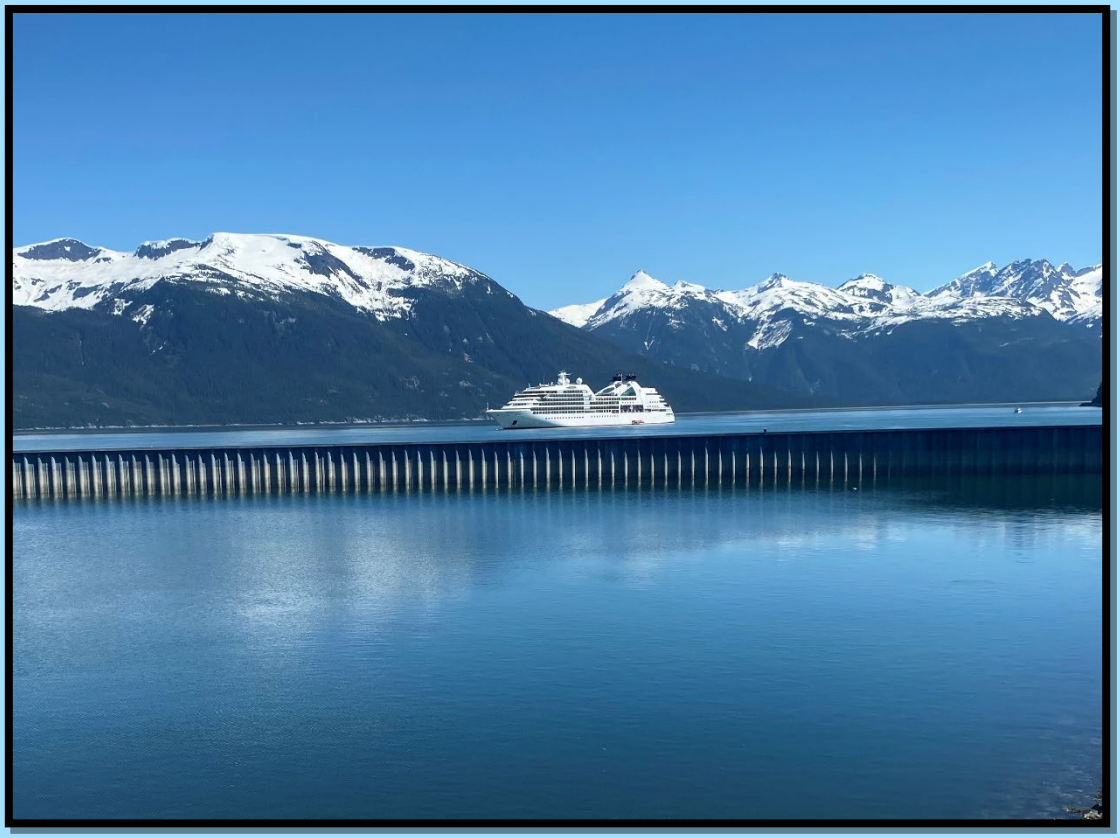
HAINES
BOROUGH

HAINES SEWER MASTER PLAN HAINES, ALASKA

June 2023



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OVERVIEW: HOW TO USE THIS PLAN

The *2023 Haines Sewer Master Plan* contains 11 sections.

Executive Summary: Overviews this plan's proposed sanitary sewer system (SSS) improvements and recommendations for the Haines Townsite.

Section 1 – Introduction: Explains this plan's purpose and scope, and provides a recap of previous community wastewater system improvements in the Haines Townsite.

Section 2 – Project Planning Area: Provides a synopsis of the natural environment of this northern SE Alaska community, including a brief history of how the town of Haines started. Climate change projections for temperature and precipitation are included.

Section 3 – Socioeconomics: Overviews basics about the Townsite population, transportation, land use, and the local government.

Section 4 – Existing Sewer System: Describes the current Townsite Sanitary Sewer System, specifically the collection system, the wastewater treatment plant and the marine outfall as well as annual volumes, federal permit parameters for effluent and required wastewater quality testing. Twelve tables summarize details.

Section 5 – Capacity Evaluation: Examines annual amounts of wastewater treated, and reviews the adequacy of the sanitary sewer system.

Section 6 – SSS Development: 2023 – 2032: Contains the eleven proposed Capital Improvement Projects (CIPs), starting with highest priority. Proposed project summaries include estimated budgets.

Section 7 – SSS Recommendations: 2023 – 2042: Explains seven recommendations for the next twenty years beyond the proposed CIP list,

Section 8 – Funding, Permits & Other Approvals: Outlines possible financial options for supporting the implementation of the proposed CIP list, and overviews usual steps for permitting construction.

Section 9 – References: Lists resources reviewed to develop this plan.

Section 10 – Appendices: Contains supporting materials referenced in the above sections. See ***Appendix A*** for drawings about the project area and the proposed improvements, and an overview of the Storm Water Sewer System. Consult ***Appendix B*** to learn more about the Townsite Sanitary Sewer System. Review ***Appendix C*** to see maps relating to area flood risk.

Cover photo of Portage Cove by Linda Van Houten

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ACRONYMNS & ABBREVIATIONS

AAC	**Alaska Administrative Code**
ABS	**Acrylonitrile Butadiene Styrene**
AC	**Asbestos Cement**
ACIS	**Applied Climate Information System**
ADEC	**Alaska Department of Environmental Conservation**
ADF&G	**Alaska Department of Fish and Game**
ADNR	**Alaska Department of Natural Resources**
ADOLWD	**Alaska Department of Labor and Workforce Development**
ADOT&PF	**Alaska Department of Transportation and Public Facilities**
AEI	**Arctic Engineering, Inc.**
AMHS	**Alaska Marine Highway System**
AP&T	**Alaska Power and Telephone**
AWWA	**American Water Works Association**
BOD_5	**Five-Day Biochemical Oxygen Demand**
BMPs	**Best Management Practices**
BR	**Beach Road**
CBJ	**City and Borough of Juneau**
CCR	**Consumer Confidence Report**
CDI	**Carson and Dorn, Inc.**
CDP	**Census Designated Place**
CFR	**Code of Federal Regulations**
CIP	**Capital Improvement Projects**
CREAT	**Climate Resilience Evaluation and Awareness Tool for Water Utilities**
Cu	**Copper**
DHS	**Department of Homeland Security**
DI	**Ductile Iron**
DMR	**Discharge Monitoring Report**
DPW	**Department of Public Works**
EMPS	**Engineering Man Power Services**
EPA	**Environmental Protection Agency**
ESA	**Endangered Species Act**
F	**Fahrenheit**
FAA	**Federal Aviation Administration**
FC	**Fecal Coliform**
FRP	**Fiber Resin Pipe**
FT	**Feet**
G	**Gallon(s)**
GIS	**Geographic Information System**
GPCD	**Gallons Per Capita-Day**
GPD	**Gallons Per Day**
GPM	**Gallons Per Month**

GPY	**Gallon Per Year**
HB	**Haines Borough or House Bill**
HB W&S GIS	**Haines Borough Water and Sewer Geographic Information System**
HDPE	**High Density Polyethylene**
HSMP	**Haines Borough Sewer Master Plan**
I/I	**Infiltration and Inflow**
IN	**Inches**
INC	**Incorporated**
ID#	**Identification Number**
ISO	**Insurance Services Office**
L	**Liter**
lbs	**Pounds**
LF	**Linear Feet**
LLC	**Limited Liability Company**
LS	**Lift Station**
MBR	**Mud Bay Road**
MCL	**Maximum Contaminant Level**
MCLG	**Maximum Contaminant Level Goal**
MG	**Million Gallons**
mg	**milligrams**
MOA	**Memorandum of Agreement**
MLLW	**Mean Lower Low Water**
MNR	**Monitored Not Regulated**
MGD	**Million Gallons per Day**
MGM	**Million Gallons per Month**
MGY	**Million Gallons per Year**
ml	**Milliliters**
MRR	**Mount Riley Road**
NA	**Not Applicable**
ND	**Not Detected**
NR	**Not Required yet Recommended**
NOAA	**National Oceanic and Atmospheric Administration**
NPDES	**National Pollutant Discharge Elimination System**
NTU	**Nephelometric Turbidity Unit**
O&M	**Operation and Maintenance**
PEX	**Cross-Linked Polyethylene**
PCi	**Picocuries**
PPB	**Parts per Billion**
PPM	**Parts per Million equals Milligrams per Liter**
PPT	**Parts per Trillion**
PSAs	**Public Service Announcements**
PSI	**Pounds per Square Inch**
PVC	**Polyvinyl Chloride**
PWS	**Public Water System**
RCPs	**Representative Concentrations Pathways**

RDII	Rainfall-Derived Infiltration and Inflow
ROW	Right of Way
RUS	Rural Utility Service
RV	Recreational Vehicle
SCADA	Supervisory Control and Data Acquisition
SE	Southeast
SHPO	State Historic Preservation Office
SNAP	Scenarios Network for Alaska and Arctic Planning
SSOAP	Sanitary Sewer Overflow Analysis and Planning
SSS	Sanitary Sewer System
SWSS	Storm Water Sewer System
STR	Small Tracts Road
STS	Small Tracts Spur
SW AK DPS	Southwest Alaska Distinct Population Segment
TBD	To Be Determined
TNTC	Too Numerous To Count
TSS	Total Suspended Solids
TT	Treatment Technique
UAF	University of Alaska – Fairbanks
ug	Micrograms
URS	United Research Services
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VFD	Variable Frequency Drive
WELTS	Well Log Tracking System
WET	Whole Effluent Toxicity
WMP	Water Master Plan
WST	Water Storage Tank
WTP	Water Treatment Plant
WWLS	Wastewater Lift Station
WWS	Wastewater System
WWTP	Wastewater Treatment Plant
ZID	Zone of Initial Influence

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EXECUTIVE SUMMARY

This *2023 Haines Sewer Master* Plan (*HSMP*) was prepared for the Haines Borough of Alaska to provide guidance for future improvements and expansion to the community's wastewater facilities in the Townsite area. This document provides an estimate of the construction costs for 11 prioritized wastewater system improvements, ranked by the Department of Public Works Staff. ***Table ES-1*** lists these improvements along with the estimated costs. (***Section 6*** contains additional details.) The total cost estimate is $12,543,042. A conceptual layout of the proposed sewer system improvements is presented in ***Figure ES-2: Map of Proposed Wastewater Improvements***.

