomb Heights Tank (2030)	$1,238,000
W-37	Upgrade Hillside Booster Station Pumps and 10" replacement	$3,251,000

CIP Project #W-1					
Lake / Hirst / Kinkead / Monastery Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 275,000	$ 137,500
2	Traffic Control	LS	1	$ 110,000	$ 55,000
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 14"	LF	1050	$ 154	$ 161,700
6	HDPE - 6"	LF	1670	$ 110	$ 183,700
7	Valving/Hydrants	LF	2720	$ 55	$ 149,600
8	Service Lines	EA	45	$ 3,850	$ 173,250
9	Connect to Existing Water	EA	4	$ 3,575	$ 14,300
10	Abandon Water Pipe	LF	2720	$ 11	$ 29,920
11	Paving	LF	2780	$ 451	$ 626,890
				ESTIMATED CONSTRUCTION COST	**$ 1,573,110**
				Contingency (20%)	$ 314,622
				Subtotal	$ 1,887,732
				Design Engineering & Administration (15%)	$ 283,160
				Construction Administration (10%)	$ 188,773
				TOTAL PROJECT COST	**$ 2,359,665**
					$ 2,360,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-2					
Lincoln Street (Lake to Jeff Davis) Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 187,000	$ 93,500
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 16"	LF	1610	$ 154	$ 247,940
6	Valving/Hydrants	LF	1610	$ 55	$ 88,550
7	Service Lines	EA	25	$ 3,850	$ 96,250
8	Connect to Existing Water	EA	6	$ 3,575	$ 21,450
9	Abandon Water Pipe	LF	1610	$ 11	$ 17,710
10	Paving	LF	1660	$ 451	$ 374,330
				ESTIMATED CONSTRUCTION COST	**$ 1,022,230**
				Contingency (20%)	$ 204,446
				Subtotal	$ 1,226,676
				Design Engineering & Administration (15%)	$ 184,001
				Construction Administration (10%)	$ 122,668
				TOTAL PROJECT COST	**$ 1,533,345**
					$ 1,534,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-3					
Wolff Drive Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 148,500	$ 74,250
2	Traffic Control	LS	1	$ 55,000	$ 27,500
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 8"	LF	1620	$ 110	$ 178,200
6	Valving/Hydrants	LF	1620	$ 55	$ 89,100
7	Service Lines	EA	33	$ 3,850	$ 127,050
8	Connect to Existing Water	EA	1	$ 3,575	$ 3,575
9	Abandon Water Pipe	LF	1620	$ 11	$ 17,820
10	Paving	LF	1645	$ 451	$370,947.50
ESTIMATED CONSTRUCTION COST					**$ 929,693**
Contingency (20%)					$ 185,939
Subtotal					$ 1,115,632
Design Engineering & Administration (15%)					$ 167,345
Construction Administration (10%)					$ 111,563
TOTAL PROJECT COST					**$ 1,394,539**
					$ 1,395,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-4					
Kirkman Way Water and Sewer Mains					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 27,500	$ 13,750
3	Construction Survey	LS	1	$ 38,500	$ 19,250
4	Erosion & Sediment Control	LS	1	$ 11,000	$ 5,500
5	HDPE - 6"	LF	300	$ 110	$ 33,000
6	Valving/Hydrants	LF	300	$ 55	$ 16,500
7	Service Lines	EA	10	$ 3,850	$ 38,500
8	Connect to Existing Water	EA	1	$ 3,575	$ 3,575
9	Abandon Water Pipe	LF	300	$ 11	$ 3,300
10	Paving	LF	350	$ 451	$ 78,925
				ESTIMATED CONSTRUCTION COST	**$ 253,550**
				Contingency (20%)	$ 50,710
				Subtotal	$ 304,260
				Design Engineering & Administration (15%)	$ 45,639
				Construction Administration (10%)	$ 30,426
				TOTAL PROJECT COST	**$ 380,325**
					$ 381,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project W-5					
Lincoln Street (Lake to Katlian) Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$187,000	$ 93,500
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 12"	LF	1300	$ 154	$ 200,200
6	Valving/Hydrants	LF	1300	$ 55	$ 71,500
7	Service Lines	EA	35	$ 3,850	$ 134,750
8	Connect to Existing Water	EA	35	$ 3,575	$ 125,125
9	Abandon Water Pipe	LF	1300	$ 193	$ 250,250
10	Temporary Services	EA	35	$ 1,100	$ 38,500
11	Paving	LF	1350	$ 451	$ 304,425
				ESTIMATED CONSTRUCTION COST	#########
				Contingency (20%)	$ 260,150
				Subtotal	$1,560,900
				Design Engineering & Administration (15%)	$ 234,135
				Construction Administration (10%)	$ 156,090
				TOTAL PROJECT COST	#########
					#########

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-6					
Install Areawide Water Meters (Three) Phase 1					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Install Clamp-on Water Meter	LS	3	$41,800	$125,400
2	Communication Line	LF	6350	$72	$454,025
				ESTIMATED CONSTRUCTION COST	**$ 579,425**
				Contingency (20%)	$ 115,885
				Subtotal	$ 695,310
				Design Engineering & Administration (15%)	$ 104,297
				Construction Administration (10%)	$ 69,531
				TOTAL PROJECT COST	**$ 869,138**
					$ 870,000

CIP Project W-7					
Halibut Point Road (Roundabout to Davidoff) Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$187,000	$ 93,500
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 12"	LF	7500	$ 154	$1,155,000
6	Valving/Hydrants	LF	7500	$ 55	$ 412,500
7	Service Lines	EA	50	$ 3,850	$ 192,500
8	Connect to Existing Water	EA	15	$ 3,575	$ 53,625
9	Abandon Water Pipe	LF	7500	$ 193	$1,443,750
10	Temporary Services	EA	50	$ 1,100	$ 55,000
11	Paving	LF	7845	$ 451	$1,769,048
				ESTIMATED CONSTRUCTION COST	**#########**
				Contingency (20%)	$1,051,485
				Subtotal	$6,308,908
				Design Engineering & Administration (15%)	$ 946,336
				Construction Administration (10%)	$ 630,891
				TOTAL PROJECT COST	**#########**
					#########

This project corresponds with a sewer main replacement project with shared costs.

CIP Project #W-8					
Retrofit Hillside Booster Station Backup Power and SCADA					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 110,000	$ 110,000
2	Electrical Rehabilitation	LS	1	$ 110,000	$ 110,000
3	Backup Generator Replacement	LS	1	$ 137,500	$ 137,500
4	Communication Line	LF	4700	$ 55	$ 258,500
5	Site Work	LS	1	$ 22,000	$ 22,000
6	Dewatering	LS	1	$ 44,000	$ 44,000
				ESTIMATED CONSTRUCTION COST	**$ 682,000**
				Contingency (20%)	$ 136,400
				Subtotal	$ 818,400
				Design Engineering & Administration (15%)	$ 122,760
				Construction Administration (10%)	$ 81,840
				TOTAL PROJECT COST	**$1,023,000**
					$1,023,000

CIP Project #W-9					
WST Siting Study & Sitka HS Tank					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 110,000	$ 110,000
2	Survey	LS	1	$ 55,000	$ 55,000
3	Geotech	LS	1	$ 165,000	$ 165,000
4	Siting Study	LS	3	$ 82,500	$ 247,500
5	Bolted Steel Tank	LS	1	$ 440,000	$ 440,000
6	Tank Install & Foundation	LS	1	$ 2,640,000	$ 2,640,000
7	Access Road	LF	1200	$ 880	$ 1,056,000
8	Install Pipe	LF	3000	$ 1,210	$ 3,630,000
9	Install Pipe - Road	LF	650	$ 660	$ 429,000
10	Pipe Connection & Temporary System	LS	1	$ 143,000	$ 143,000
11	Pump Station	LS	1	$ 1,375,000	$ 1,375,000
12	Site Work	LS	1	$ 2,475,000	$ 2,475,000
ESTIMATED CONSTRUCTION COST					**$ 12,765,500**
Contingency (20%)					$ 2,553,100
Subtotal					$ 15,318,600
Design Engineering & Administration (15%)					$ 2,297,790
Construction Administration (10%)					$ 1,531,860
TOTAL PROJECT COST					**$ 19,148,250**
					$ 19,149,000

CIP Project #W-10					
Repaint Harbor Mountain Tank					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Repaint Harbor Mountain Tank	LS	1	$ 467,500	$ 467,500
				ESTIMATED CONSTRUCTION COST	**$ 467,500**
				Contingency (20%)	$ 93,500
				Subtotal	$ 561,000
				Design Engineering & Administration (15%)	$ 84,150
				Construction Administration (10%)	$ 56,100
				TOTAL PROJECT COST	**$ 701,250**
					$ 702,000

CIP Project #						
Shotgun Alley Pressure Zone - Directional Drill						
Item	Description	Units	Quantity	Unit Price	Total Price	**Item**
1	Mobilization	LS	1	$ 275,000	$ 275,000	1
2	Traffic Control	LS	1	$ 55,000	$ 55,000	2
3	Construction Survey	LS	1	$ 27,500	$ 27,500	3
4	Erosion & Sediment Control	LS	1	$ 11,000	$ 11,000	4
5	Directional Drilling	FT	6100	$ 440	$ 2,684,000	5
6	Furnish and Install Pipe	FT	6100	$ 220	$ 1,342,000	6
7	Install Pipe - Other	LS	1	$ 143,000	$ 143,000	7
8	Prefab Structure + Install	LS	1	$ 165,000	$ 165,000	8
9	Pumps & Equipment	LS	1	$ 137,500	$ 137,500	9
10	Site Work	LS	1	$ 110,000	$ 110,000	10
11	Install PRV	LS	4	$ 77,000	$ 308,000	11
12	Communication Line	LF	7900	$ 55	$ 434,500	12
13	Connect to Existing Water	EA	2	$ 1,760	$ 3,520	13
ESTIMATED CONSTRUCTION COST					**$ 5,696,020**	
Contingency (20%)					$ 1,139,204	
Subtotal					$ 6,835,224	
Design Engineering & Administration (20%)					$ 1,367,045	
Construction Administration (10%)					$ 683,522	
TOTAL PROJECT COST					**$ 8,885,791**	
					$ 8,886,000	

CIP Project #				
Shotgun Alley Pressure Zone - Booster and Additional Lines				
Description	**Units**	**Quantity**	**Unit Price**	**Total Price**
Mobilization	LS	1	$ 85,000	$ 85,000
Traffic Control	LS	1	$ 25,000	$ 25,000
Construction Survey	LS	1	$ 20,000	$ 20,000
Erosion & Sediment Control	LS	1	$ 10,000	$ 10,000
Furnish and Install Pipe in Roadway	LF	100	$ 600	$ 60,000
Install Pipe - Other	LS	1	$ 130,000	$ 130,000
Prefab Structure + Install	LS	1	$ 150,000	$ 150,000
Pumps & Equipment	LS	1	$ 250,000	$ 250,000
Site Work	LS	1	$ 100,000	$ 100,000
Install PRV and Vault	LS	3	$ 70,000	$ 210,000
Communication Line	LF	6550	$ 50	$ 327,500
Service Connections	EA	20	$ 1,600	$ 32,000
Paving	LF	6550	$ 105	$ 687,750
			ESTIMATED CONSTRUCTION COST	**$ 2,087,250**
			Contingency (20%)	$ 417,450
			Subtotal	$ 2,504,700
			Design Engineering & Administration (15%)	$ 375,705
			Construction Administration (10%)	$ 250,470
			TOTAL PROJECT COST	**$ 3,130,875**
				$ 3,131,000

CIP Project #					
Wortman Loop Pump Station Improvements					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 154,000	$ 154,000
2	Traffic Control	LS	1	$ 82,500	$ 82,500
3	Replace Pumps & Equipment	LS	1	$ 302,500	$302,500
4	Check Valve & Vault Replacement	LS	3	$ 137,500	$412,500
5	Connection for Portable Generator	LS	1	$ 110,000	$110,000
6	Communication Line	LF	1300	$ 61	$78,650
ESTIMATED CONSTRUCTION COST					**$ 1,140,150**
Contingency (20%)					$ 228,030
Subtotal					$ 1,368,180
Design Engineering & Administration (15%)					$ 205,227
Construction Administration (10%)					$ 136,818
TOTAL PROJECT COST					**$ 1,710,225**
					$ 1,711,000

CIP Project #W-13					
Monastery / Highland / Merrill Water Mains					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 110,000	$ 55,000
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 22,000	$ 11,000
5	HDPE - 6"	LF	870	$ 110	$ 95,700
6	Valving/Hydrants	LF	870	$ 55	$ 47,850
7	Service Lines	EA	35	$ 3,850	$ 134,750
8	Connect to Existing Water	EA	2	$ 3,575	$ 7,150
9	Abandon Water Pipe	LF	870	$ 11	$ 9,570
10	Paving	LF	1275	$ 451	$ 287,513
ESTIMATED CONSTRUCTION COST					**$ 711,783**
Contingency (20%)					$ 142,357
Subtotal					$ 854,140
Design Engineering & Administration (15%)					$ 128,121
Construction Administration (10%)					$ 85,414
TOTAL PROJECT COST					**$ 1,067,675**
					$ 1,068,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-14					
Kimshan / Tilson / Peterson Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 126,500	$ 63,250
2	Traffic Control	LS	1	$ 110,000	$ 55,000
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 14"	LF	530	$ 154	$ 81,620
6	HDPE - 8"	LF	950	$ 110	$ 104,500
7	HDPE - 6"	LF	200	$ 110	$ 22,000
8	Valving/Hydrants	LF	1680	$ 55	$ 92,400
9	Service Lines	EA	24	$ 3,850	$ 92,400
10	Connect to Existing Water	EA	6	$ 3,575	$ 21,450
11	Abandon Water Pipe	LF	1680	$ 11	$ 18,480
12	Paving	LF	1625	$ 451	$ 366,438
ESTIMATED CONSTRUCTION COST					**$ 958,788**
Contingency (20%)					$ 191,758
Subtotal					$ 1,150,546
Design Engineering & Administration (15%)					$ 172,582
Construction Administration (10%)					$ 115,055
TOTAL PROJECT COST					**$ 1,438,183**
					$ 1,439,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-15					
Keet Gooshi Heen WST 1 MG					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 110,000	$ 110,000
2	Pre-fab Tank 1 MG	LS	1	$ 440,000	$ 440,000
3	Tank Install & Foundation	LS	1	$ 2,640,000	$ 2,640,000
4	Access Road	LF	1600	$ 880	$ 1,408,000
5	Install Pipe	LF	3200	$ 1,210	$ 3,872,000
6	Install Pipe - Road	LF	650	$ 660	$ 429,000
7	Pipe Connection & Temporary System	LS	1	$ 143,000	$ 143,000
8	Pump Station	LS	1	$ 1,375,000	$ 1,375,000
9	Site Work	LS	1	$ 2,475,000	$ 2,475,000
				ESTIMATED CONSTRUCTION COST	**$ 12,892,000**
				Contingency (20%)	$ 2,578,400
				Subtotal	$ 15,470,400
				Design Engineering & Administration (15%)	$ 2,320,560
				Construction Administration (10%)	$ 1,547,040
				TOTAL PROJECT COST	**$ 19,338,000**
					$ 19,338,000

CIP Project #W-16						
Gavan Street and Moller Avenue Water Mains*						
Item	Description	Units	Quantity	Orig unit	Unit Price	Total Price
1	Mobilization	LS	1	$ 75,000	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 25,000	$ 27,500	$ 13,750
3	Construction Survey	LS	1	$ 40,000	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 15,000	$ 16,500	$ 8,250
5	HDPE - 8"	LF	875	$ 100	$ 110	$ 96,250
6	Valving/Hydrants	LF	875	$ 50	$ 55	$ 48,125
7	Service Lines	EA	15	$ 3,500	$ 3,850	$ 57,750
8	Connect to Existing Water	EA	1	$ 3,250	$ 3,575	$ 3,575
9	Abandon Water Pipe	LF	875	$ 10	$ 11	$ 9,625
10	Paving	LF	900	$ 410	$ 451	$ 202,950
					ESTIMATED CONSTRUCTION COST	**$ 503,525**
					Contingency (20%)	$ 100,705
					Subtotal	$ 604,230
					Design Engineering & Administration (15%)	$ 90,635
					Construction Administration (10%)	$ 60,423
					TOTAL PROJECT COST	**$ 755,288**
						$ 756,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #					
Marine / DeArmond / New Archangel / Erler Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 159,500	$ 79,750
2	Traffic Control	LS	1	$ 49,500	$ 24,750
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 6"	LF	580	$ 110	$ 63,800
6	HDPE - 8"	LF	200	$ 110	$ 22,000
7	HDPE - 10"	LF	630	$ 132	$ 83,160
8	HDPE - 12"	LF	550	$ 132	$ 72,600
9	Valving/Hydrants	LF	1960	$ 55	$ 107,800
10	Service Lines	EA	36	$ 3,850	$ 138,600
11	Connect to Existing Water	EA	5	$ 3,575	$ 17,875
12	Abandon Water Pipe	LF	1960	$ 11	$ 21,560
13	Paving	LF	1650	$ 451	$ 372,075
				ESTIMATED CONSTRUCTION COST	**$ 1,045,220**
				Contingency (20%)	$ 209,044
				Subtotal	$ 1,254,264
				Design Engineering & Administration (15%)	$ 188,140
				Construction Administration (10%)	$ 125,426
				TOTAL PROJECT COST	**$ 1,567,830**
					$ 1,568,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-18					
Wortman Loop Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 154,000	$ 77,000
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 8"	LF	1640	$ 110	$ 180,400
6	Valving/Hydrants	LF	1640	$ 55	$ 90,200
7	Service Lines	EA	25	$ 3,850	$ 96,250
8	Connect to Existing Water	EA	2	$ 3,575	$ 7,150
9	Abandon Water Pipe	LF	1640	$ 11	$ 18,040
10	Paving	LF	1690	$ 451	$ 381,095
ESTIMATED CONSTRUCTION COST					**$ 932,635**
Contingency (20%)					$ 186,527
Subtotal					$ 1,119,162
Design Engineering & Administration (15%)					$ 167,874
Construction Administration (10%)					$ 111,916
TOTAL PROJECT COST					**$ 1,398,952**
					$ 1,399,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-19					
Connect Hillside Pressure Zone to Lance Dr.					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 154,000	$ 154,000
2	Traffic Control	LS	1	$ 82,500	$ 82,500
3	Construction Survey	LS	1	$ 55,000	$ 55,000
4	Install Pipe	LF	840	$ 726	$609,840
5	Pipe Connection & Temporary System	LS	1	$ 143,000	$143,000
6	Install PRV	LS	1	$ 92,400	$92,400
				ESTIMATED CONSTRUCTION COST	**$ 1,136,740**
				Contingency (20%)	$ 227,348
				Subtotal	$ 1,364,088
				Design Engineering & Administration (20%)	$ 272,818
				Construction Administration (10%)	$ 136,409
				TOTAL PROJECT COST	**$ 1,773,315**
					$ 1,774,000

CIP Project #W-20					
Install Areawide Water Meters (Three) Phase 2					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Install Clamp-on Water Meter	LS	3	$41,800	$125,400
2	Communication Line	LF	6350	$72	$454,025
				ESTIMATED CONSTRUCTION COST	**$ 579,425**
				Contingency (20%)	$ 115,885
				Subtotal	$ 695,310
				Design Engineering & Administration (15%)	$ 104,297
				Construction Administration (10%)	$ 69,531
				TOTAL PROJECT COST	**$ 869,138**
					$ 870,000

CIP Project #W-21					
Halibut Point Rd. 16" Water Upgrade (Old Mountain Harbor Rd. to Krestof Dr.)					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Traffic Control	LS	1	$ 27,500	$ 27,500
3	Construction Survey	LS	1	$ 44,000	$ 44,000
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 16,500
5	Replace Pipe	LF	3620	$ 858	$3,105,960
6	Pipe Connection & Temporary System	LS	1	$236,500	$236,500
				ESTIMATED CONSTRUCTION COST	**$ 3,512,960**
				Contingency (20%)	$ 702,592
				Subtotal	$ 4,215,552
				Design Engineering & Administration (15%)	$ 632,333
				Construction Administration (10%)	$ 421,555
				TOTAL PROJECT COST	**$ 5,269,440**
					$ 5,270,000

CIP Project #W-22					
Install Areawide Water Meters (Three) Phase 3					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Install Clamp-on Water Meter	LS	3	$41,800	$125,400
2	Communication Line	LF	6350	$72	$454,025
				ESTIMATED CONSTRUCTION COST	**$ 579,425**
				Contingency (20%)	$ 115,885
				Subtotal	$ 695,310
				Design Engineering & Administration (15%)	$ 104,297
				Construction Administration (10%)	$ 69,531
				TOTAL PROJECT COST	**$ 869,138**
					$ 870,000