2022 HAINES SANITARY SEWER SYSTEM FACTS

- **Annual Effluent Volume: 109.2 Million Gallons**
- **Average Daily Wastewater Treatment Volume: 0.288 Million Gallons**
- **Number of Connections: 554 Customers**
- **Gallons per Capita-Day: 185 Gallons per Person**
- **Cost to Treat 1,000 Gallons of Wastewater: $4.86**
- **Gravity Sewer Main: 17.5 Miles**
- **Force Sewer Main: 1.4 Miles**
- **Number of Lift Stations: 7**
- **Number of Manholes: 267**

The *HSMP* covers a 20-year planning period, 2023 through 2042, with a 10-year capital improvement focus, 2023 through 2033. Seven recommendations without cost estimates are also included for 2023 – 2042. Refer to ***Table ES-2*** and ***Section 7*** for specifics.

This plan includes background information about the community (***Section 2***) and previous wastewater improvements (***Section 4***), a review of population projections (***Section 3***), and an analysis of future sewer capacity and

Figure ES-1: WWTP Septage Discharge Point

needs for the Townsite area (***Section 5***).

It is recommended that the Haines Borough review this *HSMP* every five years and update the document every 10 years, assuming population growth rates remain relatively consistent with the estimates used in determining wastewater system capacity. Major population or economic changes within the Townsite area and the Haines Borough may warrant an earlier update. The renewal process currently underway for the Haines **Permit #AK-002138-5** may require additional treatment and modification of the mixing zone as well.

Recommended Wastewater Improvements

Costs for recommended wastewater system improvements over the next ten years are shown in ***Table ES-1: Haines SSS Cost Estimates for Proposed Improvements***. See ***Section 6*** for additional information.

Table ES-1: Haines SSS Estimates for Proposed Improvements, 2023 – 2032

Improvement		Design & Construction Costs
S1	BOROUGH CODE UPDATE	$19,630
S2	INFILTRATION & INFLOW: SYSTEM WIDE IMPLEMENTATION	$328 580
S3	ASSET MANAGEMENT SYSTEM IMPLEMENTATION & LIFECYCLE PLANNING	$26,000
S4	WWTP & BEACH ROAD LIFT STATION IMPROVEMENTS	$1,404,267
S5	WWTP IMPROVEMENTS: RECONDITIONING CLARIFIER & TANKS	$560,000
S6	SCADA MONITORING: WWTP & LIFT STATIONS	$75,000
S7	LIFT STATION UPGRADES: STANDARDIZING & AUXILARY POWER	$465,000
S8	HYDRUALIC MODELING FOR SSS	$74,750
S9	TOWNSITE SEWER MAIN EXTENSIONS	$2,565,000
S10	SLUDGE CONTAINMENT, STORAGE & LONG-TERM STRATEGY	$900,000
S11	EPA PERMIT COMPLIANCE	$6,473,025
	TOTAL:	$12,543,042

Figure ES-2: Map of Proposed Water Improvements, 2023 – 2032

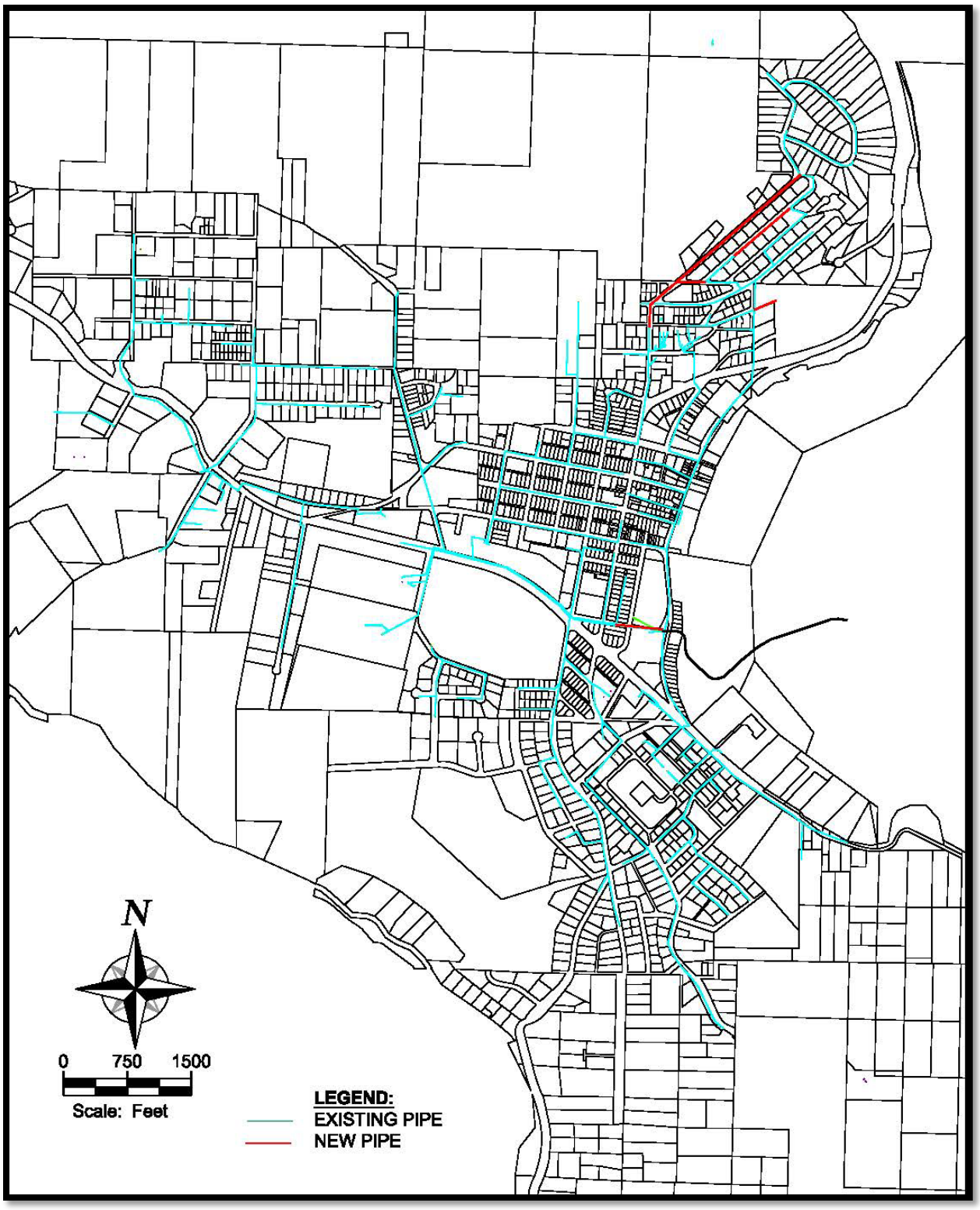


Table ES-2: Haines SSS Recommendations, 2023 – 2042

Recommendations	
SR1	HYDRAULIC MODELING & CLIMATE CHANGE UPGRADES FOR STORM WATER SEWER SYSTEM (SWSS)
SR2	RESIDENTIAL LEAK DETECTION & ABATEMENT
SR3	SSS & SWSS UPGRADES FOR CLIMATE CHANGE IMPACTS
SR4	SURVEY OF ON-SITE WW SYSTEMS IN TOWNSITE
SR5	INVESTIGATE RECONFIGUATION & UPGRADES TO WWTP
SR6	PUBLIC EDUCATION CAMPAIGN REGARDING SEWER BMPs
SR7	IMPROVING EFFICIENCES WITH SCADA & STAFFING

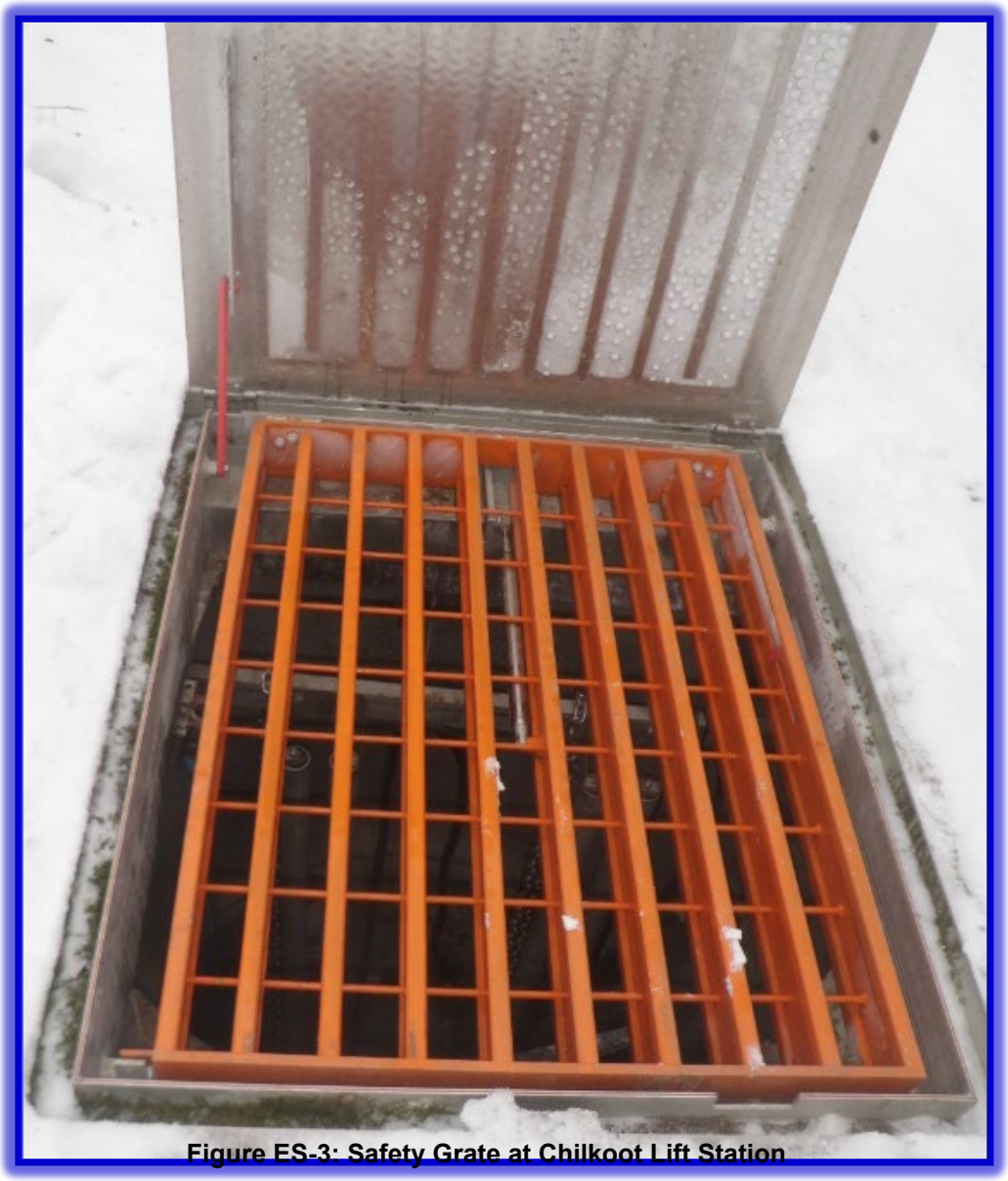


Figure ES-3: Safety Grate at Chilkoot Lift Station

1.0 INTRODUCTION

During the course of preparing this *2023 Haines Sewer Master Plan* (*HSMP*), improvements and recommendations were developed with the assistance of the Department of Public Works (DPW) Staff, and presented and discussed at three meetings of the Haines Borough Planning Commission. The final prioritized improvements are described in ***Section 6: WWS Project Development.***

This plan is intended to conform to applicable federal, state and local regulations. It is an update to the sewer portion of the *2014 Haines Water and Sewer Master Plan* prepared by Carson and Dorn, Inc. (CDI). Information from the *Haines Borough 2025 Comprehensive Plan*, developed in 2012, has been incorporated into ***Section 2 – Project Planning Area*** and ***Section 3 – Socioeconomics***. (Sheinberg Associates, 2012)

1.1 PURPOSE

The purpose of this plan is to create a roadmap for the next two decades with prioritized improvements for the Haines Townsite Sanitary Sewer System (SSS). In the past decade, Haines has experienced growth and changes impacting the sewer system. The selected improvements and recommendations in the *2023 HSMP* provide guidance for future collection and treatment facilities to serve the Townsite area and beyond. The Capital Improvement Program (CIP) list is provided in ***Section 6***.

1.2 SCOPE

The Scope of Work for preparing the *2023 Haines Sewer Master Plan* includes:

- Define and review the existing sewer infrastructure.
- Obtain updated land use information for the Townsite.
- Prepare population and community growth estimates and calculate sewage loading.
- Preparing a sewer system master plan and associated CIP list to implement the plan's improvements.
- Identify deficiencies as well as needed replacement and upgrade projects for the existing sewer system, including wastewater treatment plant components, collection pipe replacements, lift stations and force mains.
- Provide recommendation for improvements to the existing sewer system to continue serving the customer base and to accommodate growth.
- Provide a basis for funding and implementation by developing preliminary cost estimates for the proposed improvements. This includes the development of detailed CIP items with expenses, including design, permitting and construction costs for the 2023 to 2032

improvements. Include some general recommendations for the next 20 years. 2023 to 2042.
- Provide draft 35 percent, 65 percent, and 95 percent of the *2023 HSMP*. Involve the Public Works Department Staff, other Borough Staff, the Haines Borough Planning Commission as well as interested community members in development of the final improvements, priorities and recommendations for the Townsite sanitary sewer system.

Key planning issues include:

- Completion of the next *Haines Comprehensive Plan* update with implications for Haines' sanitary sewer system, including needed upgrades and expansion.
- Wastewater production in Haines will continue to grow even though the Alaska Department of Labor and Workforce Development (ADOLWD) shows a declining population. It is anticipated that seasonal workers and summer-only residents will continue the trend of increases in the number of sanitary sewer connections and the annual volume of wastewater produced and treated in the Townsite.
- Growth in the Townsite, including areas not currently served by the public sewer. New subdivisions are under development.
- An aging sanitary sewer system with many pipes approaching over 50 years age. Repair, rehabilitation and replacement of these pipes needs to be a priority to deal with infiltration and inflow (I/I).
- Impacts of climate change on the sanitary sewer system. Considerations include warmer temperatures with increased precipitation. Modeling changes to understand impacts, specifically intensity and duration of severe storm events that can overwhelm both the sanitary and storm sewer systems. Infiltration and inflow can overflow a wastewater treatment plant during extreme events.

1.3 AUTHORIZATION

The Haines Borough authorized Joiner Engineering LLC to prepare the *2023 HSMP*. Plan preparation was authorized by a contract between these two entities.

Planning Commission work meetings were held on April 13, 2023, May 11, 2023 and June 8, 2023. The Haines Borough Manager, Mayor and the public had the opportunity to participate in relevant discussions at these meetings. The improvements and expansions to the SSS recommended in the *HSMP* reflect consensus and direction by the Haines Borough Planning Commission. The final *HSMP* will be presented to the Haines Borough Assembly.

1.4 PLANNING PERIOD

A 20-year planning period is used for estimating future wastewater treatment and collection needs. Future per capita wastewater flows were predicted based on historical flow measurements taken by Haines Borough DPW Staff.

1.5 LIMITATIONS

The intent of this plan is to provide guidance to the Haines Borough and involved public agencies in the development of future sewer improvements and management of a sustainable utility infrastructure. The *2023 HSMP* cannot anticipate future changes to laws and regulations, and it cannot anticipate unforeseen changes to the Townsite's population and/or land uses. The Borough should periodically review this plan relative to important changes to state and federal laws, and significant changes in the community's infrastructure and growth patterns.

1.6 NEED FOR IMPROVMENTS

Without the improvements proposed in this plan, the basic sanitation needs of Haines could be compromised and the ability to provide sewer service to parts of the town unserved would be limited. Capacity problems will increase as the current infrastructure ages and the population base increases. The sewer improvements will ensure the safe disposal and treatment of sanitary waste. With the implementation of the proposed sanitation improvements, potential community health problems can be prevented, appreciably reduced or eliminated.

Figure 1.1: Controls for One-Mile Lift Station with Utility Supervisor

1.7 IMPROVEMENTS RECAP

The following list summarizes major sewer system studies and improvements completed within the Haines Townsite:

- 1950: Townsite Sewer Installed by Corp of Engineers (Combined Sanitary-Storm System)
- 1974: Wastewater Treatment Plant Constructed
- 1976: First Infiltration and Inflow Study Completed by Engineering Man Power System
- 1976: Sewer Line Replacements: Lynnvue Drive; Fourth Avenue; Port Chilkoot Area; View, Union, Dalton and Main Streets
- 1976: Manhole Lid Improvements
- 1976: Manhole Replacements: First Avenue, View Street
- 1976: Combined Sewer System Separated
- 1982: URS Wastewater System Analysis
- 1985: First Sewer Master Plan by Engineering Man Power Services
- 1985: Bypasses Constructed: Beach Road to Portage Bay, WWTP Influent to Effluent
- 1985: Alaska Legislature Emergency Appropriation; ADEC Investigation/Compliance Order
- 1986: AEI Sanitary Sewer System Report, Repair & Rehabilitation
- 1991: Operators Start Detailed Wastewater Records
- 1991: EPA 301(h) Waiver Granted Approved for WWTP Bypass after Treating150,000 GPD
- 1991: Montgomery Consulting Engineers Preliminary Engineering Report: Haines Treatment Plant and Outfall Modifications
- 1993: WWTP Improvements
- 2001: Federal *Section 301(h)* Waiver Granted from Secondary Treatment
- 2006: Federal *Section 301(h)* Waiver Expired
- 2010: WWTP Engineering Study by CDI
- 2010: Chilkoot Drive Lift Station Constructed
- 2014: Acquired Crystal Cathedral Sewer System
- 2016: WWTP Upgrades
- 2018: Fair Drive Sewer
- 2019: Alaska Rural Water Association Staff Site Visit to Assist with I/I
- 2019: Small Boat Harbor Lift Station Constructed
- 2021: Belt Filter Sludge Press Reconditioned
- 2021: Lift Station Pumps Replaced in WWTP after December 2020 Storm
- 2022: Skyline Lift Station Upgrade
- 2022: RV Dump Station Installed Adjacent to WWTP
- 2023: Federal *Section 301(h)* Permit Waiver under Review

2.0 PROJECT PLANNING AREA

The Townsite encompasses the boundaries of the area for this project. The area includes locations currently served by the Haines Sanitary Sewer System as well as adjoining subdivisions within the Townsite served with on-site wastewater and haul systems with holding tanks. Septage from other areas of the Borough is delivered via septage haul truck and treated at the Wastewater Treatment Plant. The Townsite consists of 20.4 square miles or approximately 13,069 acres. Refer to the following sheets in ***Appendix A***:

- ***Sheet A-1: Location of Haines Sewer System***
- ***Sheet A-2: Proposed Sanitary Sewer Improvements***
- ***Sheet A-3: Townsite & Zoning Designations***
- ***Sheet A-4: Sanitary Sewershed Zones***
- ***Sheet A-5: Storm Water Sewer System***

2.1 HISTORY

The Haines area was originally settled by Native Alaskans of the Tlingit culture who traveled along the Northwest coast as glaciers receded or ventured down mountain valleys from the Interior. This area was valued for its mild climate and abundant food. The original Native name for Haines was *Deishu*, meaning the *beginning* or the *end of the trail*. Local archeological evidence shows fish traps in the Chilkoot River 2,100 years ago and remnants of houses at the Chilkoot Village site dating back over 800 years.

The community of Haines was named for Mrs. F. E. Haines, secretary of the Presbyterian National Committee of Home Missions. This organization raised funds for a new mission school, that opened in the 1880s, to educate local Native children at Deishu Village. A post office soon followed as the community grew around the school. The location made the emerging community an important outlet for the Porcupine Mining District. Haines also marked the beginning of the Dalton Trail, which crossed the Chilkat Mountain Pass to the Yukon during the Klondike Gold Rush of 1896-99.

Construction south of Haines began in the early 1900s and included the first permanent US military installation in Alaska, Fort Seward. Four canneries were also constructed in the area by the turn of the 20th century. The last of these canneries closed in 1972. The Haines Highway, built in 1943, opened up additional transportation options.

2.2 LOCATION

The Haines Borough encompasses approximately 2,350 square miles of land, or almost 1.5 million acres, and another 382 square miles of water are within its border. It stretches nearly 120 miles long and is 80 miles at its widest point. The region is typified by snow-capped

mountains, some over 6,000 feet, glaciated and forested valleys, and numerous salmon-rich streams and rivers descending to salt water fjords.