CIP Project #W-23						
Princess / Seward / Barracks Water Mains*						
Item	Description	Units	Quantity		Unit Price	Total Price
1	Mobilization	LS	1	$ 75,000	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 75,000	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 40,000	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 15,000	$ 16,500	$ 8,250
5	HDPE - 10"	LF	410	$ 120	$ 132	$ 54,120
6	HDPE - 6"	LF	350	$ 100	$ 110	$ 38,500
7	Valving/Hydrants	LF	760	$ 50	$ 55	$ 41,800
8	Service Lines	EA	18	$ 3,500	$ 3,850	$ 69,300
9	Connect to Existing Water	EA	4	$ 3,250	$ 3,575	$ 14,300
10	Abandon Water Pipe	LF	760	$ 10	$ 11	$ 8,360
11	Paving	LF	1025	$ 410	$ 451	$ 231,138
					ESTIMATED CONSTRUCTION COST	**$ 570,268**
					Contingency (20%)	$ 114,054
					Subtotal	$ 684,322
					Design Engineering & Administration (15%)	$ 102,648
					Construction Administration (10%)	$ 68,432
					TOTAL PROJECT COST	**$ 855,402**
						$ 856,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-24					
Connect Indian River Road to Jarvis St					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Install Pipe	LF	1120	$ 1,210	$ 1,355,200
3	Pipe Connection & Temporary System	LS	1	$157,300	$ 157,300
4	Install Clamp-on Water Meter	LS	1	$ 38,500	$ 38,500
5	Communication Line	LF	1700	$ 66	$ 112,200
				ESTIMATED CONSTRUCTION COST	**$ 1,745,700**
				Contingency (20%)	$ 349,140
				Subtotal	$ 2,094,840
				Design Engineering & Administration (15%)	$ 314,226
				Construction Administration (10%)	$ 209,484
				TOTAL PROJECT COST	**$ 2,618,550**
					$ 2,619,000

CIP Project #W-25					
Anna Drive Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 110,000	$ 55,000
2	Traffic Control	LS	1	$ 55,000	$ 27,500
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	HDPE - 8"	LF	950	$ 110	$ 104,500
6	Valving/Hydrants	LF	950	$ 55	$ 52,250
7	Service Lines	EA	24	$ 3,850	$ 92,400
8	Connect to Existing Water	EA	2	$ 3,575	$ 7,150
9	Abandon Water Pipe	LF	950	$ 11	$ 10,450
10	Paving	LF	975	$ 451	$ 219,863
ESTIMATED CONSTRUCTION COST					**$ 610,363**
Contingency (20%)					$ 122,073
Subtotal					$ 732,436
Design Engineering & Administration (15%)					$ 109,865
Construction Administration (10%)					$ 73,244
TOTAL PROJECT COST					**$ 915,544**
					$ 916,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-26					
Jamestown Drive Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 44,000	$ 22,000
3	Construction Survey	LS	1	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 22,000	$ 11,000
5	HDPE - 8"	LF	520	$ 110	$ 57,200
6	Valving/Hydrants	LF	520	$ 55	$ 28,600
7	Service Lines	EA	10	$ 3,850	$ 38,500
8	Connect to Existing Water	EA	1	$ 3,575	$ 3,575
9	Abandon Water Pipe	LF	520	$ 11	$ 5,720
10	Paving	LF	545	$ 451	$ 122,898
				ESTIMATED CONSTRUCTION COST	**$ 352,743**
				Contingency (20%)	$ 70,549
				Subtotal	$ 423,292
				Design Engineering & Administration (15%)	$ 63,494
				Construction Administration (10%)	$ 42,329
				TOTAL PROJECT COST	**$ 529,114**
					$ 530,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-27					
Viking Drive Water Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 55,000	$ 27,500
2	Traffic Control	LS	1	$ 27,500	$ 13,750
3	Construction Survey	LS	1	$ 38,500	$ 19,250
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 8,250
5	HDPE - 8"	LF	320	$ 110	$ 35,200
6	Valving/Hydrants	LF	320	$ 55	$ 17,600
7	Service Lines	EA	8	$ 3,850	$ 30,800
8	Connect to Existing Water	EA	2	$ 3,575	$ 7,150
9	Abandon Water Pipe	LF	320	$ 11	$ 3,520
10	Paving	LF	400	$ 451	$ 90,200
				ESTIMATED CONSTRUCTION COST	**$ 253,220**
				Contingency (20%)	$ 50,644
				Subtotal	$ 303,864
				Design Engineering & Administration (15%)	$ 45,580
				Construction Administration (10%)	$ 30,386
				TOTAL PROJECT COST	**$ 379,830**
					$ 380,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-28						
Burkhart Drive and Lance Drive Water Mains*						
Item	Description	Units	Quantity		Unit Price	Total Price
1	Mobilization	LS	1	$ 50,000	$ 55,000	$ 27,500
2	Traffic Control	LS	1	$ 15,000	$ 16,500	$ 8,250
3	Construction Survey	LS	1	$ 25,000	$ 27,500	$ 13,750
4	Erosion & Sediment Control	LS	1	$ 10,000	$ 11,000	$ 5,500
5	HDPE - 10"	LF	2575	$ 120	$ 132	$ 339,900
6	Valving/Hydrants	LF	2575	$ 50	$ 55	$ 141,625
7	Service Lines	EA	40	$ 3,500	$ 3,850	$ 154,000
8	Connect to Existing Water	EA	4	$ 3,250	$ 3,575	$ 14,300
9	Abandon Water Pipe	LF	2575	$ 10	$ 11	$ 28,325
10	Paving	LF	2600	$ 410	$ 451	$ 586,300
					ESTIMATED CONSTRUCTION COST	**$ 1,319,450**
					Contingency (20%)	$ 263,890
					Subtotal	$ 1,583,340
					Design Engineering & Administration (15%)	$ 237,501
					Construction Administration (10%)	$ 158,334
					TOTAL PROJECT COST	**$ 1,979,175**
						$ 1,980,000

**This project corresponds with a sewer main replacement project with shared costs.*

CIP Project #W-29					
Install Areawide Water Meters (Two) Phase 4					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Install Clamp-on Water Meter	LS	2	$41,800	$83,600
2	Communication Line	LF	5000	$72	$357,500
				ESTIMATED CONSTRUCTION COST	**$ 441,100**
				Contingency (20%)	$ 88,220
				Subtotal	$ 529,320
				Design Engineering & Administration (15%)	$ 79,398
				Construction Administration (10%)	$ 52,932
				TOTAL PROJECT COST	**$ 661,650**
					$ 662,000

CIP Project #W-30					
Halibut Point Rd. 16" Water Upgrade (Krestof Dr. to Viking)					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Traffic Control	LS	1	$ 27,500	$ 27,500
3	Construction Survey	LS	1	$ 44,000	$ 44,000
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 16,500
5	Replace Pipe	LF	1700	$ 858	$1,458,600
6	Pipe Connection & Temporary System	LS	1	$236,500	$236,500
				ESTIMATED CONSTRUCTION COST	**$ 1,865,600**
				Contingency (20%)	$ 373,120
				Subtotal	$ 2,238,720
				Design Engineering & Administration (15%)	$ 335,808
				Construction Administration (10%)	$ 223,872
				TOTAL PROJECT COST	**$ 2,798,400**
					$ 2,799,000

CIP Project #W-31					
Granite Creek Water					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Traffic Control	LS	1	$ 27,500	$ 27,500
3	Construction Survey	LS	1	$ 44,000	$ 44,000
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 16,500
5	Install Pipe	LF	920	$ 858	$789,360
6	Pipe Connection	LS	1	$ 28,600	$28,600
				ESTIMATED CONSTRUCTION COST	**$ 988,460**
				Contingency (20%)	$ 197,692
				Subtotal	$ 1,186,152
				Design Engineering & Administration (15%)	$ 177,923
				Construction Administration (10%)	$ 118,615
				TOTAL PROJECT COST	**$ 1,482,690**
					$ 1,483,000

CIP Project #W-32					
Kashevaroff St. Water					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 75,000	$ 75,000
2	Traffic Control	LS	1	$ 25,000	$ 25,000
3	Construction Survey	LS	1	$ 40,000	$ 40,000
4	Erosion & Sediment Control	LS	1	$ 15,000	$ 15,000
5	Install Pipe	LF	450	$780	$351,000
6	Pipe Connection	LS	1	$26,000	$26,000
				ESTIMATED CONSTRUCTION COST	**$ 532,000**
				Contingency (20%)	$ 106,400
				Subtotal	$ 638,400
				Design Engineering & Administration (15%)	$ 95,760
				Construction Administration (10%)	$ 63,840
				TOTAL PROJECT COST	**$ 798,000**
					$ 798,000

CIP Project #W-33					
Benchlands to Harbor Mountain Tank					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Traffic Control	LS	1	$ 27,500	$ 27,500
3	Construction Survey	LS	1	$ 44,000	$ 44,000
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 16,500
5	Install Pipe - Under Pavement	LF	1500	$ 858	$1,287,000
6	Install Pipe - Under Gravel	LF	3925	$ 770	$3,022,250
7	Pipe Connection	LS	1	$ 28,600	$28,600
				ESTIMATED CONSTRUCTION COST	**$ 4,508,350**
				Contingency (20%)	$ 901,670
				Subtotal	$ 5,410,020
				Design Engineering & Administration (15%)	$ 811,503
				Construction Administration (10%)	$ 541,002
				TOTAL PROJECT COST	**$ 6,762,525**
					$ 6,763,000

CIP Project #W-34					
Connect Granite Creek to Harbor Mountain Road					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Traffic Control	LS	1	$ 27,500	$ 27,500
3	Construction Survey	LS	1	$ 44,000	$ 44,000
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 16,500
5	Install Pipe - Through Forest	LF	885	$ 1,430	$1,265,550
7	Pipe Connection	LS	1	$ 28,600	$28,600
				ESTIMATED CONSTRUCTION COST	**$ 1,464,650**
				Contingency (20%)	$ 292,930
				Subtotal	$ 1,757,580
				Design Engineering & Administration (15%)	$ 263,637
				Construction Administration (10%)	$ 175,758
				TOTAL PROJECT COST	**$ 2,196,975**
					$ 2,197,000

CIP Project #W-35					
Repaint Gavan Tank					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Repaint Gavan Tank	LS	1	$ 825,000	$ 825,000
				ESTIMATED CONSTRUCTION COST	**$ 825,000**
				Contingency (20%)	$ 165,000
				Subtotal	$ 990,000
				Design Engineering & Administration (15%)	$ 148,500
				Construction Administration (10%)	$ 99,000
				TOTAL PROJECT COST	**$ 1,237,500**
					$ 1,238,000

CIP Project #W-36					
Repaint Whitcomb Heights Tank					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Repaint Whitcomb Heights Tank	LS	1	$ 825,000	$ 825,000
				ESTIMATED CONSTRUCTION COST	**$ 825,000**
				Contingency (20%)	$ 165,000
				Subtotal	$ 990,000
				Design Engineering & Administration (15%)	$ 148,500
				Construction Administration (10%)	$ 99,000
				TOTAL PROJECT COST	**$ 1,237,500**
					$ 1,238,000

CIP Project #W-37					
Upgrade Hillside Booster Station and 10" Replacement					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 132,000	$ 132,000
2	Construction Surveying	LS	1	$ 33,000	$ 33,000
3	Replace Pumps & Equipment	LS	1	$ 302,500	$ 302,500
4	Replace Pipe	LF	1900	$ 770	$ 1,463,000
5	Pipe Connection & Temporary System	LS	1	$ 236,500	$ 236,500
				ESTIMATED CONSTRUCTION COST	**$ 2,167,000**
				Contingency (20%)	$ 433,400
				Subtotal	$ 2,600,400
				Design Engineering & Administration (15%)	$ 390,060
				Construction Administration (10%)	$ 260,040
				TOTAL PROJECT COST	**$ 3,250,500**
					$ 3,251,000

CBS Watewater CIP Projects		
High Priority		
WW-1	Thomsen Harbor Lift Station	$2,517,000
WW-2	Lake / Hirst / Kinkead / Monastery Sewer Mains*	$2,676,000
WW-3	Lake-Lincoln Lift Station	$1,386,000
WW-4	Lincoln Street (Lake to Jeff Davis) Sewer Mains*	$2,066,000
WW-5	Lincoln Street (Lake to Katlian) Sewer Mains*	$2,084,000
WW-6	10" & 16" Force Main Replacement (Japonski Island Uplands)	$3,415,000
WW-7	Lift Station Communication System	$603,000
WW-8	Japonski #3 Lift Station and Force Main Replacement	$714,000
WW-9	WWTP Grit Collector	$368,000
WW-10	WWTP Scum Concentrator	$574,000
WW-11	WWTP Belt Filter Press	$545,000
WW-12	WWTP Clarifier Pumps	$113,000
WW-13	Wolff Drive Sewer Mains*	$1,603,000
WW-14	WWTP Effluent Disinfection	$3,826,000
WW-15	Kirkman Way Sewer Mains*	$415,000
WW-16	Halibut Point Road (Roundabout to Davidoff) Sewer Mains*	$6,066,000
WW-17	Monastery / Highland / Merrill Sewer Mains*	$1,319,000
WW-18	Gravity Sewer from 1700 HPR to Brady Lift Station	$4,028,000
WW-19	Kimsham / Tilson / Peterson Sewer Mains*	$1,566,000
Medium Priority		
WW-20	Old Sitka Rocks Lift Station	$1,139,000
WW-21	Granite Creek Lift Station	$891,000
WW-22	Submarine Force Mains	$2,440,000
WW-23	Castle Hill Lift Station	$957,000
WW-24	Gavan Street and Moller Avenue Sewer Mains*	$832,000
WW-25	Marine / DeArmond / New Archangel / Erler Sewer Mains*	$1,383,000
WW-26	Wortman Loop Sewer Mains*	$1,461,000
WW-27	Tlingit Way Sewer Main	$695,000
WW-28	Princess / Seward / Barracks Sewer Mains*	$1,075,000
WW-29	Katlian Avenue (Kirkman Way to Thomsen Lift Station) Sewer Mains*	$2,222,000
Low Priority		
WW-30	Old Indian River Lift Station	$957,000
WW-31	Halibut Point Lift Station	$908,000
WW-32	Sandy Beach Lift Station	$875,000
WW-33	Landfill Lift Station	$372,000
WW-34	Anna Drive / Circle Sewer Mains*	$1,132,000
WW-35	Jamestown Drive Sewer Mains*	$580,000
WW-36	Viking Way Sewer Mains*	$433,000
WW-37	Emergency Generators	$424,000
WW-38	Burkart Street and Lance Drive Sewer Mains*	$2,105,000
WW-39	East Jamestown Lift Station	$45,000
WW-40	Marine Outfall	$2,282,000
WW-41	Castle Hill Catchment Area Sewer Mains	$927,000
Other		
WW-42	E-Ones Lift Stations	$555,000
WW-43	WWTP Secondary Treatment	$49,500,000
Underway		
Biosolids Disposal		
WWTP Compressed Air Pipe		
Wachusetts Lift Station (Peterson Creek Culvert Project)		

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-1					
Thomsen Harbor Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 110,000	$ 110,000
2	Demolition	LS	1	$ 55,000	$ 55,000
3	Traffic Control	LS	1	$ 55,000	$ 55,000
4	Bypass Pumping	LS	1	$ 352,000	$ 352,000
5	Wet Well Conversion	LS	1	$ 330,000	$ 330,000
6	Building Improvements	LS	1	$ 110,000	$ 110,000
7	Electrical Rehabilitation	LS	1	$ 121,000	$ 121,000
8	Controls and Communications	LS	1	$ 110,000	$ 110,000
9	Disinfection System	LS	1	$ 44,000	$ 44,000
10	Backup Generator Connection/Compatibility	LS	1	$ 137,500	$ 137,500
11	Site Work	LS	1	$ 88,000	$ 88,000
12	Dewatering/Shoring/Sheeting/Bracing	LS	1	$ 165,000	$ 165,000
				ESTIMATED CONSTRUCTION COST	**$ 1,677,500**
				Contingency (20%)	$ 335,500
				Subtotal	$ 2,013,000
				Design Engineering & Administration (15%)	$ 301,950
				Construction Administration (10%)	$ 201,300
				TOTAL PROJECT COST	**$ 2,516,250**
					$ 2,517,000

CIP Project WW-2					
Lake / Hirst / Kinkead / Monastery Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 275,000	$ 137,500
2	Traffic Control	LS	1	$ 110,000	$ 55,000
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	2680	$ 11	$ 29,480
6	Demolition - Paving	LF	2780	$ 72	$ 99,385
7	Sewer Pipe - 14"	LF	800	$ 193	$ 154,000
8	Sewer Pipe - 12"	LF	250	$ 165	$ 41,250
9	Sewer Pipe - 8"	LF	1630	$ 110	$ 179,300
10	Manholes	EA	7	$ 16,500	$ 115,500
11	Cleanouts	EA	4	$ 825	$ 3,300
12	Temporary Services	EA	45	$ 1,100	$ 49,500
13	Service Connections	EA	45	$ 5,500	$ 247,500
14	Connect to Existing Sewer	EA	2	$ 1,760	$ 3,520
15	Paving	LF	2780	$ 451	$ 626,890
				ESTIMATED CONSTRUCTION COST	**$ 1,783,375**
				Contingency (20%)	$ 356,675
				Subtotal	$ 2,140,050
				Design Engineering & Administration (15%)	$ 321,008
				Construction Administration (10%)	$ 214,005
				TOTAL PROJECT COST	**$ 2,675,063**
					$ 2,676,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-3					
Lake-Lincoln Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Demolition	LS	1	$ 44,000	$ 44,000
3	Traffic Control	LS	1	$ 55,000	$ 55,000
4	Bypass Pumping	LS	1	$ 88,000	$ 88,000
5	Wet Well Conversion	LS	1	$ 192,500	$ 192,500
6	Building Improvements	LS	1	$ 33,000	$ 33,000
7	Electrical Rehabilitation	LS	1	$ 99,000	$ 99,000
8	Backup Generator Replacement	LS	1	$ 165,000	$ 165,000
9	Site Work	LS	1	$ 55,000	$ 55,000
10	Dewatering/Shoring/Sheeting/Bracing	LS	1	$ 110,000	$ 110,000
				ESTIMATED CONSTRUCTION COST	**$ 924,000**
				Contingency (20%)	$ 184,800
				Subtotal	$ 1,108,800
				Design Engineering & Administration (15%)	$ 166,320
				Construction Administration (10%)	$ 110,880
				TOTAL PROJECT COST	**$ 1,386,000**
					$ 1,386,000

CIP Project WW-4					
Lincoln Street (Lake to Jeff Davis) Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 187,000	$ 93,500
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	1600	$ 11	$ 17,600
6	Demolition - Paving	LF	1660	$ 72	$ 59,345
7	Sewer Pipe - 20"	LF	950	$ 275	$ 261,250
8	Sewer Pipe - 18"	LF	650	$ 248	$ 160,875
9	Manholes	EA	9	$ 16,500	$ 148,500
10	Temporary Services	EA	25	$ 1,100	$ 27,500
11	Service Connections	EA	25	$ 5,500	$ 137,500
12	Connect to Existing Sewer	EA	8	$ 1,760	$ 14,080
13	Paving	LF	1660	$ 451	$ 374,330
				ESTIMATED CONSTRUCTION COST	**$ 1,376,980**
				Contingency (20%)	$ 275,396
				Subtotal	$ 1,652,376
				Design Engineering & Administration (15%)	$ 247,856
				Construction Administration (10%)	$ 165,238
				TOTAL PROJECT COST	**$ 2,065,470**
					$ 2,066,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-5					
Lincoln Street (Lake to Katlian) Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 187,000	$ 93,500
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	1965	$ 11	$ 21,615
6	Demolition - Paving	LF	1450	$ 72	$ 51,838
7	Sewer Pipe - 20"	LF	600	$ 275	$ 165,000
8	Sewer Pipe - 18"	LF	180	$ 248	$ 44,550
9	Sewer Pipe - 14" (FM)	LF	665	$ 193	$ 128,013
10	Sewer Pipe - 8"	LF	520	$ 110	$ 57,200
11	FM Fittings, Assemblies, Valves	LS	1	$ 27,500	$ 27,500
12	Manholes	EA	9	$ 16,500	$ 148,500
13	Temporary Services	EA	35	$ 1,100	$ 38,500
14	Service Connections	EA	35	$ 5,500	$ 192,500
15	Connect to Existing Sewer	EA	6	$ 1,760	$ 10,560
16	Paving	LF	1450	$ 451	$ 326,975
				ESTIMATED CONSTRUCTION COST	**$ 1,388,750**
				Contingency (20%)	$ 277,750
				Subtotal	$ 1,666,500
				Design Engineering & Administration (15%)	$ 249,975
				Construction Administration (10%)	$ 166,650
				TOTAL PROJECT COST	**$ 2,083,125**
					$ 2,084,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-6					
10" and 16" Force Main Replacement (Uplands - Japonski Island)					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 187,000	$ 187,000
2	Traffic Control	LS	1	$ 82,500	$ 82,500
3	Construction Survey	LS	1	$ 55,000	$ 55,000
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 27,500
5	Demolition - Sewer	LF	6000	$ 11	$ 66,000
6	Clear/Grub	LS	1	$ 16,500	$ 16,500
7	Trenching	LF	3000	$ 176	$ 528,000
8	Sewer Pipe - 16" (FM)	LF	3000	$ 220	$ 660,000
9	Sewer Pipe - 10" (FM)	LF	3000	$ 138	$ 412,500
10	FM Fittings, Assemblies, Valves	LS	1	$ 110,000	$ 110,000
11	Temporary Bypass	LS	1	$ 110,000	$ 110,000
12	Connect to Existing Sewer	EA	6	$ 3,520	$ 21,120
				ESTIMATED CONSTRUCTION COST	**$ 2,276,120**
				Contingency (20%)	$ 455,224
				Subtotal	$ 2,731,344
				Design Engineering & Administration (15%)	$ 409,702
				Construction Administration (10%)	$ 273,134
				TOTAL PROJECT COST	**$ 3,414,180**
					$ 3,415,000