Chart 2.1: Haines Daily Precipitation & Temperature Data (NOAA, Fourth & Union Weather Station), 2020 – 2021

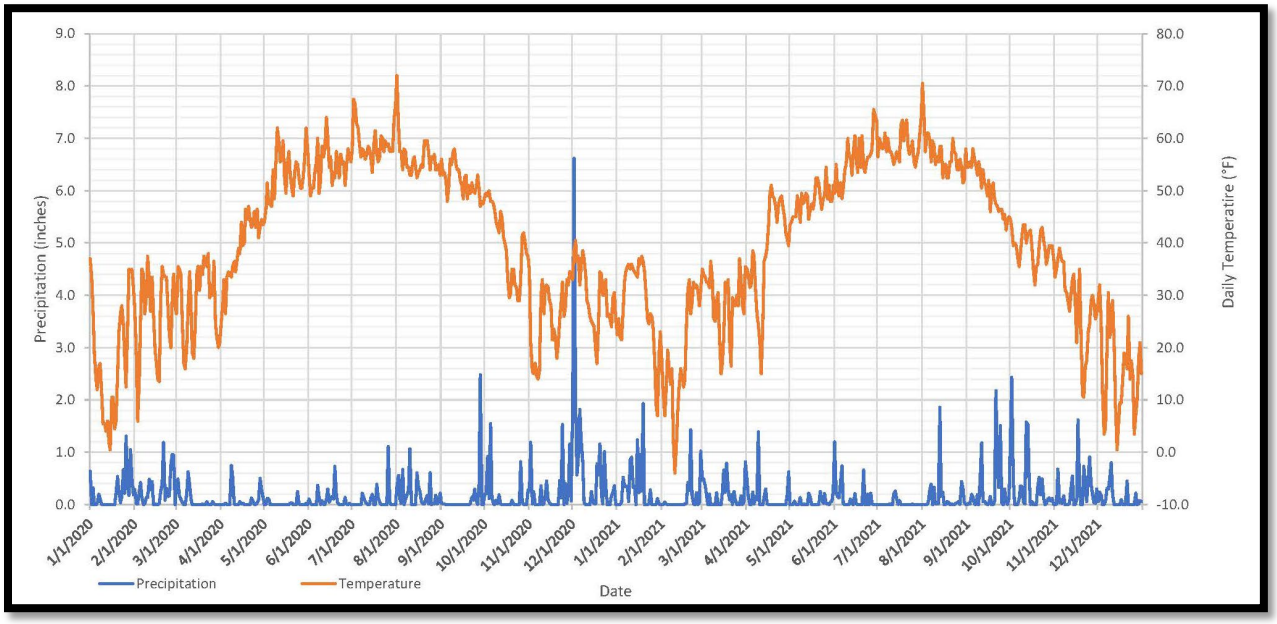


Chart 2.2: Haines Annual Precipitation Data (NOAA, Fourth & Union Weather Station), 2000 – 2022

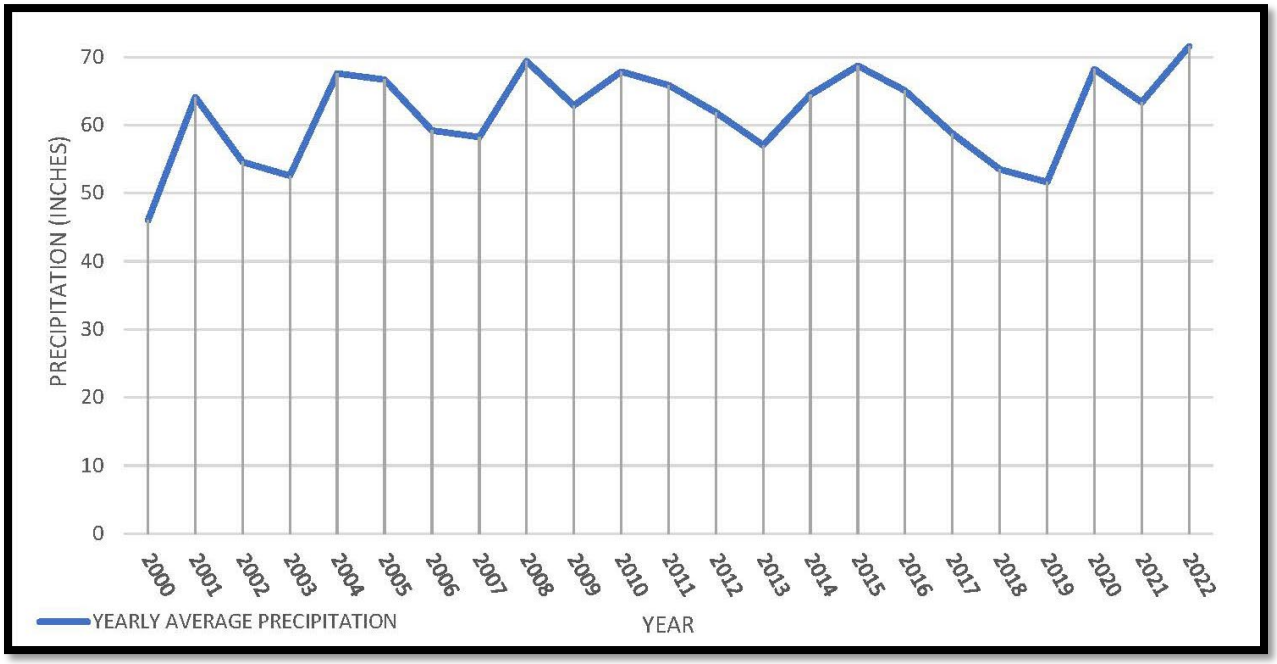
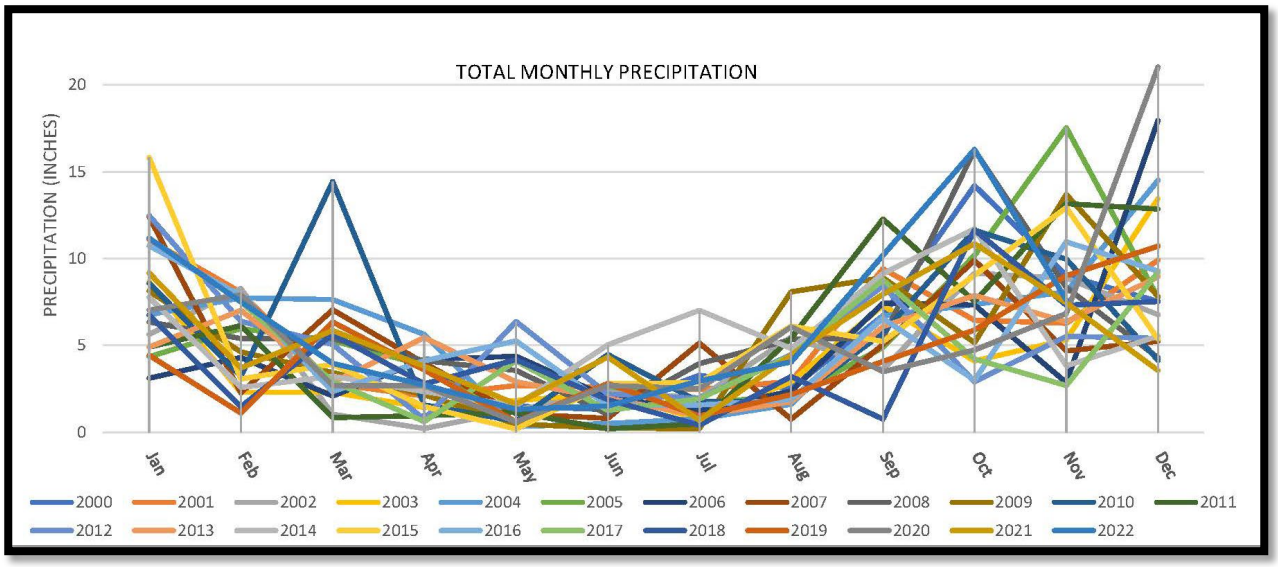


Chart 2.3: Haines Average Monthly Precipitation Data (NOAA, Fourth & Union Weather Station), 2000 – 2022



SNAP

Scenarios Network for Alaska & Arctic Planning

The University of Alaska – Fairbanks SNAP tool uses Representative Concentration Pathways (RCPs) to display climate scenarios for over 3,800 northern communities in Alaska and Canada. RCPs represent possible future climate scenarios to the year 2100 and provide a basis for comparison. The three RCP scenarios include:

- **RCP 4.5 – Low Scenario: Assumes new technologies and socioeconomic strategies cause emissions to peak in 2-4- and radiative forcing to stabilize after 2100.**
- **RCP 6.0 – Medium Scenario: Assumes emissions peak in 2080 and radiative forcing stabilizes after 2100.**
- **RCP 8.8 – High Scenario: Emissions increase through the 21st century.**

2.3 CLIMATE

The Haines Borough climate is dominated by maritime influences. The area is characteristically drier than most of Southeast Alaska throughout the year because of its distance from the exposed coast, more northerly latitude, proximity to Interior regions, and local mountains. ***Chart 2.1*** provides a precipitation and temperature summary for the Haines Townsite. ***Chart 2.2*** and ***Chart 2.3*** show specifics of the annual precipitation for 23 years, from 2000 through 2022. (Data for these charts were recorded at the NOAA, Fourth & Union Weather Station in Haines, Alaska.)

SNAP Community Climate Charts, based on three future scenarios, indicate the Haines area will likely become warmer and wetter. ***Chart 2.4*** and ***Chart 2.5*** show Representative Concentration Pathways (RCPs) for the Haines / Deishu area for precipitation and temperature, respectively, describing paths to future climates based on greenhouse gas concentrations. For more information see: Climate Tools — SNAP (uaf-snap.org)

Chart 2.4: Future Climate Scenarios: Average Monthly Precipitation for Haines (Deishu), Alaska

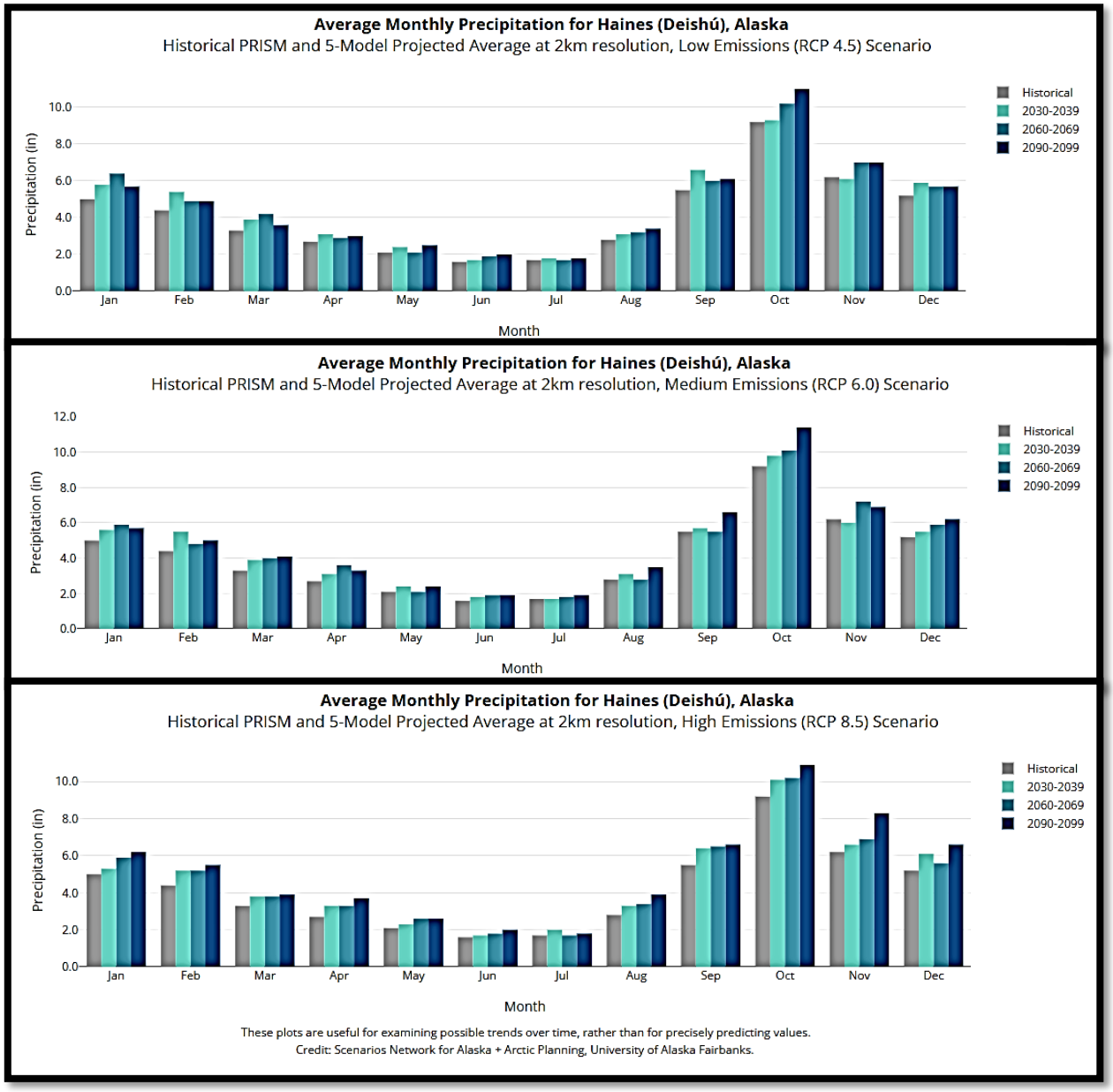
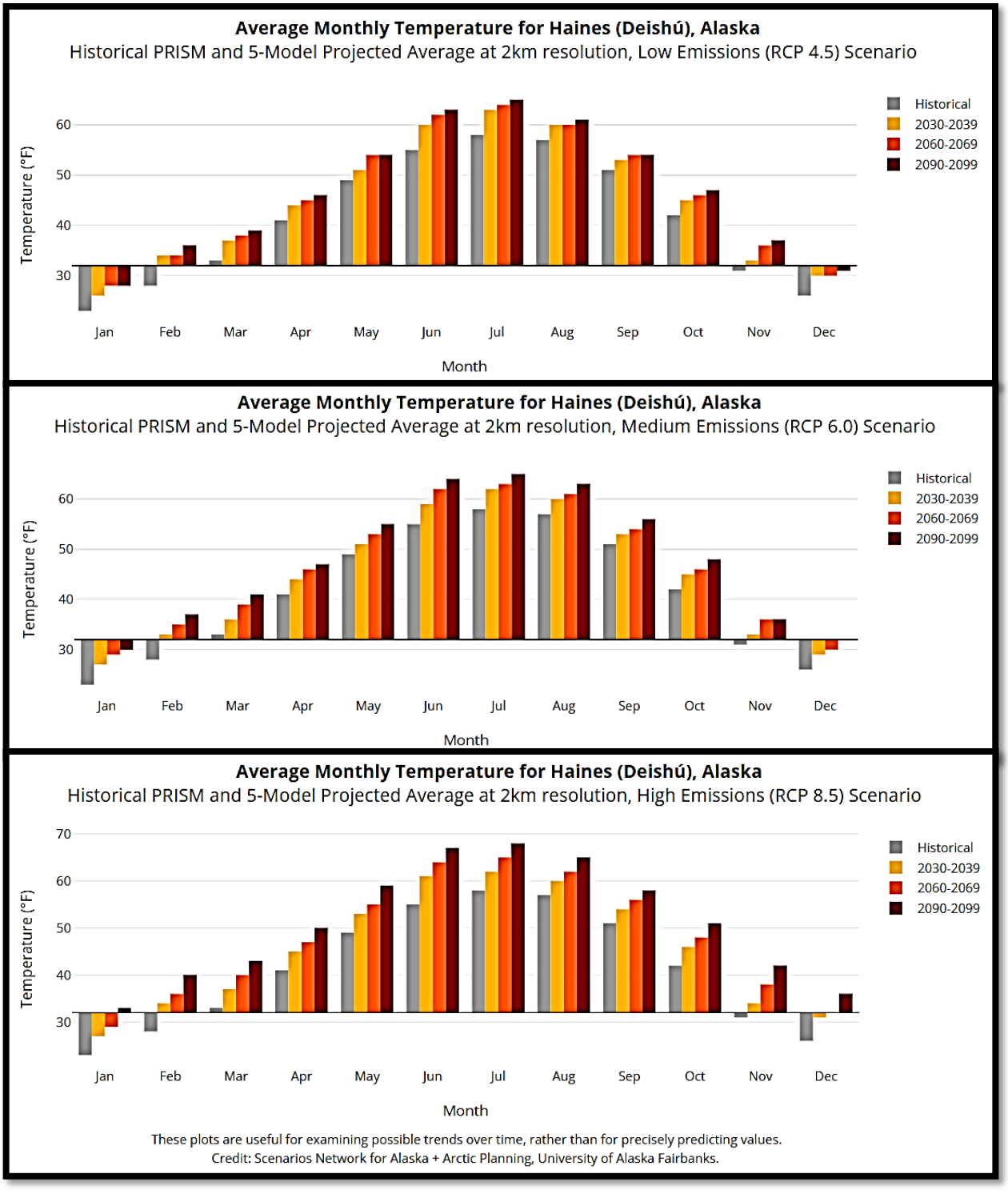


Chart 2.5: Future Climate Scenarios: Average Monthly Temperatures for Haines (Deishu), Alaska



2.4 TOPOGRAPHY

The Haines Townsite is bounded by the Takshunuk Mountains to the north, the Chilkat Peninsula to the south, Lynn Canal to the east and the Chilkoot River to the west. Elevations range from sea level to Mount Ripinski, at the southern terminus of the Takshunuk Mountains, reaching 3,612 feet. Steep, rocky slopes are common in the area, and the adjacent fjord, named Lynn Canal, hits depths of over 2,000 feet. Lynn Canal is the deepest fjord in North America, and one of the deepest and longest in the world. The northern end of the Alexander Archipelago, a group of 1,100 islands lying off the coast of southeastern Alaska, extends to the Haines Borough with Eldred Rock, Sullivan Island and others.

2.5 GEOLOGY & SOIL CONDITIONS

The geologic processes that formed the Haines area are recorded in the landforms, fossils, debris and plant life. Faulting and folding of the earth's crust began forming the rugged and relatively young mountains of the area, and the Alexander terrain that predominates in Southeast Alaska emerged.

Glaciations had a major effect on the shape of land in the Haines area. At least eight major glacial cycles have occurred, carving out valleys, grinding down rock and depositing moraines and layers of glacial till. A warming of the climate caused a general retreat of late Pleistocene ice that ended approximately six to seven thousand years ago. At that time Alaska's glaciers were reduced to near their current size. Post-glacial rebound, the uplift of terrain after the weight of glaciation is removed, causes measurable elevation increases, especially along shorelines, mud flats and riverine basins. The rate of isostatic rebound has been constant in the last two centuries with recordings as high as 1.6 inches per year in the region and 0.9 inches in the Townsite area.

The Chilkat Peninsula forms an important geological boundary in Lynn Canal. It is composed of Mesozoic greenstones, volcanic sandstones, mudstone, chert, and limestone that closely resemble the rocks of the Gravina belt. These Gravina belt type rocks lie on top of much older, lower to middle Paleozoic carbonates of the Alexander terrain.

Near the delta of the Tsirku and Chilkat Rivers, 750 feet of river sands and gravel fill this deep glacially scoured valley. Along the Chilkat River Valley, Mesozoic Gravina-like rocks, and Alexander terrain rocks are separated by the Chatham Strait fault, tracing from Berner's Bay north of Juneau, along Lynn Canal and northwestward through the Chilkat River Valley. On the Chatham Strait fault, fjord-filling sediments indicate no slippage has occurred. Some gravel areas are underlaid by blue clay and surface bedrock is common.

Area soils are rich from years of river deposition loaded by nutrients that abundant salmon and eagles create in this temperate rainforest. Areas of best agricultural potential are located on stream terraces. Small vegetable gardens have been successful in the Haines Borough for decades, and a number of farms produce commercial sales.

2.6 GEOHAZARDS

The three geophysical hazards most common in Southeast Alaska are earthquakes, flooding (coastal and stream), and mass wasting (rock and/or mud slides). Due to the physical location of Haines, the community is relatively free of flooding and avalanche danger, although local drainage characteristics and construction activity on the slopes beyond the Townsite area have caused runoff and ground slumping problems.

Landslides occur frequently in Haines on or adjacent to steep slopes. Unconsolidated soils, talus deposits and overburden, and overlay bedrock or impermeable soils are contributing factors. Avalanches also occur on these slopes. Most are small, and occur away from developed and inhabited areas. Landslides and mixed mud and snow debris avalanches occur during or after periods of extreme precipitation.

The past twelve years brought two memorable landslides in the Haines area. In January, 2011 a ground slump above Lutak Road and Oceanview Drive fractured and moved toward Portage Cove, displacing the road and ground. The Haines Borough Assembly declared a state of emergency.