CIP Project WW-7					
Lift Station Communications					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Castle Hill - Install SCADA	Each	1	$ 66,000	$ 66,000
2	Centennial - Install SCADA	Each	1	$ 66,000	$ 66,000
3	Old Indian River - Install SCADA	Each	1	$ 66,000	$ 66,000
4	Granite Creek - Install SCADA	Each	1	$ 66,000	$ 66,000
5	Rands Drive - Upgrade Radio	Each	1	$ 27,500	$ 27,500
6	Jamestown - Upgrade Radio	Each	1	$ 27,500	$ 27,500
7	New Indian River - Upgrade Radio	Each	1	$ 27,500	$ 27,500
8	Monastery - Upgrade Radio	Each	1	$ 27,500	$ 27,500
9	Lake - Upgrade Radio	Each	1	$ 27,500	$ 27,500
				ESTIMATED CONSTRUCTION COST	**$ 401,500**
				Contingency (20%)	$ 80,300
				Subtotal	$ 481,800
				Design Engineering & Administration (15%)	$ 72,270
				Construction Administration (10%)	$ 48,180
				TOTAL PROJECT COST	**$ 602,250**
					$ 603,000

CIP Project WW-8					
Japonski #3 Lift Station and Force Main Replacement					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 55,000	$ 55,000
2	Lift Station Improvements	LS	1	$ 247,500	$ 247,500
3	Demolition - Sewer	LF	75	$ 11	$ 825
4	Demolition - Paving	LF	100	$ 72	$ 7,150
5	Sewer Pipe - 6" (FM)	LS	75	$ 110	$ 8,250
6	FM Fittings, Assemblies, Valves	LS	1	$ 11,000	$ 11,000
7	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
8	Paving	LF	100	$ 451	$ 45,100
9	Install Backup Generator	LS	1	$ 99,000	$ 99,000
				ESTIMATED CONSTRUCTION COST	**$ 475,585**
				Contingency (20%)	$ 95,117
				Subtotal	$ 570,702
				Design Engineering & Administration (15%)	$ 85,605
				Construction Administration (10%)	$ 57,070
				TOTAL PROJECT COST	**$ 713,377**
					$ 714,000

CIP Project WW-9					
WWTP Grit Collector					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Equipment - Classifier/Cyclone	LS	1	$ 156,200	$ 156,200
2	Equipment - Pumps	EA	2	$ 16,500	$ 33,000
3	Shipping	LS	1	$ 27,500	$ 27,500
4	Installation/Start Up	LS	1	$ 49,500	$ 49,500
				ESTIMATED CONSTRUCTION COST	**$ 266,200**
				Contingency (20%)	$ 53,240
				Subtotal	$ 319,440
				Design Engineering & Administration (5%)	$ 15,972
				Construction Administration (10%)	$ 31,944
				TOTAL PROJECT COST	**$ 367,356**
					$ 368,000

CIP Project WW-10					
WWTP Scum Concentrator					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Equipment - Scum Concentrator Unit	LS	1	$ 297,000	$ 297,000
2	Shipping	LS	1	$ 44,000	$ 44,000
3	Installation/Start Up	LS	1	$ 74,250	$ 74,250
				ESTIMATED CONSTRUCTION COST	**$ 415,250**
				Contingency (20%)	$ 83,050
				Subtotal	$ 498,300
				Design Engineering & Administration (5%)	$ 24,915
				Construction Administration (10%)	$ 49,830
				TOTAL PROJECT COST	**$ 573,045**
					$ 574,000

CIP Project WW-11					
WWTP Belt Filter Press					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Equipment - Filter Press Unit	LS	1	$ 280,500	$ 280,500
2	Shipping	LS	1	$ 42,350	$ 42,350
3	Installation/Start Up	LS	1	$ 71,500	$ 71,500
				ESTIMATED CONSTRUCTION COST	**$ 394,350**
				Contingency (20%)	$ 78,870
				Subtotal	$ 473,220
				Design Engineering & Administration (5%)	$ 23,661
				Construction Administration (10%)	$ 47,322
				TOTAL PROJECT COST	**$ 544,203**
					$ 545,000

CIP Project WW-12					
WWTP Clarifier Pumps					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Equipment - Pumps	EA	3	$ 19,250	$ 57,750
2	Shipping	LS	1	$ 8,800	$ 8,800
3	Installation/Start Up	LS	1	$ 14,850	$ 14,850
				ESTIMATED CONSTRUCTION COST	**$ 81,400**
				Contingency (20%)	$ 16,280
				Subtotal	$ 97,680
				Design Engineering & Administration (5%)	$ 4,884
				Construction Administration (10%)	$ 9,768
				TOTAL PROJECT COST	**$ 112,332**
					$ 113,000

CIP Project WW-13					
Wolff Drive Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 148,500	$ 74,250
2	Traffic Control	LS	1	$ 55,000	$ 27,500
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	1450	$ 11	$ 15,950
6	Demolition - Paving	LF	1645	$ 72	$ 58,809
7	Sewer Pipe - 8"	LF	1450	$ 110	$ 159,500
8	Manholes	EA	6	$ 16,500	$ 99,000
9	Cleanouts	EA	2	$ 825	$ 1,650
10	Temporary Services	EA	33	$ 1,100	$ 36,300
11	Service Connections	EA	33	$ 5,500	$ 181,500
12	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
13	Paving	LF	1645	$ 451	$ 370,948
				ESTIMATED CONSTRUCTION COST	**$ 1,068,416**
				Contingency (20%)	$ 213,683
				Subtotal	$ 1,282,099
				Design Engineering & Administration (15%)	$ 192,315
				Construction Administration (10%)	$ 128,210
				TOTAL PROJECT COST	**$ 1,602,624**
					$ 1,603,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-14					
WWTP Effluent Disinfection					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 132,000	$ 132,000
2	Effluent Tie-In and Yard Piping	LS	1	$ 66,000	$ 66,000
3	Clearing and Grubbing	LS	1	$ 22,000	$ 22,000
4	Earthwork	LS	1	$ 132,000	$ 132,000
5	Site Grading and Drainage	LS	1	$ 110,000	$ 110,000
6	Redundant Concrete Channels	LS	1	$ 264,000	$ 264,000
7	Redundant Removable Grating/Stairs	LS	1	$ 35,200	$ 35,200
8	Channel Slide Gates and Actuators	LS	1	$ 55,000	$ 55,000
9	Redundant Downstream Level Control Wier	LS	1	$ 88,000	$ 88,000
10	UV Banks, Cleaning and Lift System	LS	1	$ 990,000	$ 990,000
11	Cleaning Compressor	LS	1	$ 55,000	$ 55,000
12	Power Distribution Center	LS	1	Included	
13	System Control Center	LS	1	Included	
14	Remote Monitoring and Controls	LS	1	$ 110,000	$ 110,000
15	Water Level Sensors and Controls	LS	1	$ 66,000	$ 66,000
16	UV Equipment Shelter (Open Air/Covers)	LS	1	$ 165,000	$ 165,000
17	Electrical Service and Distribution	LS	1	$ 110,000	$ 110,000
18	Start-up and Commissioning	LS	1	$ 110,000	$ 110,000
				ESTIMATED CONSTRUCTION COST	**$ 2,510,200**
				Contingency (20%)	$ 502,040
				Subtotal	$ 3,012,240
				Preliminar Engineering Report (2%)	$ 60,245
				Design Engineering & Administration (15%)	$ 451,836
				Construction Administration (10%)	$ 301,224
				TOTAL PROJECT COST	**$ 3,825,545**
					$ 3,826,000

CIP Project WW-15					
Kirkman Way Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 27,500	$ 13,750
3	Construction Survey	LS	1	$ 38,500	$ 19,250
4	Erosion & Sediment Control	LS	1	$ 11,000	$ 5,500
5	Demolition - Sewer	LF	300	$ 11	$ 3,300
6	Demolition - Paving	LF	350	$ 72	$ 12,513
7	Sewer Pipe - 8"	LF	300	$ 110	$ 33,000
8	Cleanouts	EA	1	$ 825	$ 825
9	Temporary Services	EA	10	$ 1,100	$ 11,000
10	Service Connections	EA	10	$ 5,500	$ 55,000
11	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
12	Paving	LF	350	$ 451	$ 78,925
				ESTIMATED CONSTRUCTION COST	**$ 276,073**
				Contingency (20%)	$ 55,215
				Subtotal	$ 331,288
				Design Engineering & Administration (15%)	$ 49,693
				Construction Administration (10%)	$ 33,129
				TOTAL PROJECT COST	**$ 414,110**
					$ 415,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-16					
Halibut Point Road (Roundabout to Davidoff) Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 187,000	$ 93,500
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	6895	$ 11	$ 75,845
6	Demolition - Paving	LF	7845	$ 72	$ 280,459
7	Sewer Pipe - 12"	LF	925	$ 165	$ 152,625
8	Sewer Pipe - 10"	LF	2900	$ 138	$ 398,750
9	Sewer Pipe - 8"	LF	3070	$ 110	$ 337,700
10	Manholes	EA	30	$ 16,500	$ 495,000
11	Cleanouts	EA	2	$ 825	$ 1,650
12	Temporary Services	EA	50	$ 1,100	$ 55,000
13	Service Connections	EA	50	$ 5,500	$ 275,000
14	Connect to Existing Sewer	EA	15	$ 1,760	$ 26,400
15	Paving	LF	7845	$ 451	$ 1,769,048
				ESTIMATED CONSTRUCTION COST	**$ 4,043,476**
				Contingency (20%)	$ 808,695
				Subtotal	$ 4,852,171
				Design Engineering & Administration (15%)	$ 727,826
				Construction Administration (10%)	$ 485,217
				TOTAL PROJECT COST	**$ 6,065,214**
					$ 6,066,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-17					
Monastery / Highland / Merrill Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 110,000	$ 55,000
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 22,000	$ 11,000
5	Demolition - Sewer	LF	1200	$ 11	$ 13,200
6	Demolition - Paving	LF	1275	$ 72	$ 45,581
7	Sewer Pipe - 8"	LF	1200	$ 110	$ 132,000
8	Manholes	EA	2	$ 16,500	$ 33,000
9	Cleanouts	EA	3	$ 825	$ 2,475
10	Temporary Services	EA	35	$ 1,100	$ 38,500
11	Service Connections	EA	35	$ 5,500	$ 192,500
12	Connect to Existing Sewer	EA	3	$ 1,760	$ 5,280
13	Paving	LF	1275	$ 451	$ 287,513
				ESTIMATED CONSTRUCTION COST	**$ 879,299**
				Contingency (20%)	$ 175,860
				Subtotal	$ 1,055,159
				Design Engineering & Administration (15%)	$ 158,274
				Construction Administration (10%)	$ 105,516
				TOTAL PROJECT COST	**$ 1,318,949**
					$ 1,319,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-18					
Gravity Sewer from 1700 HPR to Brady Lift Station					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Condition Assessment	LS	1	$ 55,000	$ 55,000
2	Mobilization	LS	1	$ 110,000	$ 110,000
3	Traffic Control	LS	1	$ 16,500	$ 16,500
4	Construction Survey	LS	1	$ 55,000	$ 55,000
5	Easement Acquisition	LS	1	$ 110,000	$ 110,000
6	Erosion & Sediment Control	LS	1	$ 55,000	$ 55,000
7	Trenching	LF	4975	$ 176	$ 875,600
8	Demolition - Sewer	LF	4975	$ 11	$ 54,725
9	Sewer Pipe - 20"	LF	4975	$ 143	$ 711,425
10	Manholes	EA	18	$ 16,500	$ 297,000
11	Temporary Services	EA	60	$ 1,100	$ 66,000
12	Service Connections	EA	60	$ 5,500	$ 330,000
13	Connect to Existing Sewer	EA	2	$ 1,760	$ 3,520
				ESTIMATED CONSTRUCTION COST	**$ 2,684,770**
				Contingency (20%)	$ 536,954
				Subtotal	$ 3,221,724
				Design Engineering & Administration (15%)	$ 483,259
				Construction Administration (10%)	$ 322,172
				TOTAL PROJECT COST	**$ 4,027,155**
					$ 4,028,000

CIP Project WW-19					
Kimshan / Tilson / Peterson Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 126,500	$ 63,250
2	Traffic Control	LS	1	$ 110,000	$ 55,000
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	1600	$ 11	$ 17,600
6	Demolition - Paving	LF	1625	$ 72	$ 58,094
7	Sewer Pipe - 8"	LF	1600	$ 110	$ 176,000
8	Manholes	EA	6	$ 16,500	$ 99,000
9	Temporary Services	EA	24	$ 1,100	$ 26,400
10	Service Connections	EA	24	$ 5,500	$ 132,000
11	Connect to Existing Sewer	EA	5	$ 1,760	$ 8,800
12	Paving	LF	1625	$ 451	$ 366,438
				ESTIMATED CONSTRUCTION COST	**$ 1,043,831**
				Contingency (20%)	$ 208,766
				Subtotal	$ 1,252,597
				Design Engineering & Administration (15%)	$ 187,890
				Construction Administration (10%)	$ 125,260
				TOTAL PROJECT COST	**$ 1,565,747**
					$ 1,566,000

Title: CIP Project WW-19 — Kimshan / Tilson / Peterson Sewer Mains*

This project corresponds with a water main replacement project with shared costs.

CIP Project WW-20					
Old Sitka Rocks Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Demolition	LS	1	$ 44,000	$ 44,000
3	Bypass Pumping	LS	1	$ 66,000	$ 66,000
4	Wet Well Rehab and Conversion	LS	1	$ 275,000	$ 275,000
5	Traffic Control	LS	1	$ 27,500	$ 27,500
6	Electrical/SCADA	LS	1	$ 93,500	$ 93,500
7	Electrical Hut	LS	1	$ 27,500	$ 27,500
8	Site Work	LS	1	$ 33,000	$ 33,000
9	Dewatering/Shoring/Sheeting/Bracing	LS	1	$ 110,000	$ 110,000
				ESTIMATED CONSTRUCTION COST	**$ 759,000**
				Contingency (20%)	$ 151,800
				Subtotal	$ 910,800
				Design Engineering & Administration (15%)	$ 136,620
				Construction Administration (10%)	$ 91,080
				TOTAL PROJECT COST	**$ 1,138,500**
					$ 1,139,000

CIP Project WW-21					
Granite Creek Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Demolition	LS	1	$ 44,000	$ 44,000
3	Bypass Pumping	LS	1	$ 66,000	$ 66,000
4	Wet Well Conversion and Valve Vault	LS	1	$ 220,000	$ 220,000
5	Electrical Rehabilitation	LS	1	$ 88,000	$ 88,000
6	Electrical Hut	LS	1	$ 27,500	$ 27,500
7	Site Work	LS	1	$ 33,000	$ 33,000
8	Dewatering	LS	1	$ 33,000	$ 33,000
				ESTIMATED CONSTRUCTION COST	**$ 594,000**
				Contingency (20%)	$ 118,800
				Subtotal	$ 712,800
				Design Engineering & Administration (15%)	$ 106,920
				Construction Administration (10%)	$ 71,280
				TOTAL PROJECT COST	**$ 891,000**
					$ 891,000

CIP Project WW-22					
Submarine Force Mains					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 220,000	$ 220,000
2	Construction/Drill Surveying	LS	1	$ 55,000	$ 55,000
3	Directional Drilling	LF	2700	$ 165	$ 445,500
4	Thompsen Harbor Bypass Tie-In	EA	2	$ 55,000	$ 110,000
5	Connection to Existing Main	EA	4	$ 33,000	$ 132,000
6	Isolation Valves	EA	2	$ 66,000	$ 132,000
7	Sewer Pipe - 16" (FM)	LF	1350	$ 220	$ 297,000
8	Sewer Pipe - 10" (FM)	LF	1350	$ 138	$ 185,625
9	FM Fittings, Assemblies, Valves	LS	1	$ 27,500	$ 27,500
10	Plug & Abandon Existing Force Mains	EA	2	$ 11,000	$ 22,000
				ESTIMATED CONSTRUCTION COST	**$ 1,626,625**
				Contingency (20%)	$ 325,325
				Subtotal	$ 1,951,950
				Design Engineering & Administration (15%)	$ 292,793
				Construction Administration (10%)	$ 195,195
				TOTAL PROJECT COST	**$ 2,439,938**
					$ 2,440,000

CIP Project WW-23					
Castle Hill Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Demolition	LS	1	$ 44,000	$ 44,000
3	Bypass Pumping	LS	1	$ 44,000	$ 44,000
4	Wet Well Conversion and Valve Vault	LS	1	$ 220,000	$ 220,000
5	Traffic Control	LS	1	$ 27,500	$ 27,500
6	Electrical/SCADA	LS	1	$ 93,500	$ 93,500
7	Electrical Hut	LS	1	$ 27,500	$ 27,500
8	Site Work	LS	1	$ 55,000	$ 55,000
9	Dewatering	LS	1	$ 44,000	$ 44,000
ESTIMATED CONSTRUCTION COST					**$ 638,000**
Contingency (20%)					$ 127,600
Subtotal					$ 765,600
Design Engineering & Administration (15%)					$ 114,840
Construction Administration (10%)					$ 76,560
TOTAL PROJECT COST					**$ 957,000**
					$ 957,000

CIP Project WW-24					
Gaven Street and Moller Avenue Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 27,500	$ 13,750
3	Construction Survey	LS	1	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 8,250
5	Demolition - Sewer	LF	820	$ 11	$ 9,020
6	Demolition - Paving	LF	900	$ 72	$ 32,175
7	Sewer Pipe - 8"	LF	820	$ 110	$ 90,200
8	Manholes	EA	2	$ 16,500	$ 33,000
9	Cleanouts	EA	1	$ 825	$ 825
10	Temporary Services	EA	15	$ 1,100	$ 16,500
11	Service Connections	EA	15	$ 5,500	$ 82,500
12	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
13	Paving	LF	900	$ 451	$ 202,950
				ESTIMATED CONSTRUCTION COST	**$ 554,180**
				Contingency (20%)	$ 110,836
				Subtotal	$ 665,016
				Design Engineering & Administration (15%)	$ 99,752
				Construction Administration (10%)	$ 66,502
				TOTAL PROJECT COST	**$ 831,270**
					$ 832,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-25					
Marine / DeArmond / New Archangel / Erler Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 159,500	$ 79,750
2	Traffic Control	LS	1	$ 49,500	$ 24,750
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	925	$ 11	$ 10,175
6	Demolition - Paving	LF	1650	$ 72	$ 58,988
7	Sewer Pipe - 8"	LF	925	$ 110	$ 101,750
8	Manholes	EA	4	$ 16,500	$ 66,000
9	Cleanouts	EA	2	$ 825	$ 1,650
10	Temporary Services	EA	24	$ 1,100	$ 26,400
11	Service Connections	EA	24	$ 5,500	$ 132,000
12	Connect to Existing Sewer	EA	4	$ 1,760	$ 7,040
13	Paving	LF	1650	$ 451	$ 372,075
				ESTIMATED CONSTRUCTION COST	**$ 921,828**
				Contingency (20%)	$ 184,366
				Subtotal	$ 1,106,194
				Design Engineering & Administration (15%)	$ 165,929
				Construction Administration (10%)	$ 110,619
				TOTAL PROJECT COST	**$ 1,382,742**
					$ 1,383,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-26					
Wortman Loop Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 154,000	$ 77,000
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	1400	$ 11	$ 15,400
6	Demolition - Paving	LF	1690	$ 72	$ 60,418
7	Sewer Pipe - 8"	LF	1400	$ 110	$ 154,000
8	Manholes	EA	2	$ 16,500	$ 33,000
9	Cleanouts	EA	2	$ 825	$ 1,650
10	Temporary Services	EA	25	$ 1,100	$ 27,500
11	Service Connections	EA	25	$ 5,500	$ 137,500
12	Connect to Existing Sewer	EA	2	$ 1,760	$ 3,520
13	Paving	LF	1690	$ 451	$ 381,095
				ESTIMATED CONSTRUCTION COST	**$ 973,583**
				Contingency (20%)	$ 194,717
				Subtotal	$ 1,168,300
				Design Engineering & Administration (15%)	$ 175,245
				Construction Administration (10%)	$ 116,830
				TOTAL PROJECT COST	**$ 1,460,375**
					$ 1,461,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-27					
Tlingit Sewer Main					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Traffic Control	LS	1	$ 27,500	$ 27,500
3	Construction Survey	LS	1	$ 38,500	$ 38,500
4	Erosion & Sediment Control	LS	1	$ 11,000	$ 11,000
5	Demolition - Sewer	LF	380	$ 11	$ 4,180
6	Demolition - Paving	LF	380	$ 72	$ 27,170
7	Sewer Pipe - 8"	LF	380	$ 110	$ 41,800
8	Manholes	EA	1	$ 16,500	$ 16,500
9	Cleanouts	EA	1	$ 825	$ 825
10	Temporary Services	EA	6	$ 1,100	$ 6,600
11	Service Connections	EA	6	$ 5,500	$ 33,000
12	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
13	Paving	LF	380	$ 451	$ 171,380
				ESTIMATED CONSTRUCTION COST	**$ 462,715**
				Contingency (20%)	$ 92,543
				Subtotal	$ 555,258
				Design Engineering & Administration (15%)	$ 83,289
				Construction Administration (10%)	$ 55,526
				TOTAL PROJECT COST	**$ 694,073**
					$ 695,000