In December 2020, an atmospheric river impacted the Haines area with a catastrophic landslide on Beach Road. The extreme weather event brought above-freezing temperatures and delivered record-breaking rainfall. The existing snowpack melted, increasing the runoff volume and resulted in flooding and landslides washing out roads, damaging utilities and impacting homes. Dozens of landslides occurred during or after the two days of intense precipitation. The Beach Road Landslide, which demolished two houses and resulted in the loss of two residents in these structures, occurred in an area considered safe by community planners. This destruction swath was 600 feet wide and resulted in 1-to-16 feet of landslide debris covering the area. The Haines Borough Assembly declared a state of emergency, followed by the State of Alaska. This event overloaded the Townsite's Wastewater Treatment Plant and Storm Water Sewer System, resulting in localized flooding in low-lying areas and damage to various roads, such as Young Road which turned into a drainage conduit.

The Haines area is in a seismically active region in Alaska, part of the highly active Circum-Pacific Seismic Belt where earthquakes of magnitude 8 and greater on the Richter scale have occurred. In historic times, five earthquakes of this intensity have occurred in Southeast Alaska near the tectonically-active Queen Charlotte-Fairweather fault system and the Chugach-Saint Elias fault.

The United States Army Corps of Engineers (USACE) designates the Haines area in Seismic Zone 3, where the largest expected earthquakes could have magnitudes greater than 6.0 on the Richter scale with major damage to human-made structures. The strongest ground vibration as a result of an earthquake is expected to occur on filled areas, such as the Haines Airport, the Alaska Department of Transportation and Public Facilities (ADOT&PF) Shop, the Alaska Marine Highway System (AMHS) Ferry Terminal area and the Lutak Dry Cargo Dock area, also known as the Lutak Industrial Dock. (Only the ADOT&PF Shop is located in the Haines Townsite.) Settlement of the ground surface due to shaking could cause damage to buried and above-ground utilities, road beds, buildings, and other facilities with foundations on filled land.

A distant, intense earthquake from the Queen Charlotte-Fairweather fault could cause damage to the Haines area. Local subsidiary faults to the Chatham Strait fault are the Chilkat River, Chilkoot and Takhin faults, as well as faults in the Townsite saddle area. For the most part, these faults are concealed by water or valley floor deposits, and their exact location can only be estimated.

In 1987 an earthquake registering 5.3 on the Richter scale epi-centered near Haines. Seismic records indicate that over 100 significant earthquakes have been recorded in the Haines area since 1899. Earthquakes of moderate size, between 6.0 and 7.0 on the Richter scale, can be expected to occur on the order of once or twice per century.

Flood hazard areas exist throughout the flood plains of all riverine systems. Sudden changes in main channel alignment and course are common, as has recently occurred at Klukwan and the Tsirku River Fan. Sloughs, riverine islands, river deltas and tributary channels are all subject to sudden flood immersion and scouring, with a resultant uncertainty as to the permanence of existing lowland physical features.

Flood hazard areas and other geophysical hazard areas in the Townsite are identified in the *1989 Flood Plain and Flood Hazards Map*. Development in hazard areas is considered by the Haines Borough Planning Commission and the Haines Borough Assembly. It is estimated for emergency preparedness purposes, that a 1,000-year cycle of seiches, sea waves caused by ground movement or landslides, could have impacts up to 100 feet elevation above Mean Lower Low water (MLLW) shoreward. Effects at a higher elevation are possible. The *Flood Hazard Map*, located in ***Appendix C***, was developed over three decades ago and needs updating.

Major tsunami effects from earthquakes near or outside the region are less likely. The energy of distant tsunami shock waves tends to dissipate before they reach Haines due to the community's location 100 miles up Lynn Canal as well as the shelter provided by the Chilkat Islands and Peninsula. See ***Appendix C*** for 2018 *Tsunami Impact Maps* created by researchers at the Alaska Earthquake Center, Geophysical Institute, University of Alaska – Fairbanks (UAF).

2.7 WATER RESOURCES

The wastewater collected in the Townsite area served by the sanitary sewer system stems from three main water sources as well as infiltration and inflow from precipitation events. ***Chart 2.4: Haines 2021 Precipitation & Sewer Effluent Flow Data*** illustrates the impact on the sewer system from infiltrating precipitation.

There are three available sources of water: springs, surface and groundwater wells. The only surface water source for the Haines Townsite is Lily Lake on the Chilkat Peninsula, at an elevation of 663 feet. There are no other major surface water sources in the near vicinity of Haines that can be used as a significant source of drinking water. While the Chilkat River has significant volume, rock flour and salt water intrusion would require significant capital costs for the construction of an appropriate water treatment plant. Historically, the US Army ran a wood-stave pipeline from Pyramid Harbor to Fort Seward, tapping into a surface water source on the west side of the Chilkat River.

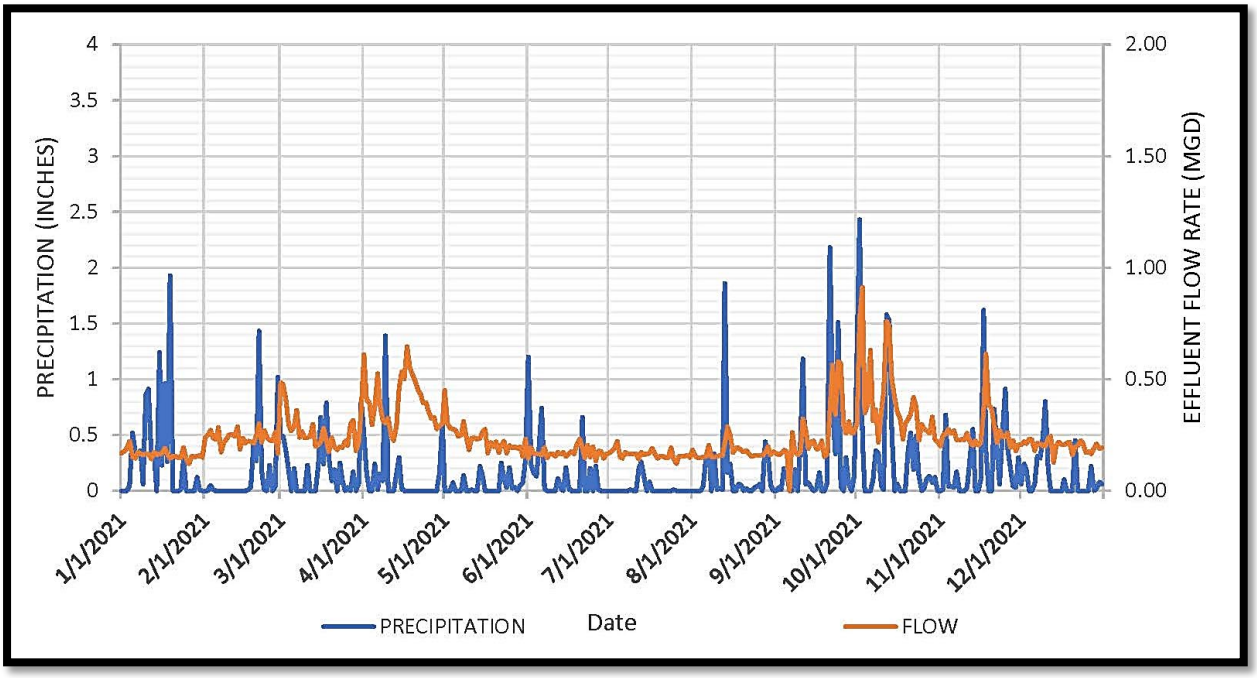
The AMHS Ferry Terminal uses a surface water source from a small, dammed reservoir on an unnamed stream west of the Haines Ferry Terminal. This surface water source is filtered and disinfected for usage as potable water for staff and travelers.

Current groundwater sources in the Crystal Cathedral Well Field aquifer meet ADEC minimum standards yet the public prefers consuming less mineralized water. A nearby artesian well, located at 1 Mile Haines Highway and referred to as Sloan's well in the Department of Natural Resources (ADNR) Well Log Tracking System (WELTS) database under the Crystal Cathedral Wells, could be a future groundwater source if it was economically and technologically viable.

The current spring source consists of three springs – the Main Spring, Meyers Tunnel and the Lower Spring. Collectively, these are referred to as the Piedad Springs. Other springs on the same mountainside, Mount Ripinski, are known, and more may be viable, additional sources. There are additional springs in the area below Lily Lake, south of the Townsite on Mud Bay Road. One of these springs, the Mud Bay Spring, is an untreated, unregulated community water source popular with local residents. (See the *2023 Haines Water Master Plan* for additional information.)

The Haines PWS currently uses Lily Lake and the Piedad Springs as the primary water sources. The Crystal Cathedral Wells function as a backup source.

Chart 2.6: Haines Precipitation & Sewer Effluent Flow Data (NOAA, Fourth & Union Weather Station; Haines Borough, Public Facilities), 2021



2.8 ENDANGERED SPECIES & CRITICIAL HABITAT

The purpose of the federal Endangered Species Act (ESA) is to conserve threatened and endangered species and their ecosystems. A species is considered **endangered i**f it is in danger of extinction throughout all or a significant portion of its range. Species shown in bold are found in the Haines area.

Endangered species in Alaska include: Aleutian Shield Fern, Blue Whale, Bowhead Whale, Cook Inlet Beluga Whale, Eskimo Curlew, Fin Whale, **Humpback Whale** (Western North Pacific DPS), Leatherback Sea Turtle, North Pacific Right Whale, Sei Whale, Short-tailed Albatross, Sperm Whale, **Stellar Sea Lion** (Source: ADF&G, 2022)

Threatened species encompass: Green Sea Turtle, Loggerhead Sea Turtle, Northern Sea Otter (SW AK DPS), Olive Ridley Sea Turtle, Polar Bear, Spectacled Eider, Steller's Eider, Wood Bison.

Alaska **species under review** for consideration include: **Alexander Archipelago Wolf**, Pacific Walrus, **Kittlitz's Murrelet**, Pinto Abalone, **Lynn Canal Herring.**

Stellar Sea Lion **critical habitat** (haul out) is located in the Haines vicinity. The Chilkoot River, the Chilkat River and some of its tributaries are considered anadromous fish streams.