CIP Project WW-28					
Princess / Seward / Barracks Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 8,250
5	Demolition - Sewer	LF	975	$ 11	$ 10,725
6	Demolition - Paving	LF	1025	$ 72	$ 36,644
7	Sewer Pipe - 8"	LF	625	$ 110	$ 68,750
8	Sewer Pipe - 10"	LF	350	$ 138	$ 48,125
9	Manholes	EA	5	$ 16,500	$ 82,500
10	Cleanouts	EA	2	$ 825	$ 1,650
11	Temporary Services	EA	18	$ 1,100	$ 19,800
12	Service Connections	EA	18	$ 5,500	$ 99,000
13	Connect to Existing Sewer	EA	3	$ 1,760	$ 5,280
14	Paving	LF	1025	$ 451	$ 231,138
				ESTIMATED CONSTRUCTION COST	**$ 716,361**
				Contingency (20%)	$ 143,272
				Subtotal	$ 859,633
				Design Engineering & Administration (15%)	$ 128,945
				Construction Administration (10%)	$ 85,963
				TOTAL PROJECT COST	**$ 1,074,542**
					$ 1,075,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-29					
Katlian Avenue (Kirkman Way to Thompson Lift Station) Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 187,000	$ 93,500
2	Traffic Control	LS	1	$ 82,500	$ 41,250
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	1890	$ 11	$ 20,790
6	Demolition - Paving	LF	1990	$ 72	$ 71,143
7	Sewer Pipe - 20"	LF	1890	$ 275	$ 519,750
8	Manholes	EA	10	$ 16,500	$ 165,000
9	Temporary Services	EA	30	$ 1,100	$ 33,000
10	Service Connections	EA	30	$ 5,500	$ 165,000
11	Connect to Existing Sewer	EA	2	$ 1,760	$ 3,520
12	Paving	LF	1450	$ 451	$ 326,975
				ESTIMATED CONSTRUCTION COST	**$ 1,481,178**
				Contingency (20%)	$ 296,236
				Subtotal	$ 1,777,414
				Design Engineering & Administration (15%)	$ 266,612
				Construction Administration (10%)	$ 177,741
				TOTAL PROJECT COST	**$ 2,221,767**
					$ 2,222,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-30					
Old Indian River Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Demolition	LS	1	$ 44,000	$ 44,000
3	Bypass Pumping	LS	1	$ 44,000	$ 44,000
4	Wet Well Conversion and Valve Vault	LS	1	$ 220,000	$ 220,000
5	Traffic Control	LS	1	$ 27,500	$ 27,500
6	Electrical/SCADA	LS	1	$ 93,500	$ 93,500
7	Electrical Hut	LS	1	$ 27,500	$ 27,500
8	Site Work	LS	1	$ 55,000	$ 55,000
9	Dewatering	LS	1	$ 44,000	$ 44,000
				ESTIMATED CONSTRUCTION COST	**$ 638,000**
				Contingency (20%)	$ 127,600
				Subtotal	$ 765,600
				Design Engineering & Administration (15%)	$ 114,840
				Construction Administration (10%)	$ 76,560
				TOTAL PROJECT COST	**$ 957,000**
					$ 957,000

CIP Project WW-31					
Halibut Point Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Demolition	LS	1	$ 44,000	$ 44,000
3	Bypass Pumping	LS	1	$ 66,000	$ 66,000
4	Wet Well Conversion and Valve Vault	LS	1	$ 220,000	$ 220,000
5	Building Improvements	LS	1	$ 16,500	$ 16,500
6	Electrical Rehabilitation	LS	1	$ 88,000	$ 88,000
7	SCADA	LS	1	$ 22,000	$ 22,000
8	Site Work	LS	1	$ 33,000	$ 33,000
9	Dewatering	LS	1	$ 33,000	$ 33,000
				ESTIMATED CONSTRUCTION COST	**$ 605,000**
				Contingency (20%)	$ 121,000
				Subtotal	$ 726,000
				Design Engineering & Administration (15%)	$ 108,900
				Construction Administration (10%)	$ 72,600
				TOTAL PROJECT COST	**$ 907,500**
					$ 908,000

CIP Project WW-32					
Sandy Beach Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 82,500	$ 82,500
2	Demolition	LS	1	$ 44,000	$ 44,000
3	Bypass Pumping	LS	1	$ 66,000	$ 66,000
4	Wet Well Conversion and Valve Vault	LS	1	$ 220,000	$ 220,000
5	Building Improvements	LS	1	$ 16,500	$ 16,500
6	Electrical Rehabilitation	LS	1	$ 88,000	$ 88,000
7	SCADA	LS	1	$ 11,000	$ 11,000
8	Site Work	LS	1	$ 22,000	$ 22,000
9	Dewatering	LS	1	$ 33,000	$ 33,000
				ESTIMATED CONSTRUCTION COST	**$ 583,000**
				Contingency (20%)	$ 116,600
				Subtotal	$ 699,600
				Design Engineering & Administration (15%)	$ 104,940
				Construction Administration (10%)	$ 69,960
				TOTAL PROJECT COST	**$ 874,500**
					$ 875,000

CIP Project WW-33					
Landfill Lift Station					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Lift Station Improvements	LS	1	$ 247,500	$ 247,500
				ESTIMATED CONSTRUCTION COST	**$ 247,500**
				Contingency (20%)	$ 49,500
				Subtotal	$ 297,000
				Design Engineering & Administration (15%)	$ 44,550
				Construction Administration (10%)	$ 29,700
				TOTAL PROJECT COST	**$ 371,250**
					$ 372,000

CIP Project WW-34					
Anna Drive Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 110,000	$ 55,000
2	Traffic Control	LS	1	$ 55,000	$ 27,500
3	Construction Survey	LS	1	$ 55,000	$ 27,500
4	Erosion & Sediment Control	LS	1	$ 27,500	$ 13,750
5	Demolition - Sewer	LF	950	$ 11	$ 10,450
6	Demolition - Paving	LF	975	$ 72	$ 34,856
7	Sewer Pipe - 8"	LF	950	$ 110	$ 104,500
8	Manholes	EA	6	$ 16,500	$ 99,000
9	Cleanouts	EA	2	$ 825	$ 1,650
10	Temporary Services	EA	24	$ 1,100	$ 26,400
11	Service Connections	EA	24	$ 5,500	$ 132,000
12	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
13	Paving	LF	975	$ 451	$ 219,863
ESTIMATED CONSTRUCTION COST					**$ 754,229**
Contingency (20%)					$ 150,846
Subtotal					$ 905,075
Design Engineering & Administration (15%)					$ 135,761
Construction Administration (10%)					$ 90,507
TOTAL PROJECT COST					**$ 1,131,343**
					$ 1,132,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-35					
Jamestown Drive Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 82,500	$ 41,250
2	Traffic Control	LS	1	$ 44,000	$ 22,000
3	Construction Survey	LS	1	$ 44,000	$ 22,000
4	Erosion & Sediment Control	LS	1	$ 22,000	$ 11,000
5	Demolition - Sewer	LF	520	$ 11	$ 5,720
6	Demolition - Paving	LF	545	$ 72	$ 19,484
7	Sewer Pipe - 8"	LF	520	$ 110	$ 57,200
8	Manholes	EA	1	$ 16,500	$ 16,500
9	Cleanouts	EA	1	$ 825	$ 825
10	Temporary Services	EA	10	$ 1,100	$ 11,000
11	Service Connections	EA	10	$ 5,500	$ 55,000
12	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
13	Paving	LF	545	$ 451	$ 122,898
				ESTIMATED CONSTRUCTION COST	**$ 386,636**
				Contingency (20%)	$ 77,327
				Subtotal	$ 463,963
				Design Engineering & Administration (15%)	$ 69,594
				Construction Administration (10%)	$ 46,396
				TOTAL PROJECT COST	**$ 579,954**
					$ 580,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-36					
Viking Drive Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 55,000	$ 27,500
2	Traffic Control	LS	1	$ 27,500	$ 13,750
3	Construction Survey	LS	1	$ 38,500	$ 19,250
4	Erosion & Sediment Control	LS	1	$ 16,500	$ 8,250
5	Demolition - Sewer	LF	350	$ 11	$ 3,850
6	Demolition - Paving	LF	400	$ 72	$ 14,300
7	Sewer Pipe - 8"	LF	350	$ 110	$ 38,500
8	Manholes	EA	1	$ 16,500	$ 16,500
9	Temporary Services	EA	8	$ 1,100	$ 8,800
10	Service Connections	EA	8	$ 5,500	$ 44,000
11	Connect to Existing Sewer	EA	2	$ 1,760	$ 3,520
12	Paving	LF	400	$ 451	$ 90,200
				ESTIMATED CONSTRUCTION COST	**$ 288,420**
				Contingency (20%)	$ 57,684
				Subtotal	$ 346,104
				Design Engineering & Administration (15%)	$ 51,916
				Construction Administration (10%)	$ 34,610
				TOTAL PROJECT COST	**$ 432,630**
					$ 433,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-37					
Lift Station Emergency Generators					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Equipment - Generators	LS	2	$ 99,000	$ 198,000
2	Shipping	LS	1	$ 29,700	$ 29,700
3	Installation/Start Up	LS	1	$ 79,200	$ 79,200
				ESTIMATED CONSTRUCTION COST	**$ 306,900**
				Contingency (20%)	$ 61,380
				Subtotal	$ 368,280
				Design Engineering & Administration (5%)	$ 18,414
				Construction Administration (10%)	$ 36,828
				TOTAL PROJECT COST	**$ 423,522**
					$ 424,000

CIP Project WW-38					
Burkhart Drive and Lance Drive Sewer Mains*					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 55,000	$ 27,500
2	Traffic Control	LS	1	$ 16,500	$ 8,250
3	Construction Survey	LS	1	$ 27,500	$ 13,750
4	Erosion & Sediment Control	LS	1	$ 11,000	$ 5,500
5	Demolition - Sewer	LF	2455	$ 11	$ 27,005
6	Demolition - Paving	LF	2600	$ 72	$ 92,950
7	Sewer Pipe - 8"	LF	2455	$ 110	$ 270,050
8	Manholes	EA	6	$ 16,500	$ 99,000
9	Cleanouts	EA	2	$ 825	$ 1,650
10	Temporary Services	EA	40	$ 1,100	$ 44,000
11	Service Connections	EA	40	$ 5,500	$ 220,000
12	Connect to Existing Sewer	EA	4	$ 1,760	$ 7,040
13	Paving	LF	2600	$ 451	$ 586,300
				ESTIMATED CONSTRUCTION COST	**$ 1,402,995**
				Contingency (20%)	$ 280,599
				Subtotal	$ 1,683,594
				Design Engineering & Administration (15%)	$ 252,539
				Construction Administration (10%)	$ 168,359
				TOTAL PROJECT COST	**$ 2,104,493**
					$ 2,105,000

**This project corresponds with a water main replacement project with shared costs.*

CIP Project WW-39					
East Jamestown Lift Station Conversion					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Decommision/Site Prep	LS	1	$ 16,500	$ 16,500
2	Equipment - E-One PUmp	LS	1	$ 11,000	$ 11,000
3	Shipping	LS	1	$ 1,705	$ 1,705
4	Installation/Start Up	LS	1	$ 2,750	$ 2,750
				ESTIMATED CONSTRUCTION COST	**$ 31,955**
				Contingency (20%)	$ 6,391
				Subtotal	$ 38,346
				Design Engineering & Administration (5%)	$ 1,917
				Construction Administration (10%)	$ 3,835
				TOTAL PROJECT COST	**$ 44,098**
					$ 45,000

CIP Project WW-40					
Marine Outfall Replacement					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$ 132,000	$ 132,000
2	Construction Surveying	LS	1	$ 33,000	$ 33,000
3	Excavation and Backfill	LS	1	$ 44,000	$ 44,000
4	Rip Rap Anchor Rock	LS	1	$ 33,000	$ 33,000
5	Pipe Fittings	LS	1	$ 82,500	$ 82,500
6	24-Inch HDPE and Anchor Assebmlies	LF	2885	$ 350	$ 1,009,173
7	24-Inch Diffuser Pipe and Anchors	LF	100	$ 550	$ 55,000
8	Diffuser Tideflex Valves	EA	20	$ 4,400	$ 88,000
9	Abandon Existing Pipe and Diffuser	LS	1	$ 33,000	$ 33,000
10	FAA/Airport Coordination	LS	1	$ 11,000	$ 11,000
				ESTIMATED CONSTRUCTION COST	**$ 1,520,673**
				Contingency (20%)	$ 304,135
				Subtotal	$ 1,824,808
				Design Engineering & Administration (15%)	$ 273,721
				Construction Administration (10%)	$ 182,481
				TOTAL PROJECT COST	**$ 2,281,010**
					$ 2,282,000

CIP Project WW-41					
Castle Hill Catchment Area Sewer Mains					
Item	Description	Units	Quantity	Unit Price	Total Price
1	Mobilization	LS	1	$ 71,500	$ 71,500
2	Traffic Control	LS	1	$ 33,000	$ 33,000
3	Construction Survey	LS	1	$ 33,000	$ 33,000
4	Erosion & Sediment Control	LS	1	$ 22,000	$ 22,000
5	Demolition - Sewer	LF	675	$ 11	$ 7,425
6	Demolition - Paving	LF	550	$ 72	$ 39,325
7	Sewer Pipe - 8"	LF	675	$ 110	$ 74,250
8	Manholes	EA	2	$ 16,500	$ 33,000
9	Cleanouts	EA	2	$ 825	$ 1,650
10	Temporary Services	EA	8	$ 1,100	$ 8,800
11	Service Connections	EA	8	$ 5,500	$ 44,000
12	Connect to Existing Sewer	EA	1	$ 1,760	$ 1,760
13	Paving	LF	550	$ 451	$ 248,050
				ESTIMATED CONSTRUCTION COST	**$ 617,760**
				Contingency (20%)	$ 123,552
				Subtotal	$ 741,312
				Design Engineering & Administration (15%)	$ 111,197
				Construction Administration (10%)	$ 74,131
				TOTAL PROJECT COST	**$ 926,640**
					$ 927,000

CIP Project WW-42					
E-Ones Lift Station Privatization					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Equipment - E-One PUmp	LS	26	$ 11,000	$ 286,000
2	Shipping	LS	26	$ 1,705	$ 44,330
3	Installation/Start Up	LS	26	$ 2,750	$ 71,500
				ESTIMATED CONSTRUCTION COST	**$ 401,830**
				Contingency (20%)	$ 80,366
				Subtotal	$ 482,196
				Design Engineering & Administration (5%)	$ 24,110
				Construction Administration (10%)	$ 48,220
				TOTAL PROJECT COST	**$ 554,526**
					$ 555,000

CIP Project WW-43					
WWTP Secondary Treatment					
Item	**Description**	**Units**	**Quantity**	**Unit Price**	**Total Price**
1	Secondary Treatment Plant				$ 33,000,000
				ESTIMATED CONSTRUCTION COST	**$ 33,000,000**
				Contingency (20%)	$ 6,600,000
				Subtotal	$ 39,600,000
				Design Engineering & Administration (15%)	$ 5,940,000
				Construction Administration (10%)	$ 3,960,000
				TOTAL PROJECT COST	**$ 49,500,000**
					$ 49,500,000

Figures

WATER SYSTEM

CITY AND BOROUGH OF SITKA

- Water Main
- WTP
- Pump Station
- Existing Water Storage Tank

ESRI IMAGERY 2021

N

0 1,000 2,000
Feet

November 29, 2022

FIGURE 1

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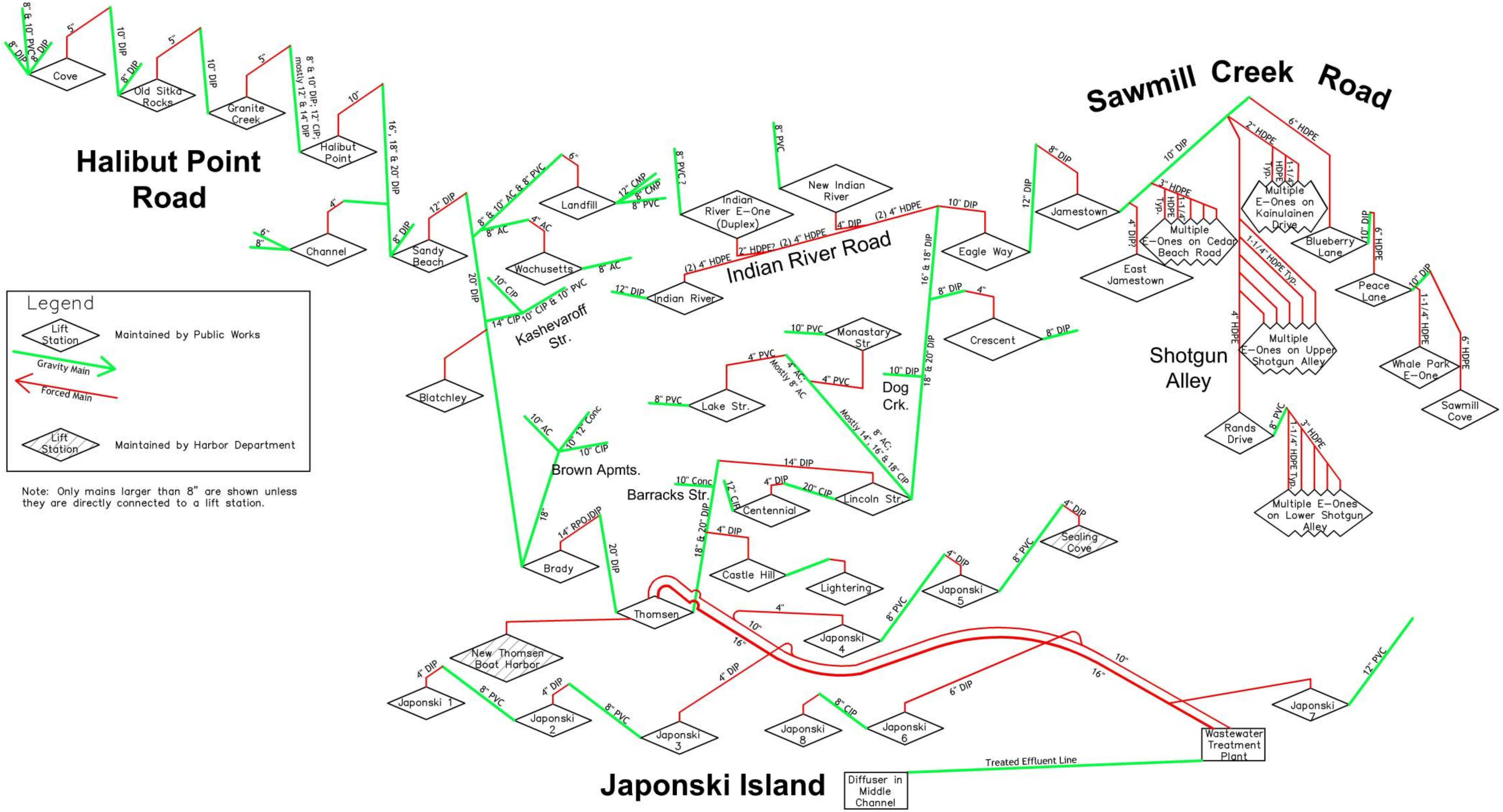


REV	DATE	REVISIONS DESCRIPTION	BY

DOWL
WWW.DOWL.COM

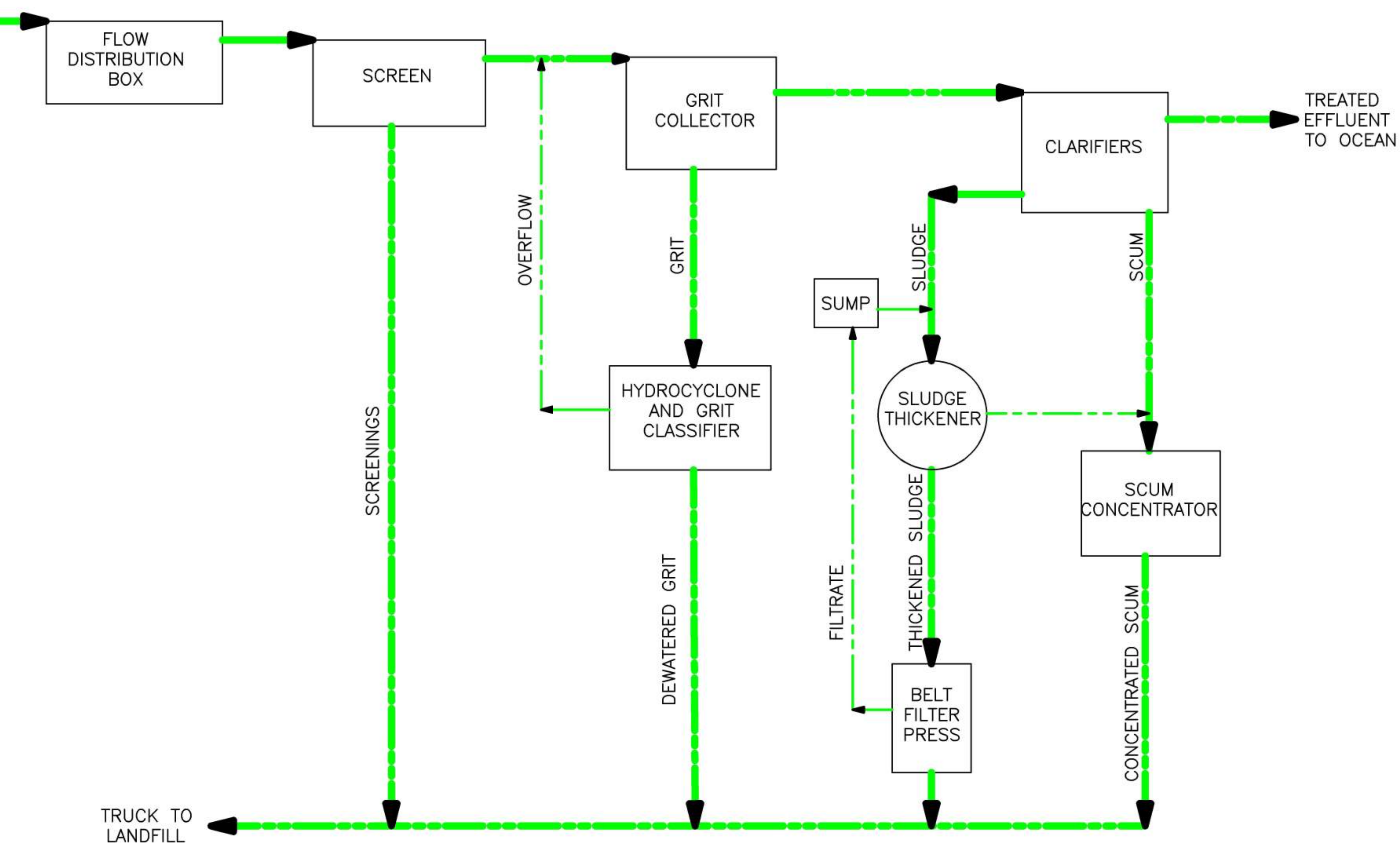
SITKA WATER / WASTEWATER MASTER PLAN

SCHEMATIC DIAGRAM OF WASTEWATER COLLECTION SYSTEM
SITKA, ALASKA

PROJECT 1528.50214.01
DATE 04/09/2021

SHEET

FIGURE 2



DESIGN DATA

Design Population	10,500
Design Flows	
Min.	0.5 MGD
Avg.	1.8 MGD
Peak	5.3 MGD
Design Loadings	
S.S.	2625 LB/DAY
B.O.D.	2205 lb/day
Screens	
Number	3
Capacity (each)	1900 gpm
Capacity (total)	5700 gpm
Clear Opening	0.060 inches
Grit Collectors	
Number	1 initial, 1 future
Area (each)	154 sq. ft.
Capacity (each)	7.8 MGD
Sedimentation Tanks	
Number	3
Side water depth	10 ft.
Weir length	60 ft/tank
Weir rate*	15,000 gal/day/ft
Overflow rate*	740 gal/day/sq. ft.
Detention time*	2.4 hours
* Rates are at design avg. flow with two tanks in operation	
Sludge Thickener	
Number	1
Solids loading	4.1 lb/day/sq. ft.
Overflow rate @ 90 gpm	412 gal/day/sq. ft.
Scum Concentrator	
Number	1
Capacity (Dilute scum)	18 gpm
Belt Filter Press	
Capacity (Primary sludge)	500 lb/hr/m
Total capacity (Primary sludge)	500 lb/hr
Sludge Cake Moisture Content	65%–70%

REVISIONS

REV	DATE	DESCRIPTION	BY

DOWL WWW.DOWL.COM

SITKA WATER/WASTEWATER SYSTEM MASTER PLAN
SITKA, ALASKA

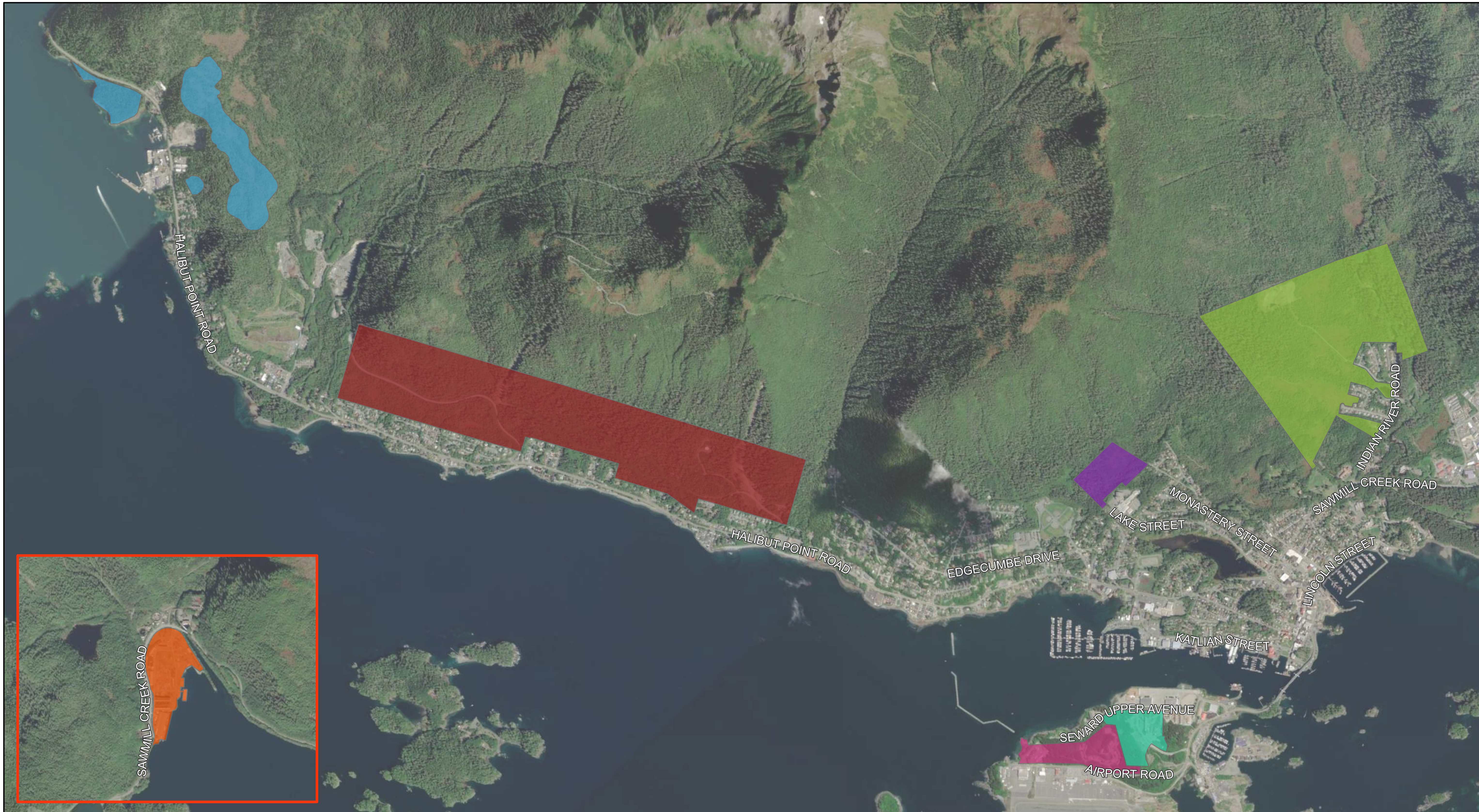
WASTEWATER TREATMENT PLANT FLOW SCHEMATIC

LEGAL DESCRIPTION LOCATION

PROJECT 1528.50214.01
DATE 04/23/2021

SHEET

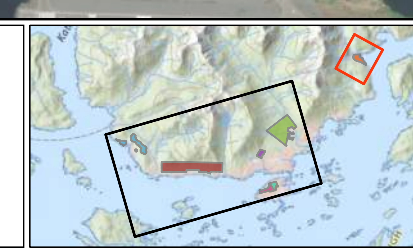
FIGURE 3



Area of Potential Growth

- CBS Property
- Gary Paxton Industrial Park
- Indian River Uplands
- Kraemer Benchlands
- No Name Mountain Master Plan
- SEARHC Mt. Edgecomb Medical Center Campus
- United States Coast Guard Facility

0 500 1,000 2,000 Feet



Areas of Potential Growth

Sitka Water & Wastewater System Master Plan

DOWL

Date: May 03, 2021

FIGURE 4

K:\28\50214-01\60GIS\Sitka Water and Wastewater Master Plan\Sitka Water and Wastewater Master Plan.aprx May 03, 2021 4:47 PM User: tjameson

Imagery Layer Credits: Earthstar Geographics

LAKE ST, HIRST ST, KINKEAD ST, AND MONASTERY ST SEWER AND WATER MAIN UPGRADES

PROJECT: W-1, WW-2

Existing Conditions
- Bellies
- Standing Sewage
- Debris Build-Up
- Joint Offsets
- Leaky Service Taps

Scope of Work
- Replace 2720 LF of Water Main
- Replace 2680 LF of Sewer Main
- Replace 4 Cleanouts
- Replace 7 Manholes

SANITARY SEWER

CITY AND BOROUGH OF SITKA

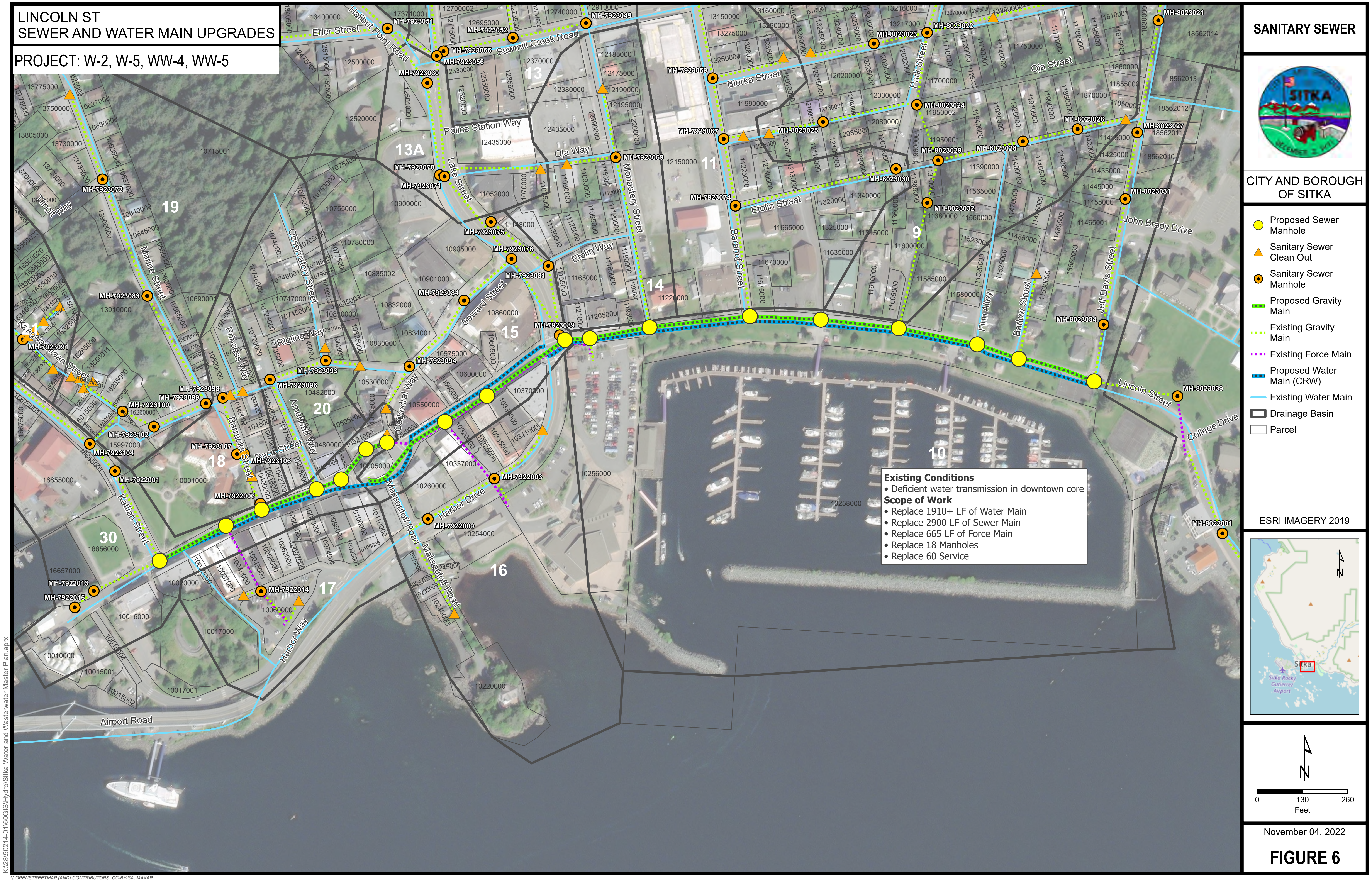
- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Force Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 60 120
Feet

November 04, 2022

FIGURE 5


LINCOLN ST
SEWER AND WATER MAIN UPGRADES
PROJECT: W-2, W-5, WW-4, WW-5
Existing Conditions
• Deficient water transmission in downtown core
Scope of Work
• Replace 1910+ LF of Water Main
• Replace 2900 LF of Sewer Main
• Replace 665 LF of Force Main
• Replace 18 Manholes
• Replace 60 Service
SANITARY SEWER
CITY AND BOROUGH OF SITKA
Proposed Sewer Manhole
Sanitary Sewer Clean Out
Sanitary Sewer Manhole
Proposed Gravity Main
Existing Gravity Main
Existing Force Main
Proposed Water Main (CRW)
Existing Water Main
Drainage Basin
Parcel
ESRI IMAGERY 2019
0
130
260
Feet
November 04, 2022
FIGURE 6
Lincoln Street
Harbor Drive
Airport Road
Katlian Street
Maksoutoff Road
Cathedral Way
Seward Street
Lake Street
Monastery Street
Baranof Street
Park Street
Jeff Davis Street
John Brady Drive
College Drive
Etolin Street
Biorka Street
Oja Street
Oja Way
Etolin Way
Police Station Way
Sawmill Creek Road
Erler Street
Halibut Point Road
Marine Street
Observatory Street
Princess Way
Barracks Street
American Way
Finn Alley
Barlow Street
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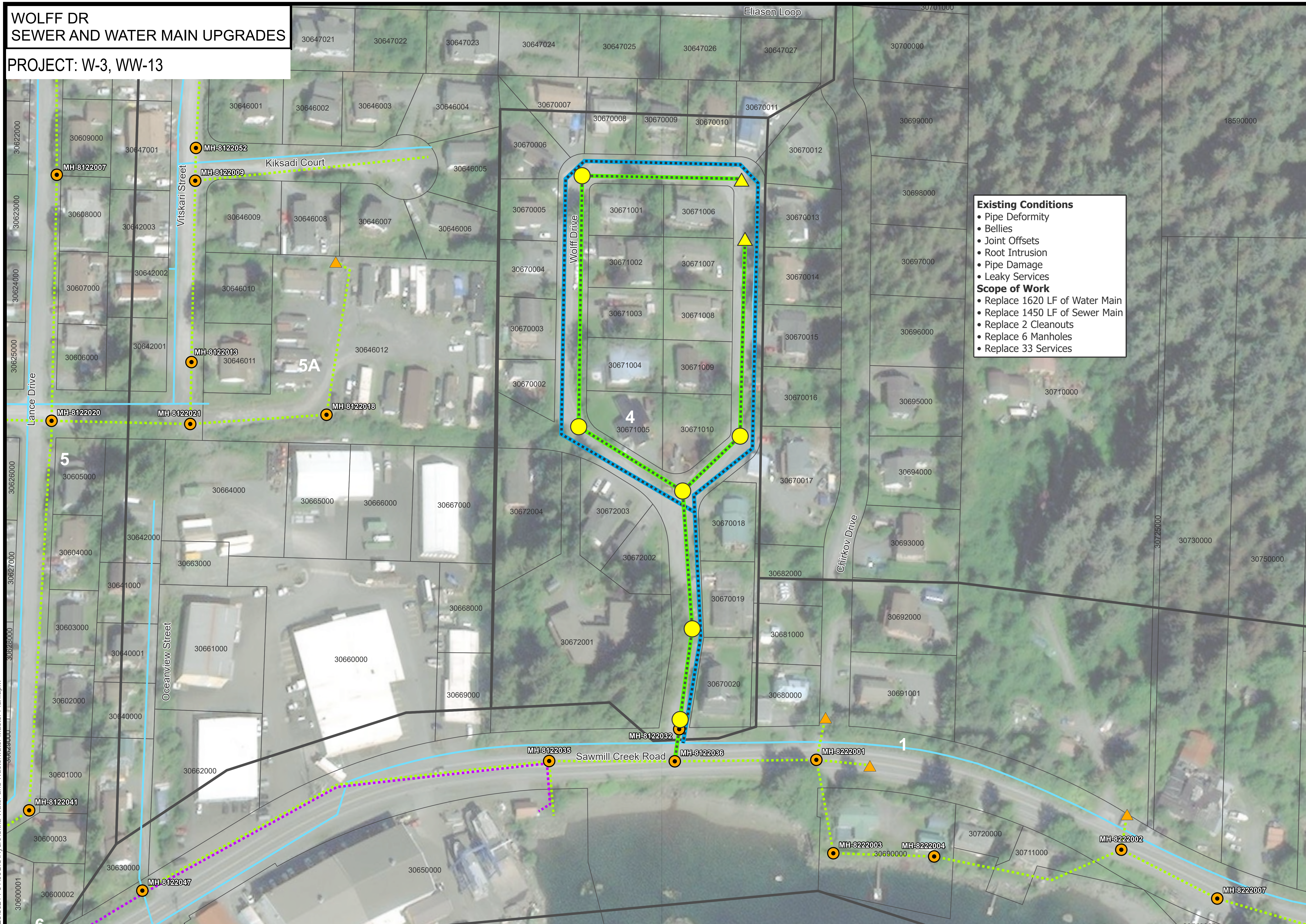
WOLFF DR SEWER AND WATER MAIN UPGRADES

PROJECT: W-3, WW-13



Existing Conditions
- Pipe Deformity
- Bellies
- Joint Offsets
- Root Intrusion
- Pipe Damage
- Leaky Services

Scope of Work
- Replace 1620 LF of Water Main
- Replace 1450 LF of Sewer Main
- Replace 2 Cleanouts
- Replace 6 Manholes
- Replace 33 Services

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Force Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 60 120
Feet

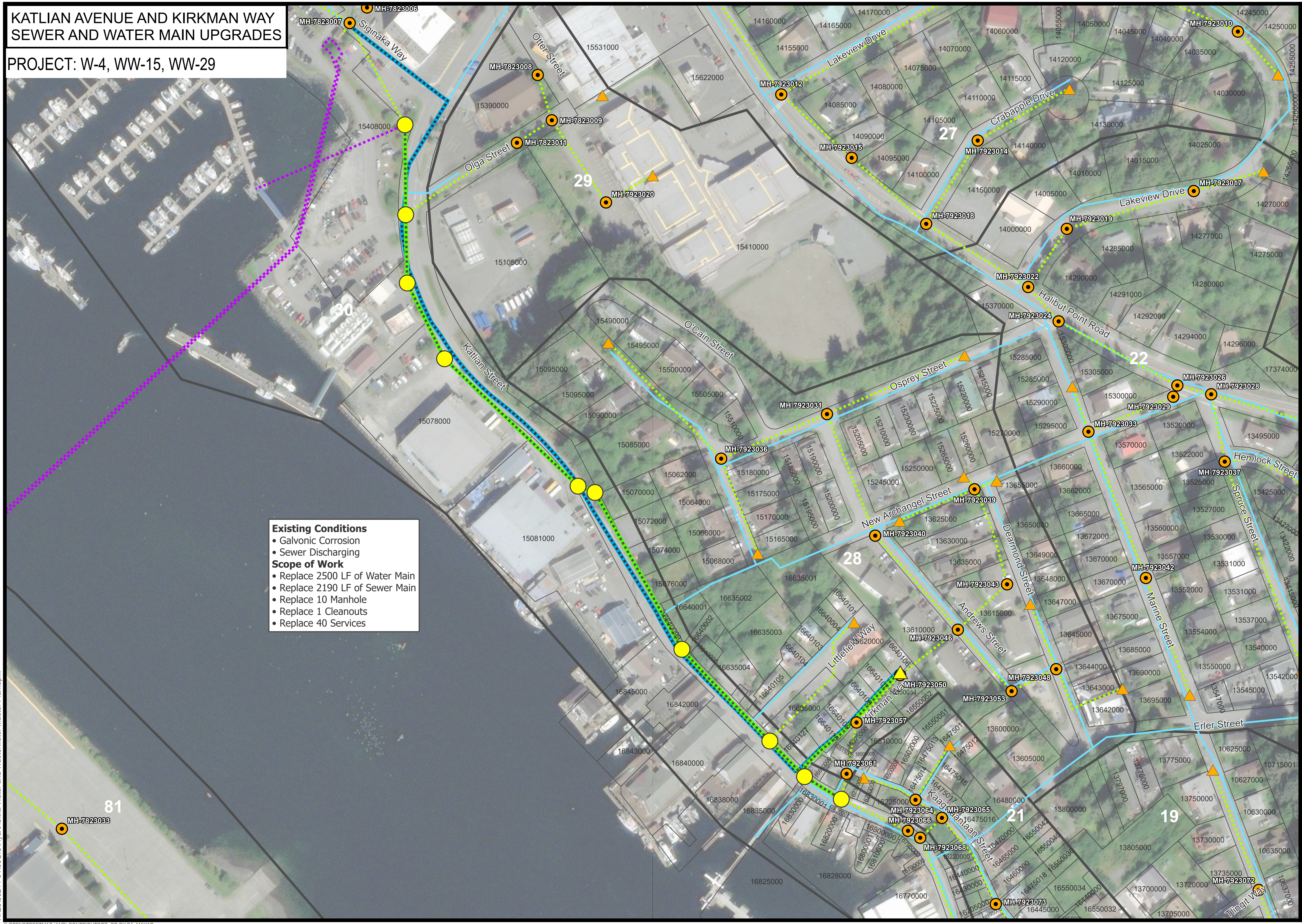
November 04, 2022

FIGURE 7

K:\2815\0214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

KATLIAN AVENUE AND KIRKMAN WAY SEWER AND WATER MAIN UPGRADES

PROJECT: W-4, WW-15, WW-29



Existing Conditions
- Galvonic Corrosion
- Sewer Discharging

Scope of Work
- Replace 2500 LF of Water Main
- Replace 2190 LF of Sewer Main
- Replace 10 Manhole
- Replace 1 Cleanouts
- Replace 40 Services