2.9 HISTORICAL & ARCHAEOLOGICAL SITE CONDITIONS

All future sewer projects will be coordinated with the Alaska Office of History and Archaeology in order to identify any potential impacts to historical and/or archeological sites. The State Historic Preservation Office (SHPO) must give an archaeological clearance for any state or federally funded project, which usually occurs when a project is proceeding into final design and permitting. SHPO reviews projects under *Section 106 of the National Historic Preservation Act (36 CFR 800)* and the *Alaska Historic Preservation Act (AS 41.35.070).* *Section 106* requires Federal agencies to take into account the effects of proposed activities on historic properties. The Alaska Historic Preservation Act requires a review of State public construction projects to determine if historic, prehistoric, or archaeological sites may be adversely affected.

3.0 SOCIOECONOMIC

Since the Native mission school was established in the 1880s, the Haines population and economy has continued to grow.

3.1 POPULATION PROJECTIONS

The number of Townsite households served with the Haines SSS appears to be expanding. However, federal census data and population projections from the Alaska Department of Labor and Workforce Development (ADOLWD) indicate the Haines Townsite population is decreasing, and this trend will continue. The federal census counts year-round residents only.

The annual growth rate per decade for the past 80 years based on census data varies from minus 4 percent to plus 4 percent. (See ***Table 3.1: Haines Townsite Population & Growth Rates***.) ***Table 3.2: Haines CDP Estimated Population Projections*** presents a summary of ADOLWD estimates for the Haines Townsite from 2025 through 2050.

For the purposes of this plan, an annual population growth rate of 2 percent is assumed for 2023 to 2032, and from 2033 to 2042. Growth appears to be tied to new, part-time residents. The increase in the annual number of residential utility hookups is at least a decade-long trend. According to the *2020 US Census,* a Townsite household constitutes 2.2 people (1,657 residents in 759 occupied dwellings of 921 total). (See ***Table 3.3: Haines Townsite Dwelling Units, Occupancy & Growth Rates***.) The State Demographer stated that the *2020 Census* appears to have undercounted residencies, suggesting the 2021 and 2022 State of Alaska estimates are a better assessment of the actual situation. (Sandberg, 2022)

The *2025 Haines Comprehensive Plan*, focusing on 2012 to 2030, projects a high-average annual growth rate and a low-average annual growth rate for the Haines Borough of 0.85 percent and 0.47 percent respectively. This projection estimates that, by 2030, the Haines Borough will have gained an additional 248 to 463 people and need an additional 92-210 dwelling units. (Sheinberg Associates, 2012)

The population figure used for the WWTP capacity analysis in ***Section 5***, 1,570 Townsite residents, is derived from the number of sewer connections, 554 in 2022, coupled with 2.2 people per household from the *2020 Census*. (More structures are connected to the Townsite PWS than the SSS.) An additional 350 non-transient residents is added for summer residents, a number derived from the *2022 Haines PWS Sanitary Survey*. (Joiner Engineering, 2022)

The Haines population is expected to remain stable with continued, steady growth of part-time residents. Growth is expected to occur throughout the Townsite. More construction is expected to occur in planned and newer subdivisions. The Haines Borough Planner indicates areas of expansion may include:

- Hilltop – 64 lots
- LynnVista Estates – 10 lots
- Well Field Road – 6 lots

- North Sawmill Road – 13 lots
- Bear Trail Lane / Small Tracts Spur – 18 lots
- Small Tracts Road – 79 lots
- Mount Riley Road – 13 lots
- Mount Riley Subdivision – 60 to 70 lots

The majority of future growth will be single and multi-family homes, with the accompanying commercial, light industrial and public facilities.

3.2 ECONOMY / FINANCIAL PROFILE

Haines' economy is based primarily on government, tourism, construction, mining timber and fishing. Every summer numerous seasonal workers arrive to work in the Borough, including the Townsite. Seasonal residents also return for summer weather and activities. The *2025 Haines Comprehensive Plan*, currently under revision, addresses the future development of the local economy including mine exploration. Tourist-related industries also include a brewery, a distillery and a meadery.

Table 3.1: Haines Townsite Population & Growth Rates, 1940 – 2020

YEAR	POPULATION			PERIOD	ANNUAL GROWTH RATE
1940	Haines Townsite Chilkoot Barracks	357 337	694	1941-1950	-4.0%
1950	Haines Townsite Port Chilkoot Village	338 125	463	1951-1960	1.0%
1960	Haines Townsite Port Chilkoot Village	392 120	512	1961- 1970	2.6%
1970	Haines City Port Chilkoot	463 220	663	1971-1980	4.1%
1980	Haines City (Port Chilkoot merged)	993		1981-1990	2.2%
1990	Haines City	1,238		1991-2000	3.9%
2000	Haines City	1,811		2001-2010	-0.6%
2010	Haines CDP	1,713		2010-2020	-0.3%
2020	Haines CDP	1,657			
Average Growth Rate: 1941 - 2020					1.1%
Average Growth Rate: 1980 - 2020					1.3%
Average Growth Rate: 2000 - 2020					-0.4%
Maximum Growth Rate Per Decade: 1941 - 2020					4.1%
Assumed Annual Growth: 2023 - 2032					2%
Assumed Annual Growth: 2033 - 2042					2%

Table 3.2: Haines CDP Estimated Population Projections, 2025 - 2050

YEAR	ESTIMATED POPULATION	ANNUAL GROWTH RATE
2025	2,613	-0.2%
2030	2,600	-0.5%
2035	2,575	-0.8%
2040	2,536	-1.1%
2045	2,483	-1.1%
2050	2,427	

Table 3.3: Haines Townsite Dwelling Units, Occupancy & Growth Rates, 1980 to 2020

YEAR	POPULATION	DWELLING UNITS	ANNUAL GROWTH RATE	OCCUPANCY
1980	993	399	2.2%	84%
1990	1,238	527	3.3%	90%
2000	1,713	895	0.6%	84%
2010	1,811	902	-0.9%	87%
2020	1,657	921		82%

3.3 TRANSPORTATION

Haines can be reach by sea, air and ground transportation. The Haines Airport, operated and maintained by the Alaska Department of Transportation and Public Facilities (ADOT&PF), is located north of the Townsite Area and consists of a 4,000-ft by 100-ft asphalt runway. Regular flights are available from Juneau. Haines is on the Alaska Marine Highway System (AMHS), with a Ferry Terminal located at Mile 3 Lutak Road, and can be reached via the Haines Highway from Haines Junction in the Yukon Territory. Government port and harbor facilities include:

- the Lutak Industrial Dock;
- two boat harbors (the Small Boat Harbor and a seasonal one at Letnikof Cove);
- the Port Chilkoot Dock used by cruise ships, day ferries and other vessels;
- a seaplane base at Portage Cove;
- the Alaska Marine Highway System ferry terminal, northeast of the community.

Other privately-owned facilities in and near the Townsite include the Chilkoot Lumber dock (north of Lutak Dock), and the Chilkat Cruises dock in Portage Cove.

3.4 LAND USE

Lands impacted by the recommendations in this *2023 Haines Sewer Master Plan* are primarily owned or controlled by the Haines Borough, the State of Alaska or public agencies. In some instances, future easements through private or public-owned property will be required for the recommended improvements.

When the former City of Haines and the Haines Borough incorporated neither was eligible to select much land as part of its municipal entitlement compared to other parts of the State because there is little State land in Southeast Alaska. In 2010, the State Legislature helped remedy this when *House Bill 273* passed transferring an additional 3,167 acres to Haines.

The developed land in Haines is classified as being used for commercial, industrial, or residential purposes. Industrial facilities include fish processing, marine support, construction, shipping, timber processing and small-scale alcohol beverage production. The Haines Borough Planning Department developed a zoning map, which is included in ***Appendix A.***

The Townsite is compact, with residential neighborhoods surrounding the commercial center. About 64 percent of Borough residents live in this area. Land in town is primarily privately owned. The Borough owns parcels where public facilities have been constructed, such as the wastewater treatment plant, as well as some undeveloped land.

The parts of town with water and sewer lines are developed with relatively dense residential, commercial or mixed use buildings. From the early town core, residential neighborhoods have followed road and subdivision development to the north off Young Road, Allen Road, Piedad Road, and to the south off Small Tracts and FAA Roads. The Small Tracts / FAA Road / Carrs Cove area was annexed into the former City of Haines in 1999. The majority of area residents south of Mount Riley Road provide their water and wastewater treatment systems.

3.5 COMMUNITY DEVELOPMENT PROJECTS

Future development is expected in the main part of the Haines Townsite, where much of the existing commercial development has already occurred. Future expansion for the sewer system is expected to derive from residential construction as well as extension into current subdivisions with on-site wastewater systems.

Road rehabilitation or construction projects currently planned with the Haines Townsite include:

- **Portage Cove Trail Development**: proximity to proposed water and sewer line extension on Front Street
- **FEMA Young Road Repairs – December 2020 Storm**: scheduled for completion summer 2023
- **New Subdivision Development**: Hilltop and LynnVista Estates

3.6 UTILITIES

The present sewer system is a sanitary sewer with both gravity and force mains. The Wastewater Treatment Plant (WWTP), has an average flow capacity of 0.23 million gallons per day.

Determining the number of residencies on the sewer system is an approximation. In 2022, the Haines Borough has 554 sewer connections. There are 1,277 residential and commercial buildings in the Townsite. (Durr, 2023) Thus, 42.6 percent of the Townsite buildings are connected to the Haines Sewer System. The remaining Townsite homeowners use on-site wastewater systems.

3.7 LOCAL GOVERNMENT

Haines currently functions as a Home Rule Borough. After statehood in 1959, the Alaska Legislature urged occupied areas of the state to become more organized. In 1968, the Haines Borough became the only third class borough in Alaska, and its only mandated power was taxation for education. The original boundaries encompassed approximately 2,200 square miles. In 1975, the Borough annexed an additional 420 square miles with the inclusion of the commercial fish processing facility at Excursion Inlet.

In 2002, citizens voted to consolidate the City of Haines and Haines Borough to form the Home Rule Haines Borough. A charter written by residents sets the basic municipal rules. The Haines Borough possesses all powers and privileges of a home rule borough under the laws of the State of Alaska and the Haines Borough Charter.

Figure 3.1: Inside Haines Wastewater Treatment Plant

Table 3.4: Haines Local Government Changes, 1956 – 2002

YEAR	LOCAL GOVERNMENT
1956	City of Port Chilkoot
1968	Third Class Haines Borough
1970	City of Haines
2002	Home Rule Haines Borough (Consolidation)

4.0 EXISTING WASTEWATER SYSTEM

Wastewater is used water. It includes substances such as human waste, food scraps, oils, soaps and chemicals. In homes, this includes water from sinks, showers, bathtubs, toilets, washing machines and dishwashers. Businesses and industries also contribute to a community's wastewater, as does storm water runoff through inflow and infiltration.