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Force Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

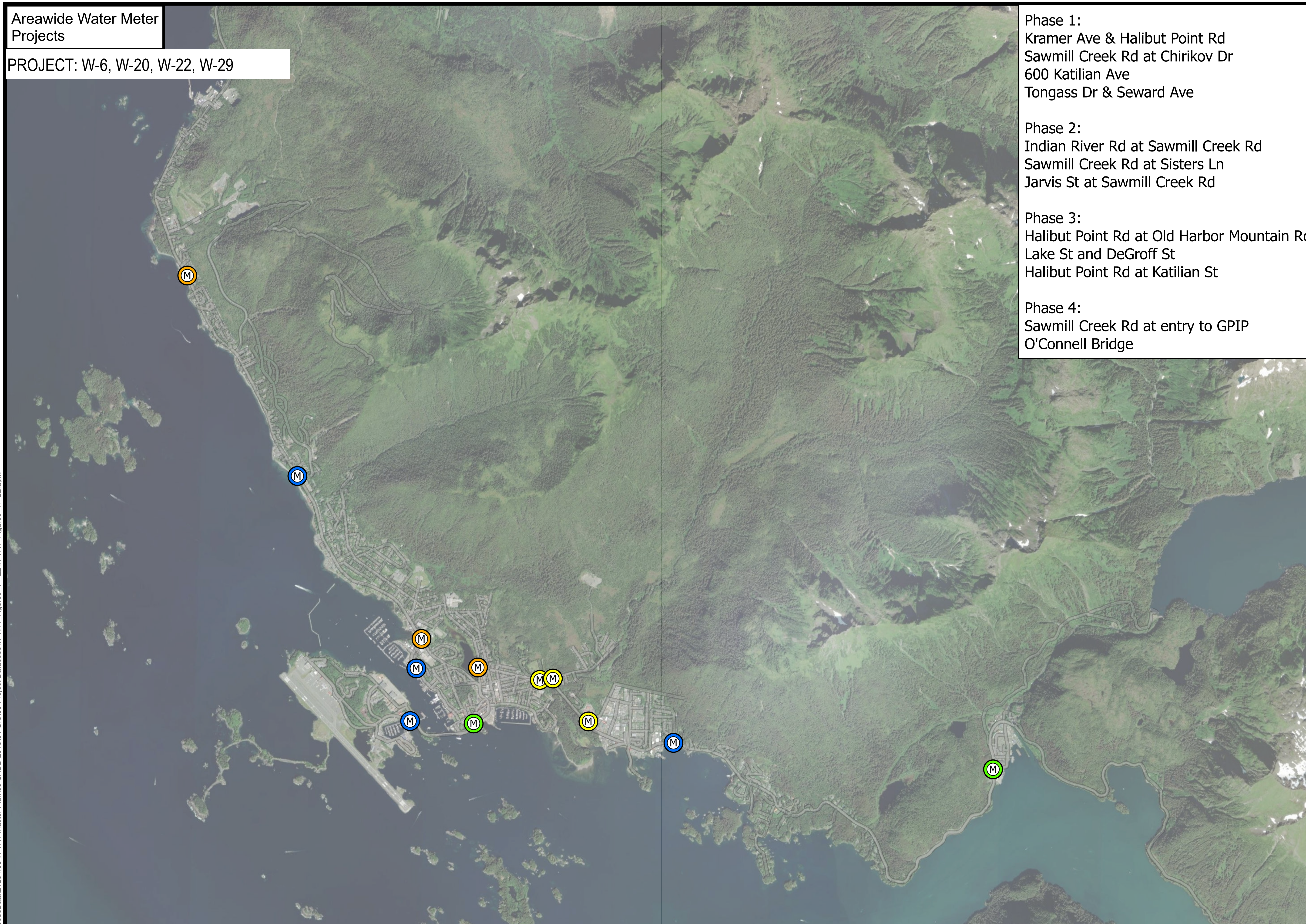
ESRI IMAGERY 2019

0 100 200
Feet

November 04, 2022

FIGURE 8

K:\28\50214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx



WATER SYSTEM

CITY AND BOROUGH OF SITKA

Water Meter Phases

- Phase 1
- Phase 2
- Phase 3
- Phase 4

ESRI IMAGERY 2021

N

0 1,000 2,000
Feet

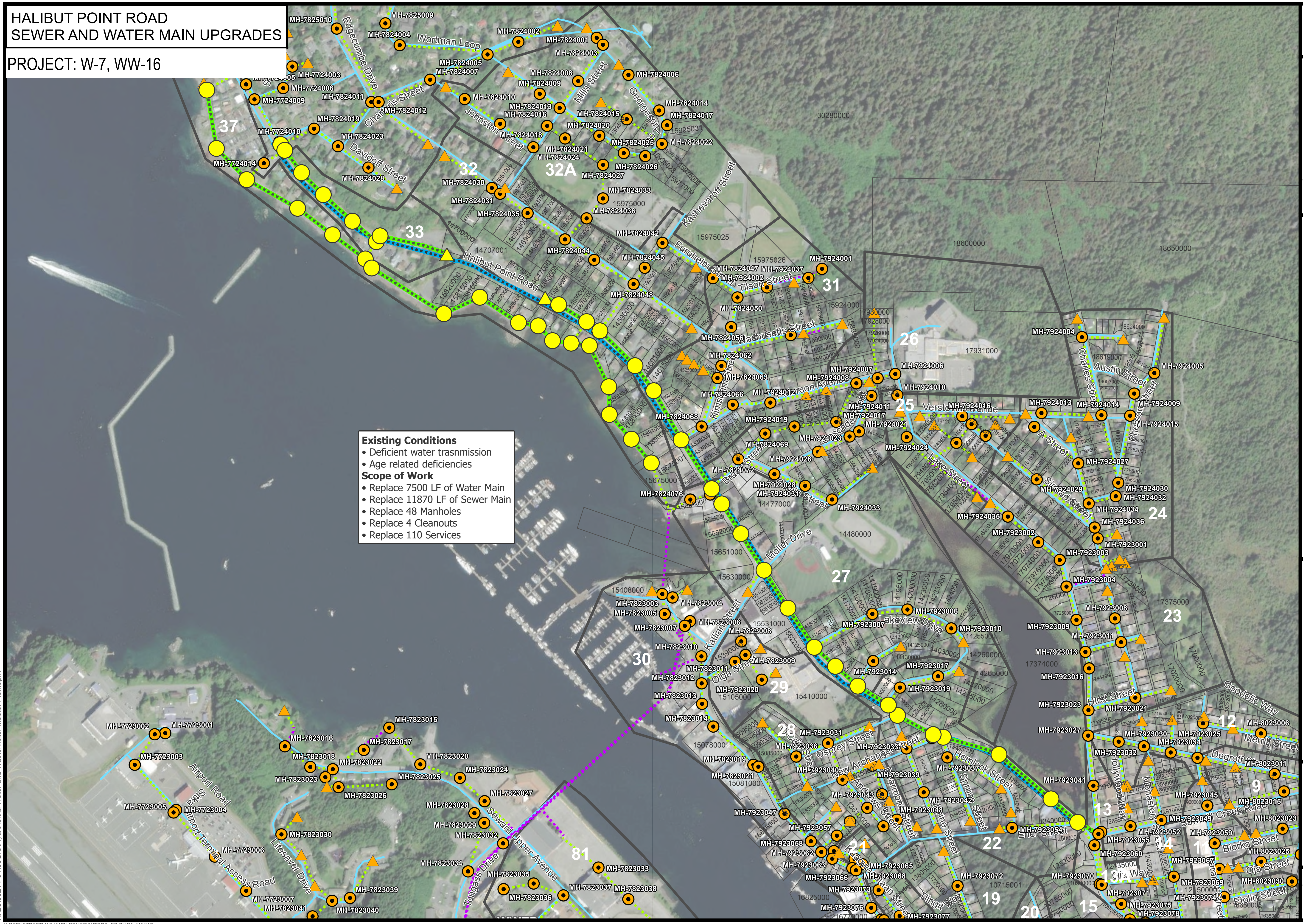
November 29, 2022

FIGURE 9

J:\JobsData\21201.05 W-WW Master Plan\00 CADD 2019\04 GIS\00 Project Database\W-WW_Figures_11_22\W-WW_Figures_11_22.aprx

HALIBUT POINT ROAD SEWER AND WATER MAIN UPGRADES

PROJECT: W-7, WW-16



SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Force Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 340 680
Feet

November 04, 2022

FIGURE 10

K:\2815\0214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

Water Storage Tank Projects

WATER SYSTEM

CITY AND BOROUGH OF SITKA

Tanks

Water Storage Tanks

Existing Tanks

New Tanks

ESRI IMAGERY 2021

0 970 1,940
Feet

November 29, 2022

STCIP #

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Shotgun Alley Pressure Zone

PROJECT: W-11

WATER SYSTEM

CITY AND BOROUGH OF SITKA

- Curb Stop Valve
- Hydrant
- Lateral Line
- Water Main
- System Valve
- Alt 1 PRV
- Alt 1 Pump Station
- Alt 2 Pump Station
- Alt 2 HDD Bypass Line
- Approximate New Pressure Zone Boundary
- Parcel

ESRI IMAGERY 2021

0 325 650
Feet

November 29, 2022

FIGURE 12

J:\JobsData\21201.05 W-WW Master Plan\00 CADD 2019\04 GIS\00 Project Database\W-WW_Figures_11_22\W-WW_Figures_11_22.aprx

MONASTERY ST, HIGHLAND ST, AND MERRILL ST SEWER AND WATER MAIN UPGRADES

PROJECT: W-13, WW-17

Existing Conditions
- Bellies
- Debris Build-Up
- Joint Offsets
- Leaky Service Taps

Scope of Work
- Replace 870 LF of Water Main
- Replace 1200 LF of Sewer Main
- Replace 2 Manholes
- Replace 3 Cleanouts
- Replace 35 Services

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 60 120 Feet

November 04, 2022

FIGURE 13

K:\2815\0214-0160\GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

KIMSHAM ST, TILSON ST, AND PETERSON ST SEWER AND WATER MAIN UPGRADES

PROJECT: W-14, WW-19

Existing Conditions
- Bellies
- Debris Build-Up
- Joint Offsets
- Standing Water
- Pipe Size Reduction

Scope of Work
- Replace 1680 LF of Water Main
- Replace 1950 LF of Sewer Main
- Replace 7 Manholes
- Replace 2 Cleanouts
- Replace 7 Services

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Force Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 60 120
Feet

November 04, 2022

FIGURE 14

K:\2815\0214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

GAVIN ST AND MOLLER AVE WATER MAIN UPGRADES

PROJECT: W-16, WW-24

K:\28\50214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 30 60
Feet

November 04, 2022

FIGURE 15

NEW ARCHANGEL ST, MARINE ST, DEARMOND ST, AND ERLER ST SEWER AND WATER MAIN UPGRADES

PROJECT: W-17, WW-25

Existing Conditions
- Bellies
- Plugging
- Water Main Leak
- Water Main Maintenance Issues

Scope of Work
- Replace 1960 LF of Water Main
- Replace 925 LF of Sewer Main
- Replace 4 Manholes
- Replace 2 Cleanouts
- Replace 36 Services

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Water Main
- Drainage Basin
- Parcel

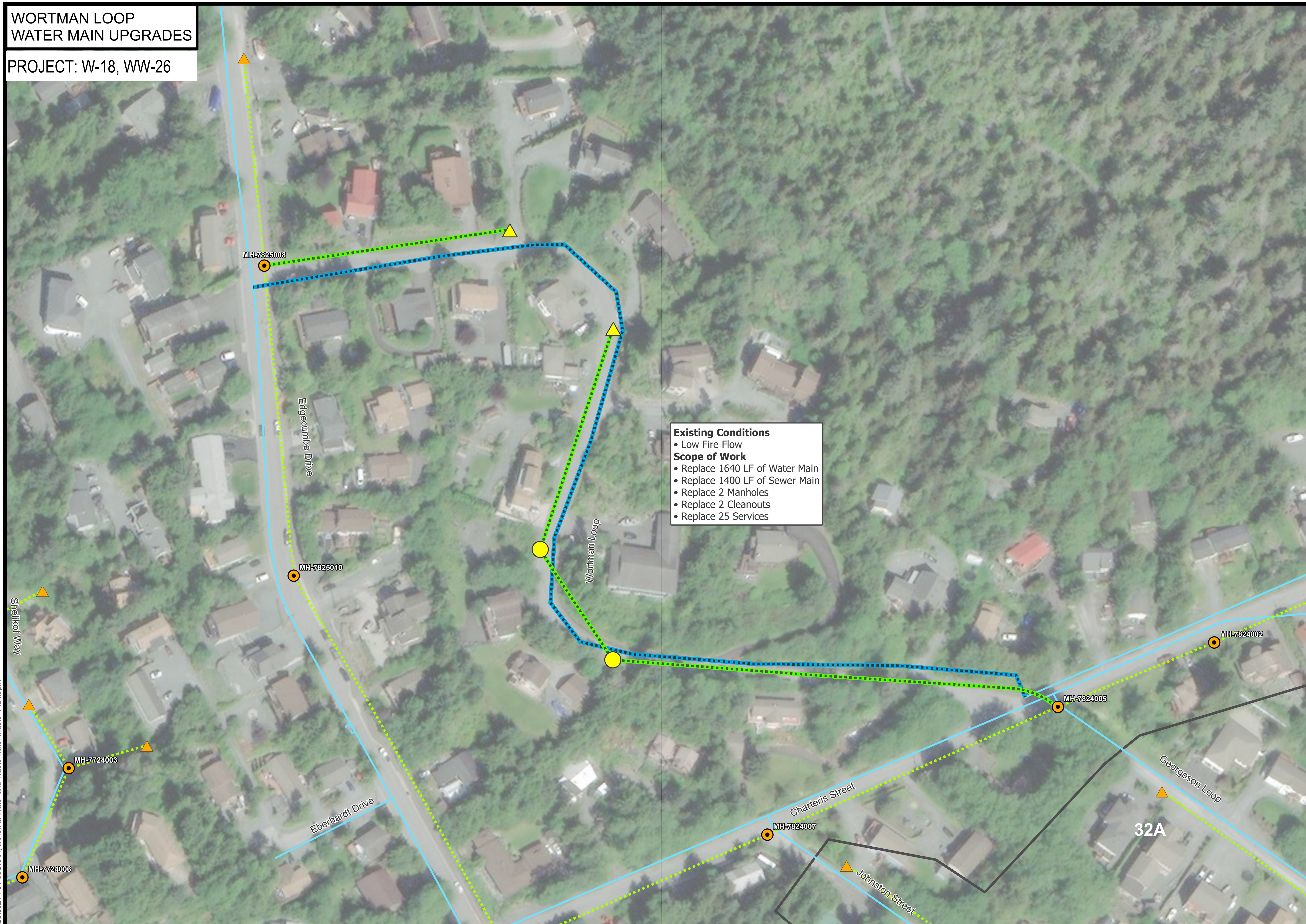
ESRI IMAGERY 2019

0 30 60
Feet

November 04, 2022

FIGURE 16

K:\28150214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx



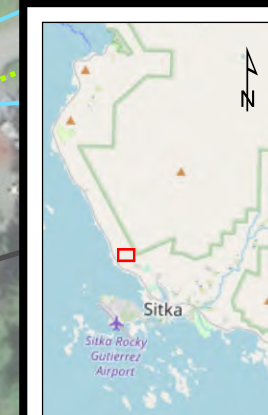
K:\28\50214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin

ESRI IMAGERY 2019



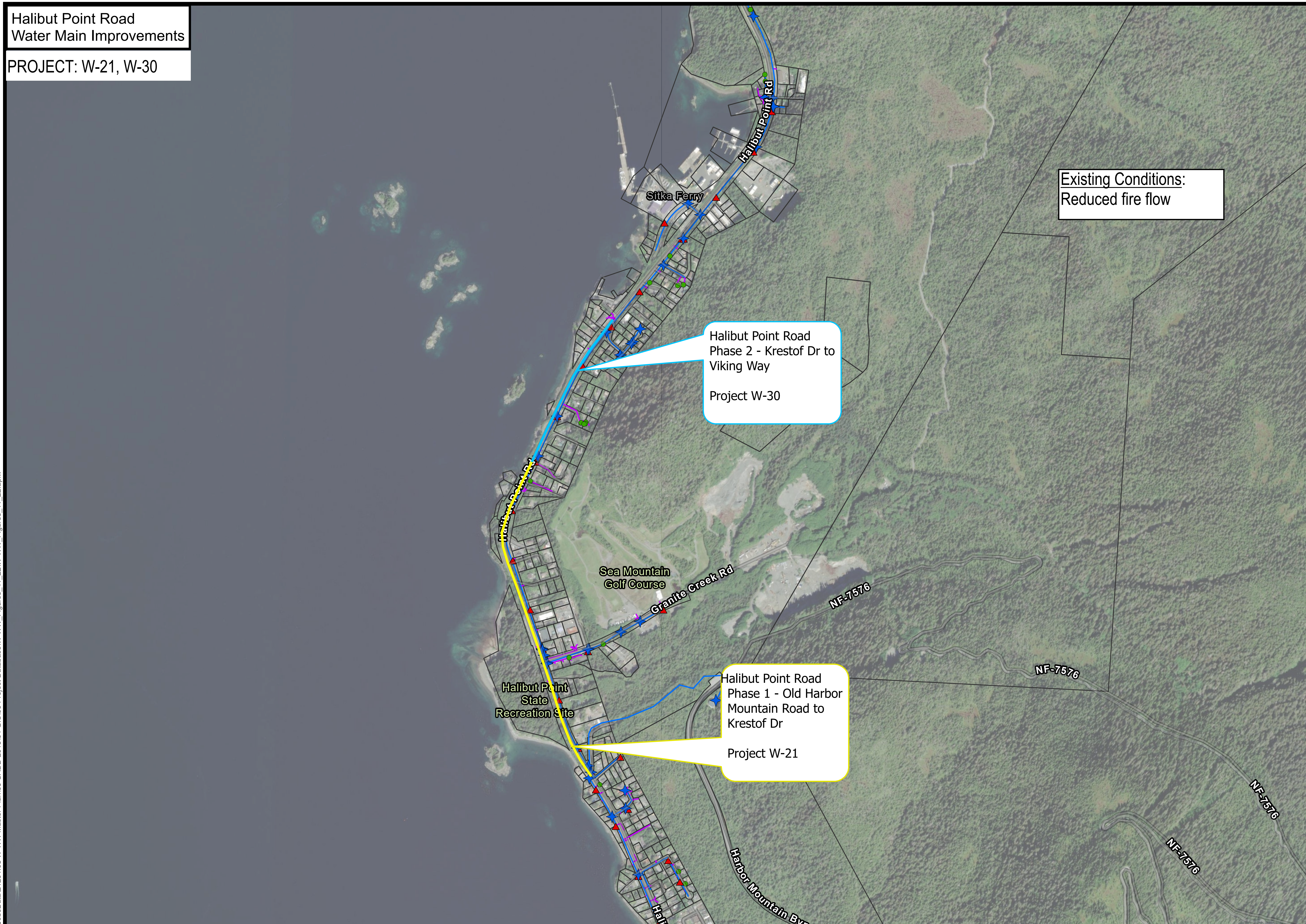
0 60 120
Feet

November 04, 2022

FIGURE 17

Halibut Point Road
Water Main Improvements

PROJECT: W-21, W-30



WATER SYSTEM

CITY AND BOROUGH OF SITKA

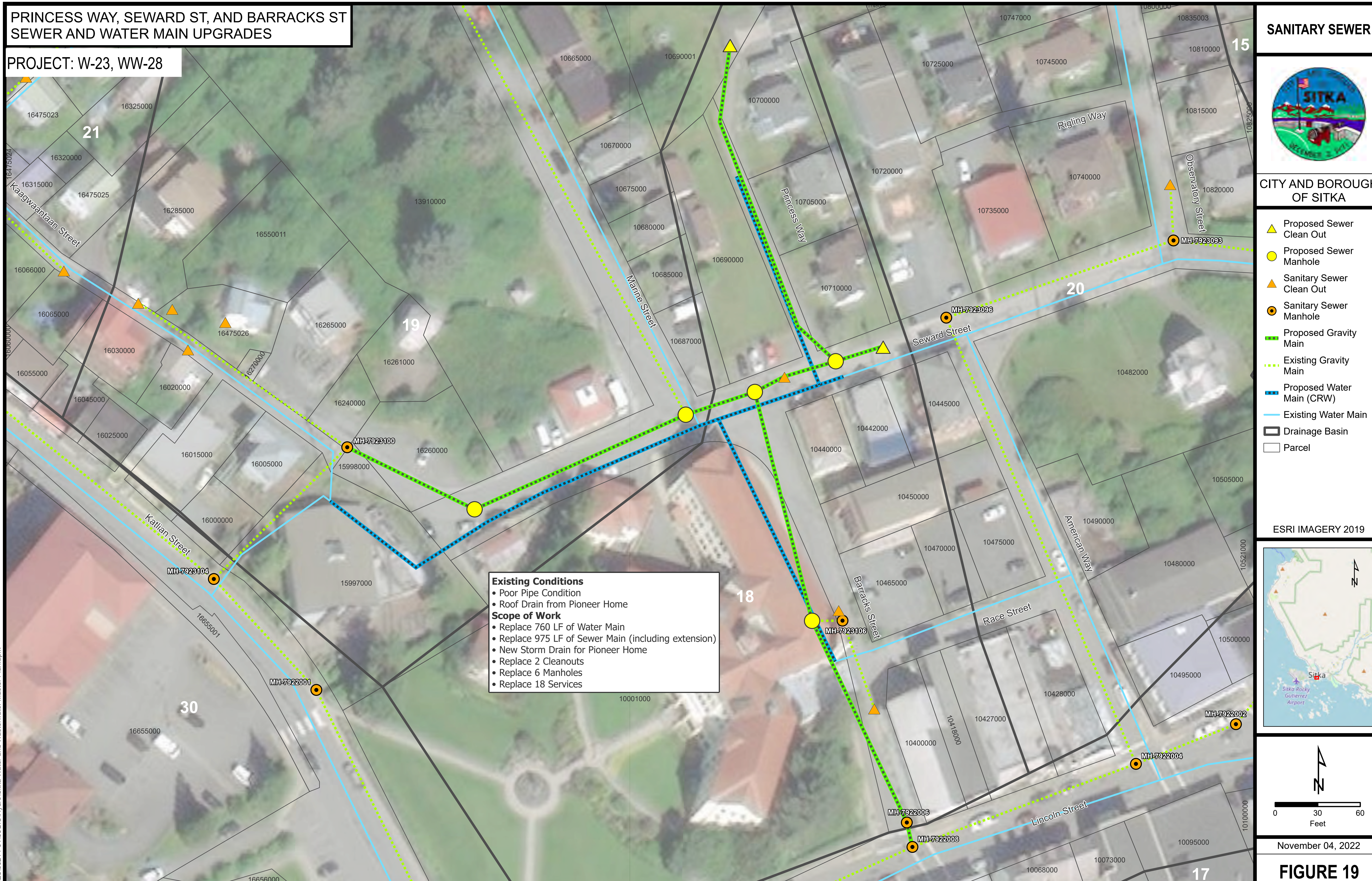
Curb Stop Valve
Hydrant
Lateral Line
Water Main
System Valve
Parcel
Water Main Improvement
Phase 1
Phase 2

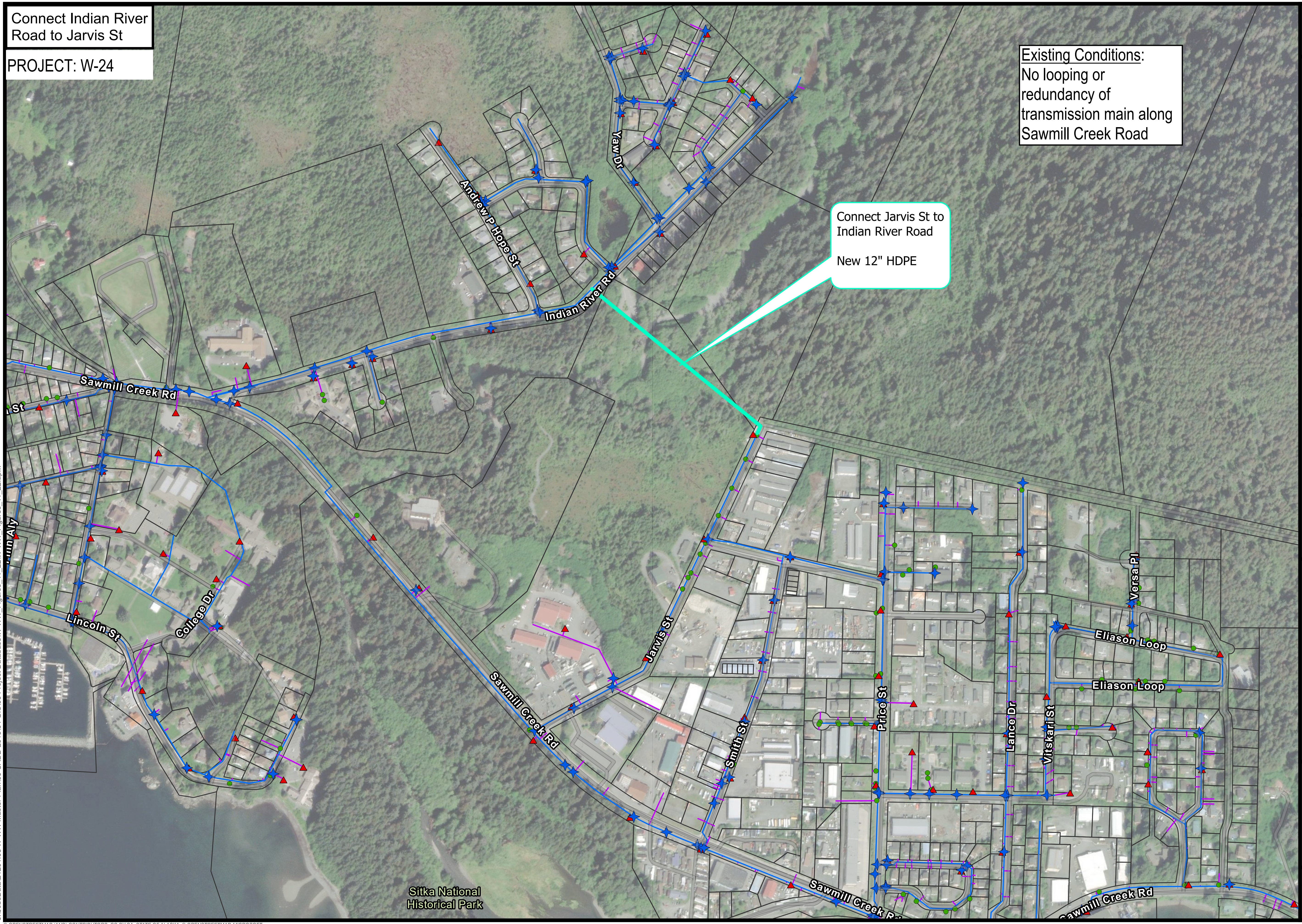
ESRI IMAGERY 2021

0 550 1,100
Feet

November 29, 2022

FIGURE 18


PRINCESS WAY, SEWARD ST, AND BARRACKS ST
SEWER AND WATER MAIN UPGRADES
PROJECT: W-23, WW-28
Existing Conditions
• Poor Pipe Condition
• Roof Drain from Pioneer Home
Scope of Work
• Replace 760 LF of Water Main
• Replace 975 LF of Sewer Main (including extension)
• New Storm Drain for Pioneer Home
• Replace 2 Cleanouts
• Replace 6 Manholes
• Replace 18 Services
SANITARY SEWER
CITY AND BOROUGH OF SITKA
Proposed Sewer Clean Out
Proposed Sewer Manhole
Sanitary Sewer Clean Out
Sanitary Sewer Manhole
Proposed Gravity Main
Existing Gravity Main
Proposed Water Main (CRW)
Existing Water Main
Drainage Basin
Parcel
ESRI IMAGERY 2019
0 30 60
Feet
November 04, 2022
FIGURE 19



WATER SYSTEM

CITY AND BOROUGH OF SITKA

- Curb Stop Valve
- Hydrant
- Lateral Line
- Water Main
- System Valve
- Proposed Connection
- Parcel

ESRI IMAGERY 2021

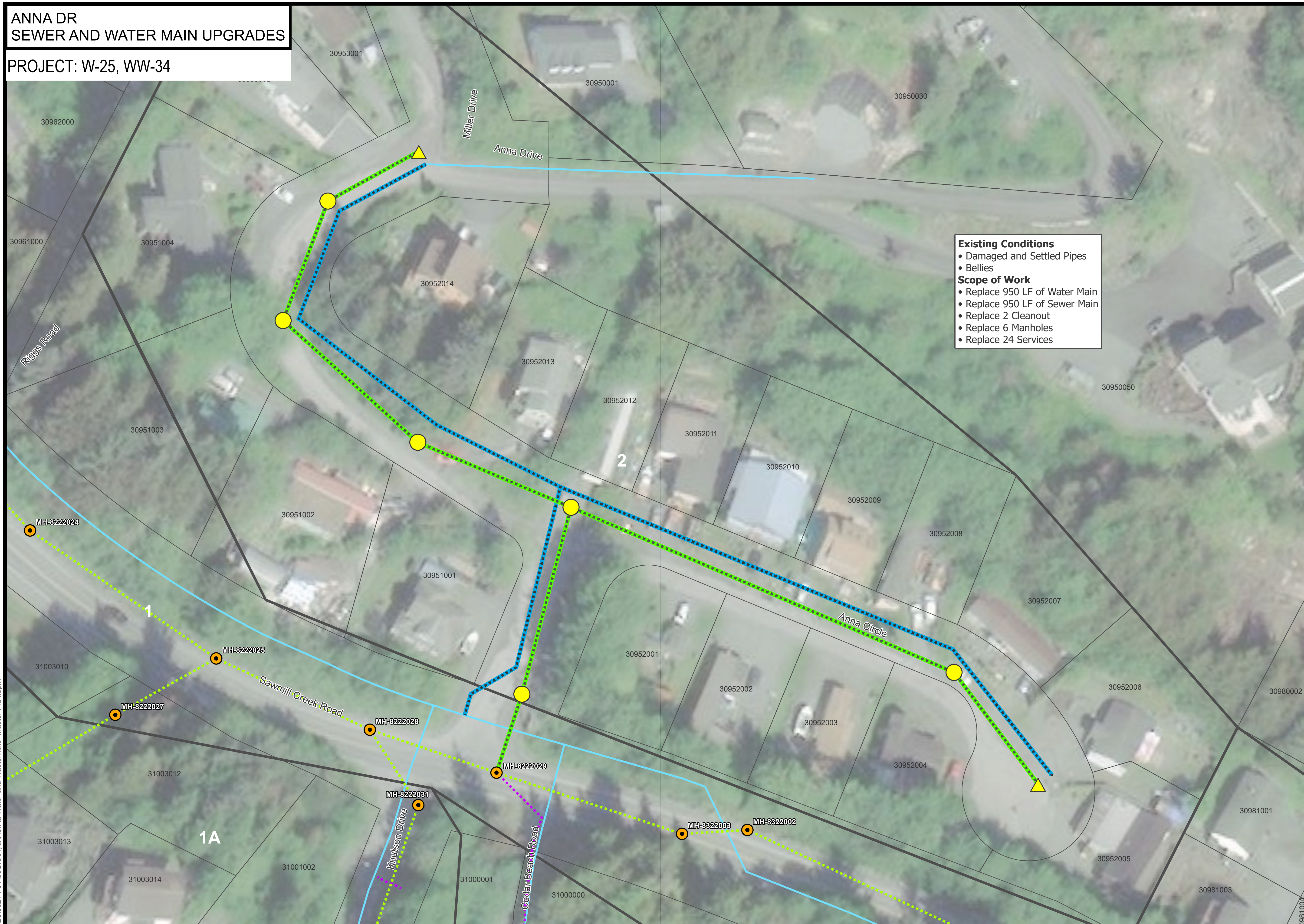
0 250 500
Feet

November 29, 2022

FIGURE 20

ANNA DR
SEWER AND WATER MAIN UPGRADES

PROJECT: W-25, WW-34



Existing Conditions
- Damaged and Settled Pipes
- Bellies

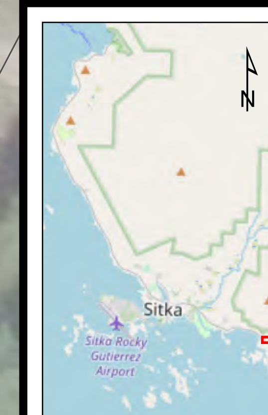
Scope of Work
- Replace 950 LF of Water Main
- Replace 950 LF of Sewer Main
- Replace 2 Cleanout
- Replace 6 Manholes
- Replace 24 Services

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Force Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019



N
0 30 60
Feet

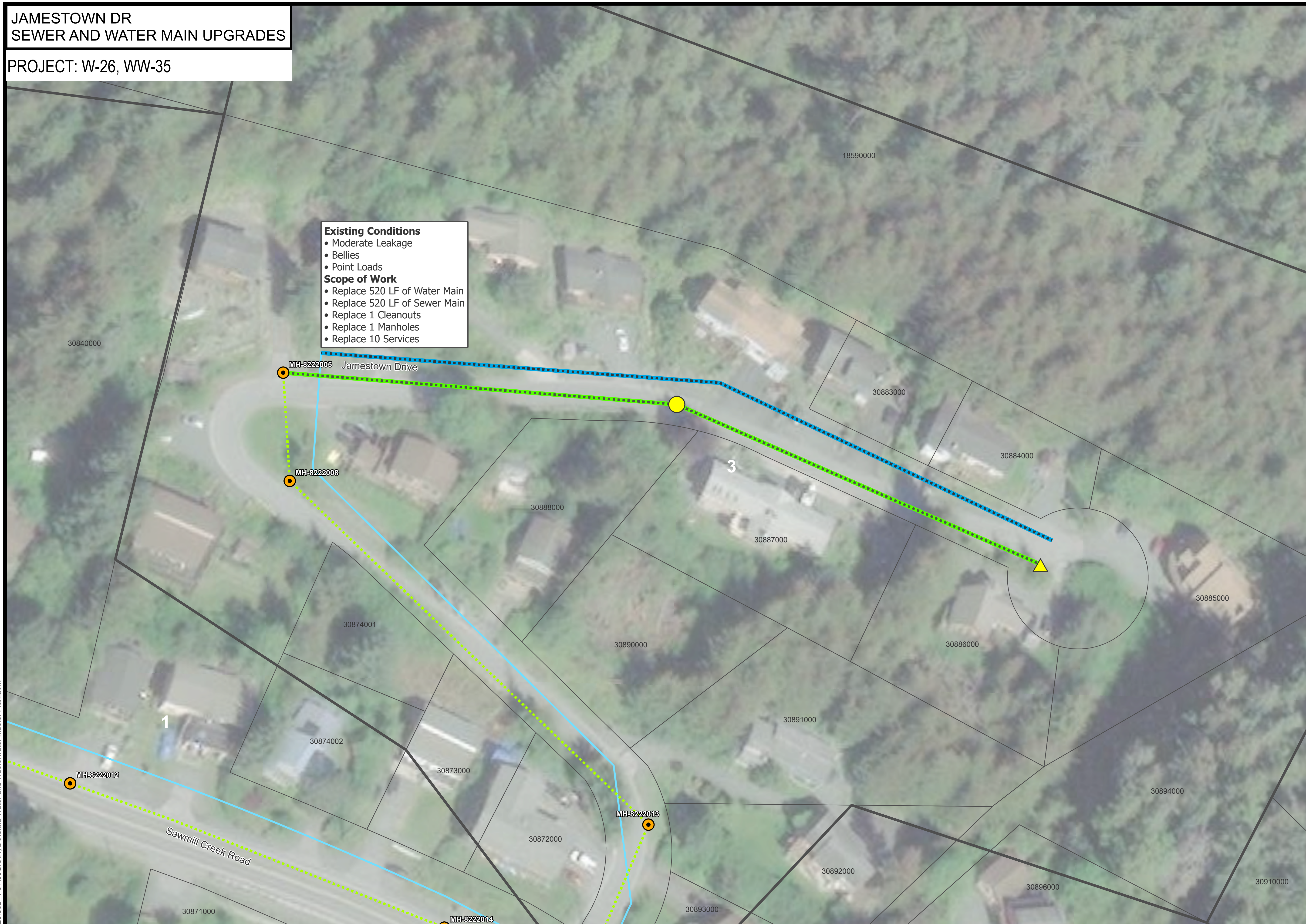
November 04, 2022

FIGURE 21

K:\28150214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

JAMESTOWN DR
SEWER AND WATER MAIN UPGRADES

PROJECT: W-26, WW-35



K:\28150214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

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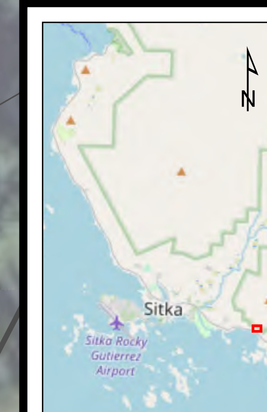
SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019



N

0 30 60
Feet

November 04, 2022

FIGURE 22

VIKING WAY
SEWER AND WATER MAIN UPGRADES

PROJECT: W-27, WW-36

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 30 60
Feet

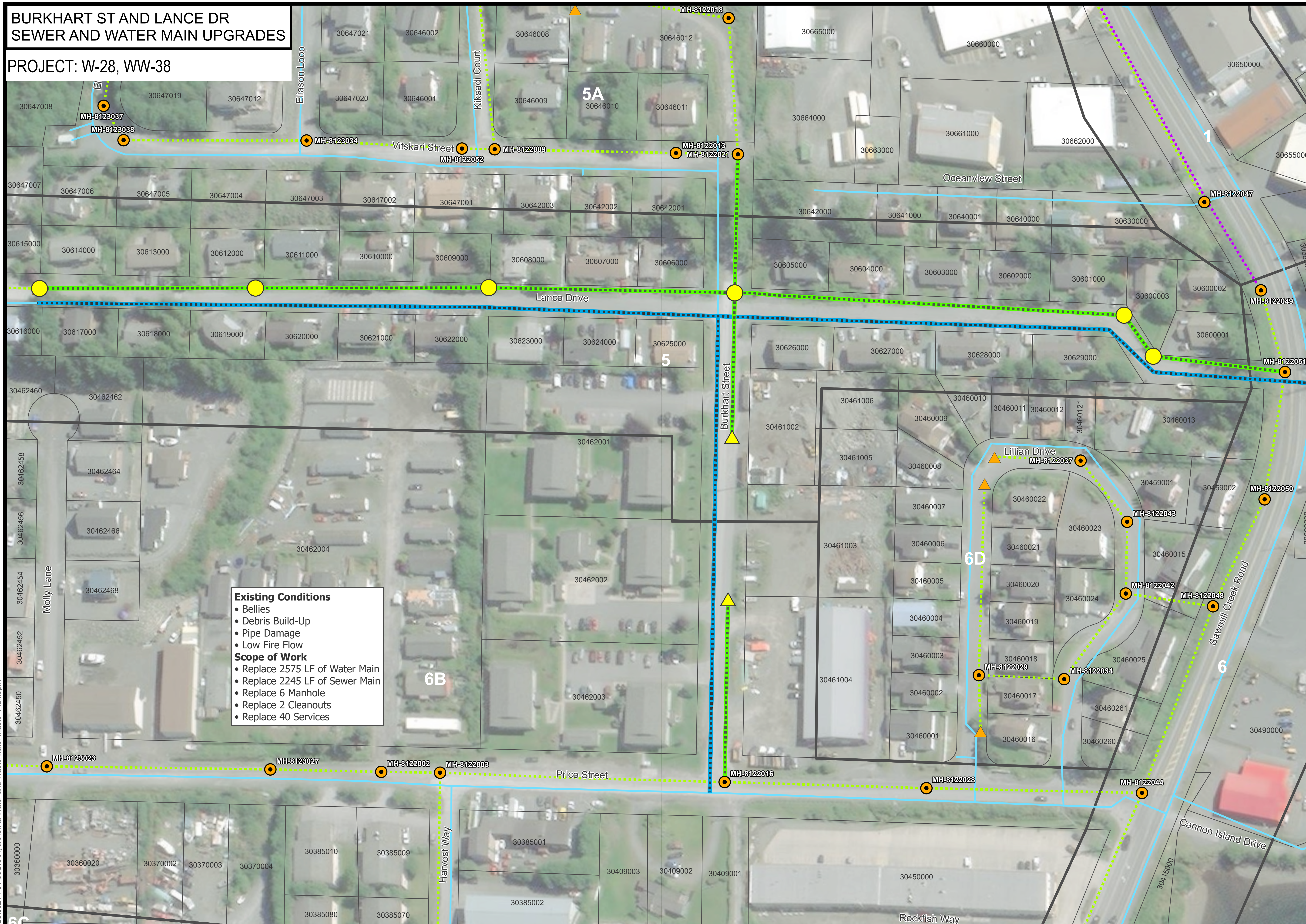
November 04, 2022

FIGURE 23

K:\28\50214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

BURKHART ST AND LANCE DR
SEWER AND WATER MAIN UPGRADES

PROJECT: W-28, WW-38



K:\28150214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Force Main
- Proposed Water Main (CRW)
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 60 120
Feet

November 04, 2022

FIGURE 24

WATER SYSTEM

CITY AND BOROUGH
OF SITKA

Curb Stop Valve
Hydrant
Lateral Line
Water Main
System Valve
Proposed
Connection
Water Storage Tank
Parcel

ESRI IMAGERY 2021

Sitka

0 250 500
Feet

November 29, 2022

FIGURE 25

J:\JobsData\21201.05 W-WW Master Plan\00 CADD 2019\04 GIS\00 Project Database\W-WW_Figures_11_22\W-WW_Figures_11_22.aprx

Kashevaroff Street Water Main Upgrades

PROJECT: W-32

WATER SYSTEM

CITY AND BOROUGH OF SITKA

- Curb Stop Valve
- Hydrant
- Lateral Line
- Water Main
- System Valve
- Proposed Connection
- Parcel

ESRI IMAGERY 2021

0 125 250
Feet

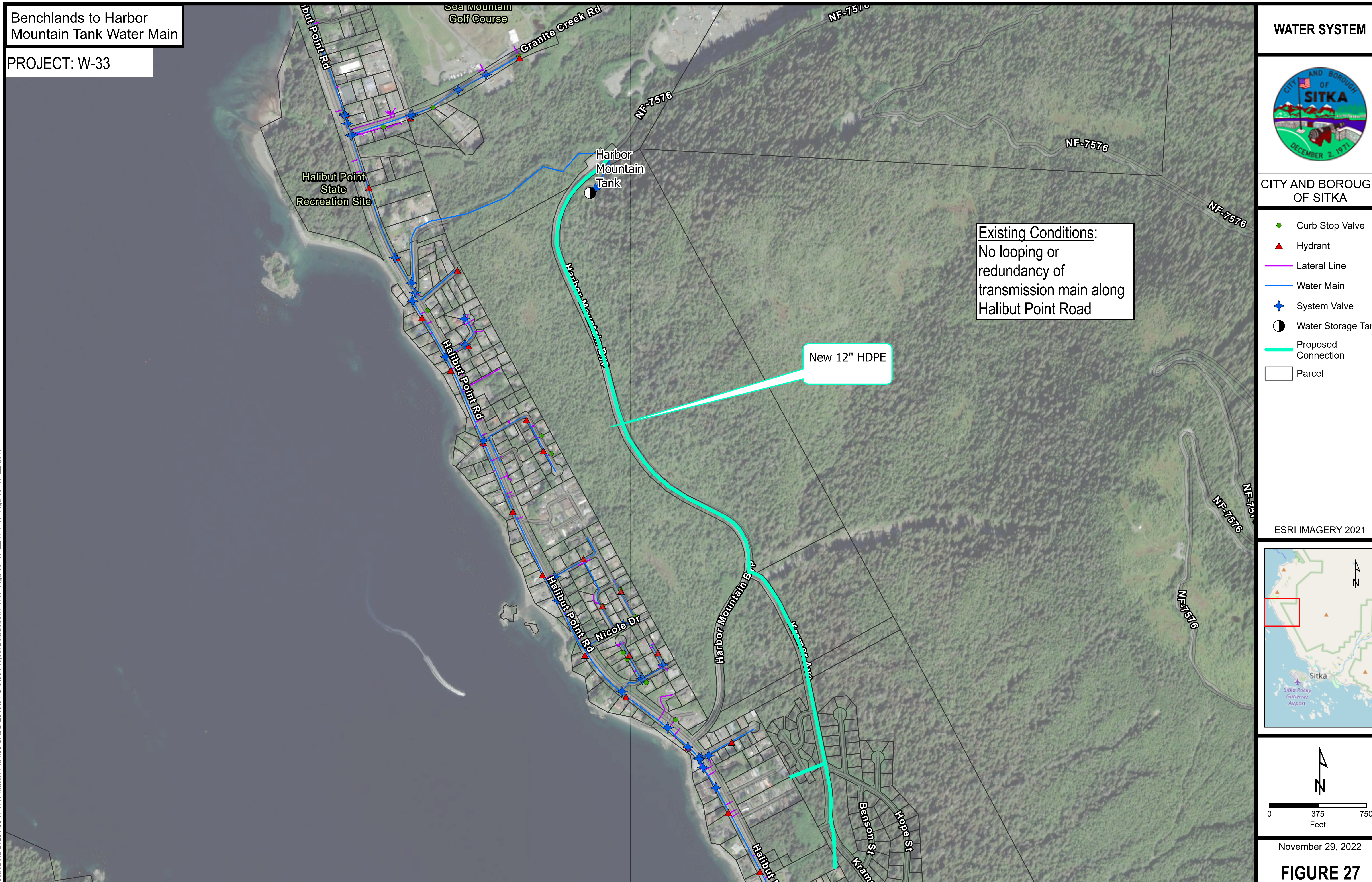
November 29, 2022

FIGURE 26

J:\Jobs\Data\21201.05 W-WW Master Plan\00 CADD 2019\04 GIS\00 Project Database\W-WW_Figures_11_22\W-WW_Figures_11_22.aprx

Benchlands to Harbor Mountain Tank Water Main

PROJECT: W-33



November 29, 2022

FIGURE 27

J:\JobsData\21201.05 W-WW Master Plan\00 CADD 2019\04 GIS\00 Project Database\W-WW_Figures_11_22\W-WW_Figures_11_22.aprx

Granite Creek Rd to Harbor Mountain Rd Water Main

PROJECT: W-34

WATER SYSTEM

CITY AND BOROUGH OF SITKA

- Curb Stop Valve
- Hydrant
- Lateral Line
- Water Main
- System Valve
- Water Storage Tank
- Proposed Connection
- Parcel

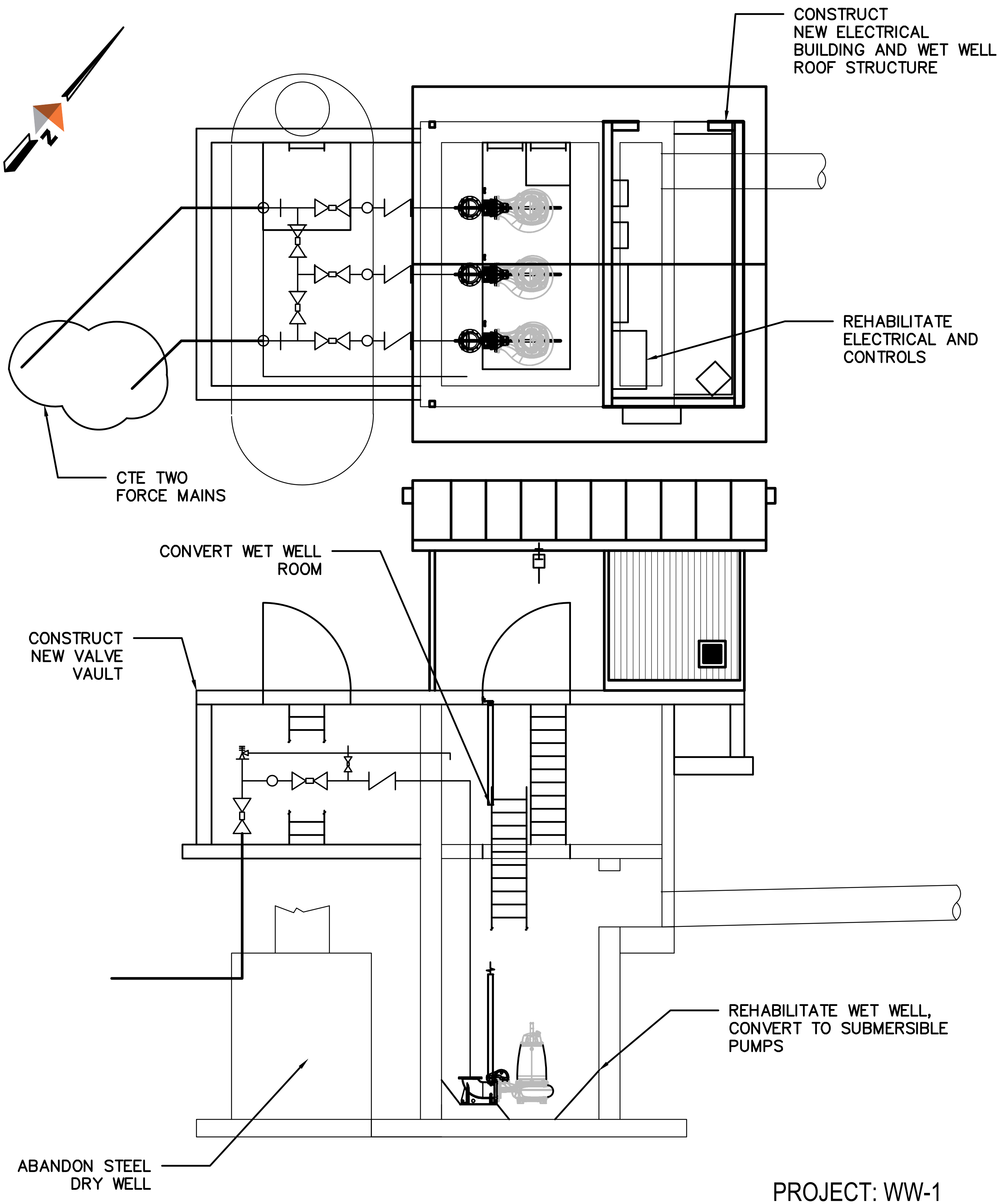
ESRI IMAGERY 2021

0 250 500
Feet

November 29, 2022

FIGURE 28

J:\JobsData\21201.05 W-WW Master Plan\00 CADD 2019\04 GIS\00 Project Database\W-WW_Figures_11_22\W-WW_Figures_11_22.aprx



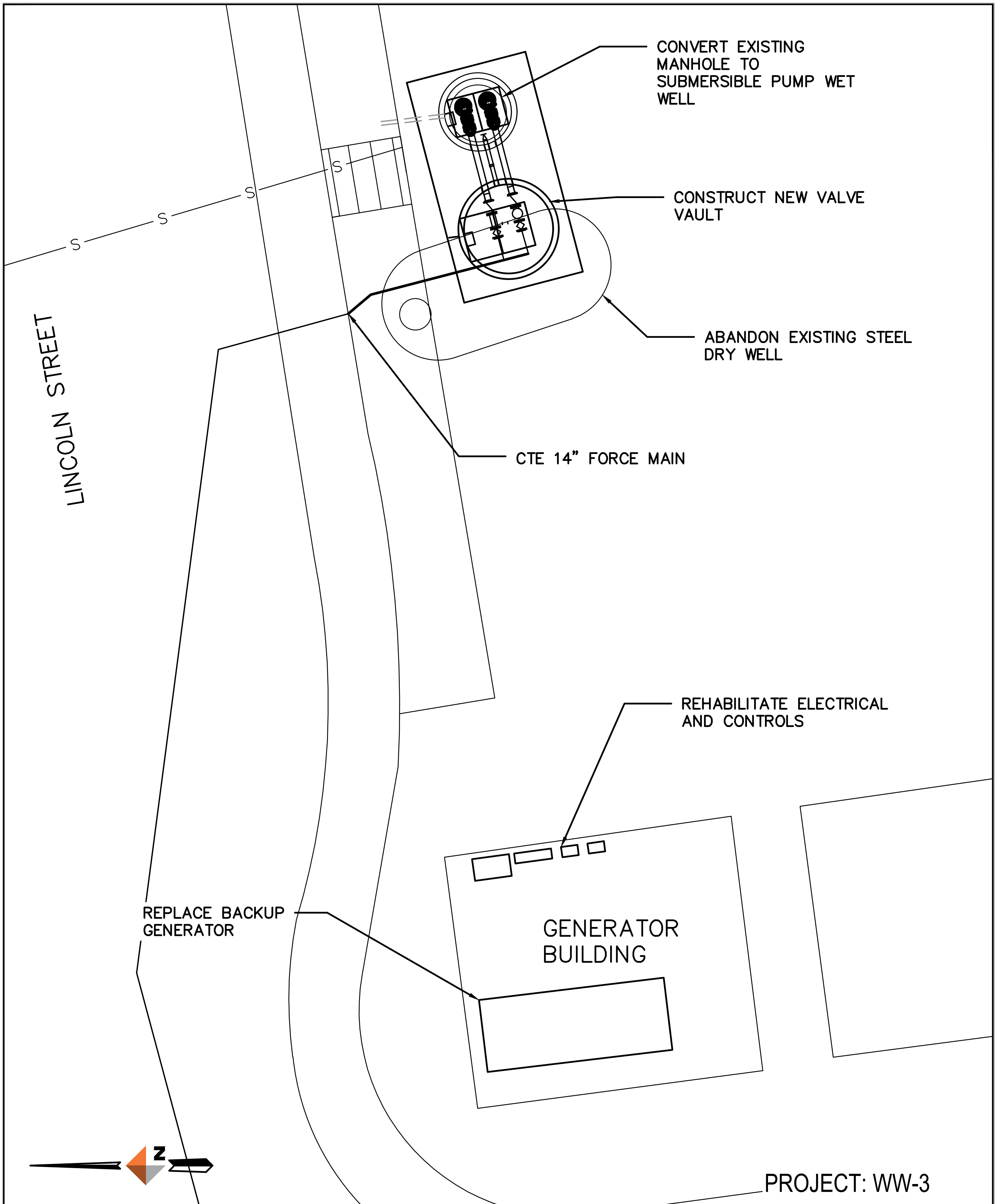
PROJECT: WW-1

DOWL
WWW.DOWL.COM

SITKA SEWER MASTER PLAN
CONCEPT DESIGN
THOMSEN LIFT STATION

PROJECT	1528.50214.01
DATE	04/29/2021

FIGURE 29



DOWL
WWW.DOWL.COM

SITKA SEWER MASTER PLAN
CONCEPT DESIGN
LAKE & LINCOLN LIFT STATION

PROJECT	1528.50214.01
DATE	04/29/2021

FIGURE 30

JAPONSKI UPLANDS
SEWER MAIN UPGRADES

PROJECT: WW-6

Existing Conditions
- Age related deficiencies

Scope of Work
- Replace 6000 LF of Force Main

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Force Main
- Existing Gravity Main
- Existing Force Main
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 130 260
Feet

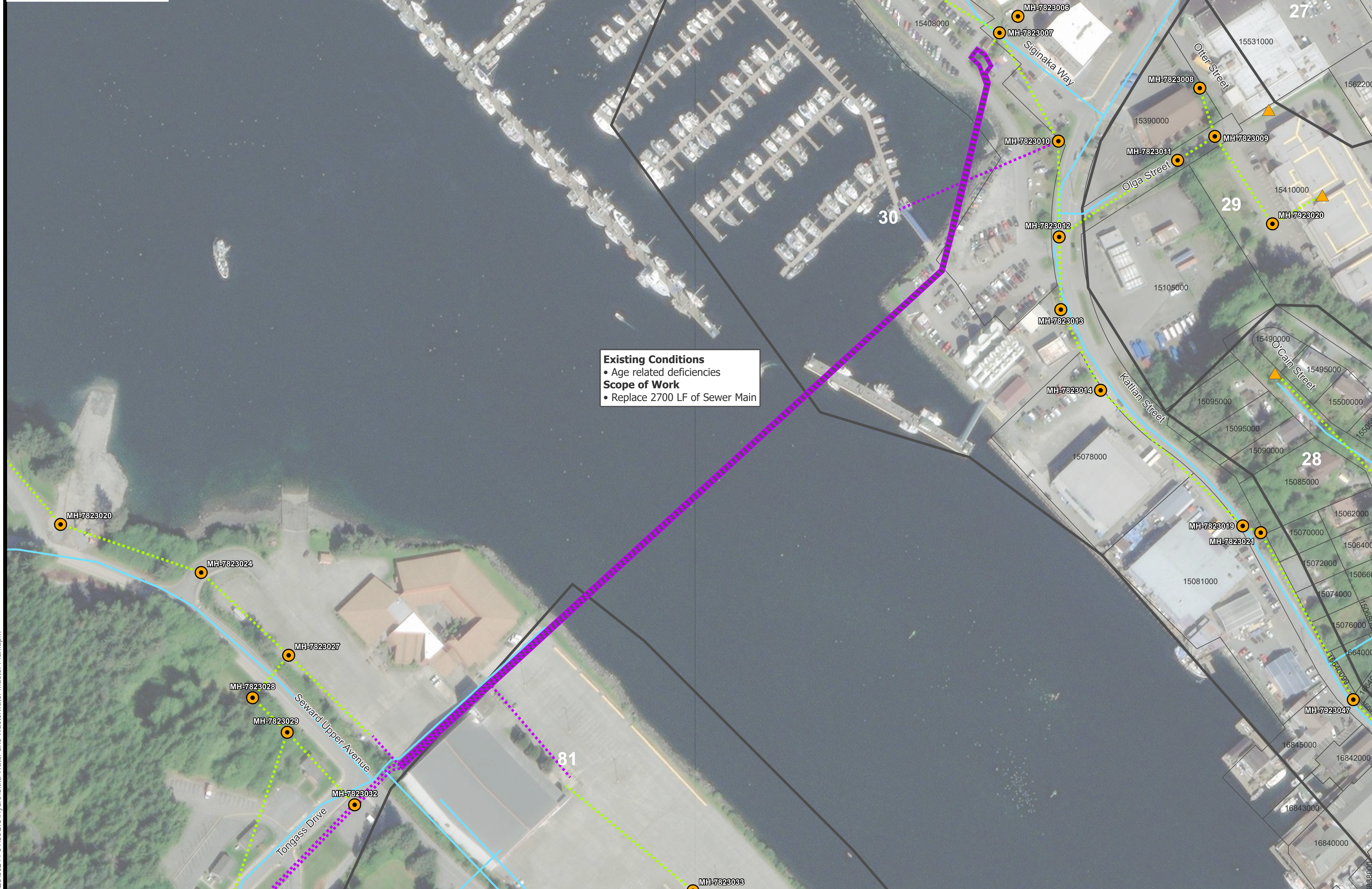
November 04, 2022

FIGURE 31

K:\28150214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

SUBMARINE FORCE MAIN SEWER MAIN UPGRADES

PROJECT: WW-22



SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Force Main
- Existing Gravity Main
- Existing Force Main
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019

0 100 200
Feet

November 04, 2022

FIGURE 32

TLINGIT WAY
SEWER AND WATER MAIN UPGRADES

PROJECT: WW-27

Existing Conditions
- Poor Pipe Condition
- Holes in Pipe
- Undersized

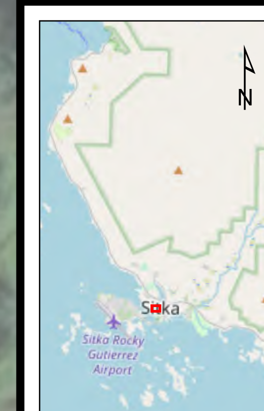
Scope of Work
- Replace 380 LF of Sewer Main
- Replace 1 Cleanout
- Replace 1 Manholes
- Replace 6 Services

SANITARY SEWER

CITY AND BOROUGH OF SITKA

- Proposed Sewer Clean Out
- Proposed Sewer Manhole
- Sanitary Sewer Clean Out
- Sanitary Sewer Manhole
- Proposed Gravity Main
- Existing Gravity Main
- Existing Water Main
- Drainage Basin
- Parcel

ESRI IMAGERY 2019



0 30 60
Feet

November 04, 2022

FIGURE 33

K:\28\50214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx

MARINE OUTFALL
SEWER MAIN UPGRADES

PROJECT: WW-40

Existing Conditions
- Age related deficiencies

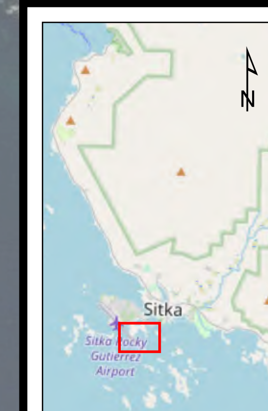
Scope of Work
- Replace 2885 LF of Sewer Main
- Replace 100 of Diffuser Pipe

SANITARY SEWER

CITY AND BOROUGH OF SITKA

Sanitary Sewer Clean Out
Sanitary Sewer Manhole
Proposed Gravity Main
Existing Gravity Main
Existing Force Main
Existing Water Main
Drainage Basin
Parcel

ESRI IMAGERY 2019



N

0 170 340
Feet

November 04, 2022

FIGURE 34

K:\28\50214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx


CASTLE HILL CATCHMENT
SEWER MAIN UPGRADES
PROJECT: WW-41
Existing Conditions
• Inflow and Infiltration
Scope of Work
• Replace 675 LF of Sewer Main
• Replace 2 Manhole
• Replace 2 Cleanouts
• Replace 8 Services
MH-7922006
MH-7922008
MH-7922010
MH-7922012
Lincoln Street
Barracks Street
Harbor Drive
Airport Road
Harbor Way
Maksoutoff Road
15
16
17
18
30
10001000
10060000
10017000
10017001
10016000
10020000
10033000
10037000
10040000
10045000
10055000
10062000
10068000
10068001
10073000
10074000
10095000
10095001
10097000
10100000
10105000
10110000
10115000
10230000
10242000
10260000
10400000
16656000
10015001
10015002
10015004
SANITARY SEWER
CITY AND BOROUGH OF SITKA
Proposed Sewer Clean Out
Proposed Sewer Manhole
Sanitary Sewer Clean Out
Sanitary Sewer Manhole
Proposed Gravity Main
Existing Gravity Main
Existing Force Main
Existing Water Main
Drainage Basin
Parcel
ESRI IMAGERY 2019
Sitka
0
30
60
Feet
November 04, 2022
FIGURE 35
K:\2815\0214-01\60GIS\Hydro\Sitka Water and Wastewater Master Plan.aprx
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E Lift Station Lots
PROJECT: WW-42
Knutson Drive
Cedar Beach Road
Kaluanen Drive
Seaview Heights Road
SAWMILL CREEK ROAD
Remington Way
Rands Drive
Shotgun Alley
Yakobi Way
Islander Drive
SANITARY SEWER
CITY AND BOROUGH OF SITKA
Sanitary Sewer Clean Out
Sanitary Sewer Manhole
Existing Gravity Main
Existing Force Main
Parcel
E-Lift Station Lots
Simplex E-One
Duplex E-One
No Longer Serviced
Sitka Aerial 2007
Sitka
0
130
260
Feet
September 10, 2021
FIGURE 36
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