2022 HAINES SANITARY SEWER SYSTEM FACTS

- **Annual Effluent Volume: 109.2 Million Gallons**
- **Average Daily Wastewater Treatment Volume: 0.288 Million Gallons**
- **Number of Connections: 554 Customers**
- **Gallons per Capita-Day: 185 Gallons per Person**
- **Cost to Treat 1,000 Gallons of Wastewater: $4.86**
- **Gravity Sewer Main: 17.5 Miles**
- **Force Sewer Main: 1.4 Miles**
- **Number of Lift Stations: 7**
- **Number of Manholes: 267**

This plan addresses the Haines wastewater collection system and the Haines wastewater treatment system. Combined, these two systems, one involving transportation and the other treatment, comprise the Haines Sanitary Sewer System (SSS). The Storm Water Sewer System (SWSS) is a separate entity, excluded from the Townsite SSS. Although Haines initially had a combined sewer with both sanitary wastewater and storm water, these two entities were separated in the 1970s.

The current National Pollution Discharge Elimination System (NPDES) permit for sewage effluent was issued on November 20, 2001, became effective on December 24, 2001, and expired on December 26, 2006. This permit continues to be in effect. The City of Haines submitted a timely and complete NPDES application for permit issuance on July 13, 2006. Pursuant to *40 CFR 122.6*, the permit has been administratively continued and remains fully effective and enforceable. The permit currently has a *301(h)* waiver that includes a modification of secondary treatment requirements approved by EPA. This waiver is currently being revisited by EPA and ADEC. EPA released a proposed update to the 2001 permit in May 2023. The Haines Borough commented on this proposal (see ***Appendix B***).

The Haines Sanitary Sewer System serves approximately 554 customers (residents and businesses), a population of approximately 1,600 within the Townsite. In 2022, the annual effluent volume was 109.2 MG, with an average daily WWTP volume of 0.288 MG. Most of the effluent is domestic. Local industry is limited to a three small facilities: a brewery, a distillery and a meadery. The outfall discharges at Portage Cove in Chilkoot Inlet.

4.1 HISTORY

The current Haines Sewer System likely began with the Fort Seward sewerage built by the US Army in the early 1900s. Underground pipes for the Townsite area sewer system were first installed by the Corp of Engineers in the early 1950s, with the system collecting both sewage and storm water. Other than pipe type and size, asbestos-cement ranging from 6-inch to 10-inch, little more is known about this system. Sewer lines were placed on Fourth Avenue, Lynnvue Drive and multiple streets: View, Union, Dalton and Main Streets. A Beach Road interceptor with lateral lines was placed to serve these same streets east of Second Avenue. All lines drained to Portage Cove near the current location of the Beach Road Lift Station. Segments of the Townsite system, including those in the downtown area, are subject to high infiltration and inflow (I/I).

In the 1970s, major sewage system improvements were completed. Additional sewer mains were installed on various roads, specifically Mud Bay Road, One-Mile Haines Highway, Allen Road and North Beach Road. The interceptor line on Beach Road, constructed in 1951, was replaced as well. All pipe for these improvements was polyvinyl chloride (PVC).

The Haines Wastewater Treatment Plant was constructed in 1973-74.The startup of this facility revealed a need to separate storm water from sanitary wastewater. After the Townsite experienced high hydraulic flows in 1976, efforts were undertaken to resolve the I/I situation. The first infiltration-inflow study was completed in 1976 by Engineering Man Power Services (EMPS).

Another Haines sewer inflow and infiltration study was completed in 1985 by EMPS. In 1986, Arctic Engineers completed a sanitary sewer report regarding repair and rehabilitation. In 1991, James Montgomery Consulting Engineers completed a Preliminary Engineering Report for the City of Haines, *Haines Treatment Plant and Outfall Modifications*. See ***Appendix B*** for a summary of the various I/I studies completed in Haines between 1976 and 1986.

Detailed wastewater records have been kept by the WWTP Operators since 1991.

Table 4.1: Haines SSS: Wastewater Volume Estimates by Source, 2022

Source	PWS GPCD	SSS Population	Volume MG
Customer Connections	163 G	1,570	93.4
Septage Service Pump-Outs			0.1
Other (Infiltration & Inflow)			15.7
		TOTAL:	109.2

4.2 WASTEWATER SOURCES

Wastewater in Haines comes from six sources:

- Residents on the Townsite Public Water System (PWS)
- Townsite residents with private wells and rainwater catchment
- Borough residents on the road system with residential wastewater treatment systems (maintenance pump-outs) – see ***Figure 4.1***
- Holding tanks on the road system
- Government, commercial and industrial operations
- Infiltration and inflow from storm water and groundwater

The WWTP currently receives no landfill leachate for processing.

Table 4.1 estimates the 2022 annual wastewater volumes by source. The sewer customer connections volume was derived with the PWS gallons per capita-day (GPCD) rate determined in the 2023 *Haines Water Master Plan* and the estimated population using the Townsite Sanitary Sewer System as described in ***Section 3.1***. (Joiner Engineering, 2023) The GPCD from the Haines Public Water System is higher than typical due to leaks.

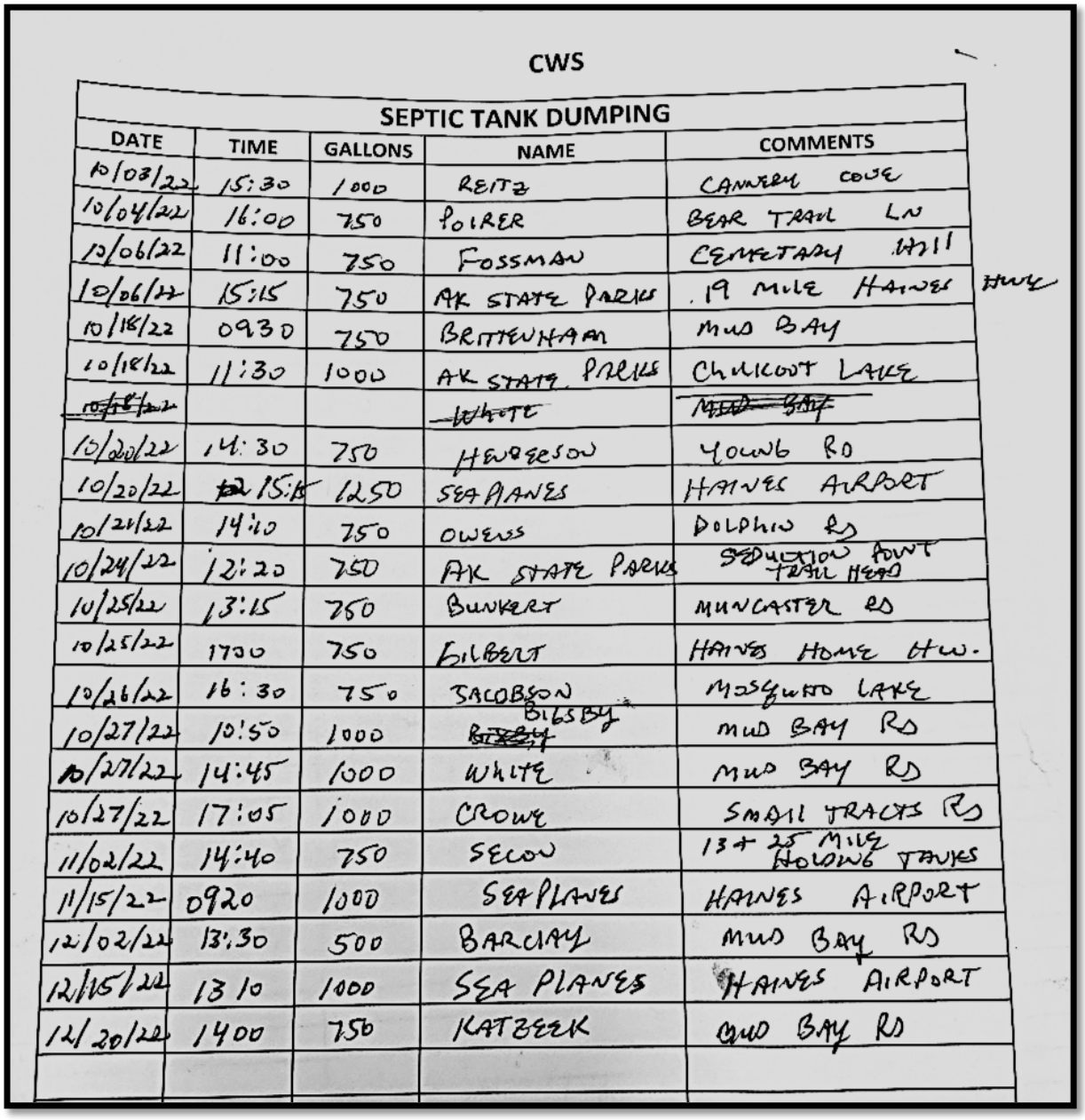
Table 4.2: Haines SSS: WWTP Daily Average & Annual Effluent Volumes, 2017 – 2022

Year	Average Daily Volume MGD	Annual Flow MG
2017	0.264	97.1
2018	0.252	91.6
2019	0.259	94.7
2020	0.295	107.6
2021	0.256	93.6
2022	0.295	109.2

Table 4.2 shows average daily and annual effluent flow volumes for six years. ***Chart 4.1*** shows the relationship between I/I and precipitation for 2022. ***Figure 4.2*** outlines the sewersheds for the Townsite SSS. Note that the Skyline Sewershed flows into the Beach Road Sewershed.

Industrial activity in the Townsite presently includes three small facilities: a brewery, a distillery and a meadery. Commercial operations include tours, food service (grocery stores, restaurants) and bars.

Figure 4.1: Community Waste Solutions Pumps Outs, 4th Quarter 2022



CWS

SEPTIC TANK DUMPING

DATE	TIME	GALLONS	NAME	COMMENTS
10/03/22	15:30	1000	REITZ	CANNERY COVE
10/04/22	16:00	750	POIRER	BEAR TRAIL LN
10/06/22	11:00	750	FOSSMAN	CEMETARY HILL
10/06/22	15:15	750	AK STATE PARKS	.19 MILE HAINES HWY
10/18/22	0930	750	BRITTENHAM	MUD BAY
10/18/22	11:30	1000	AK STATE PARKS	CHILKOOT LAKE
~~10/18/22~~			~~WHITE~~	~~MUD BAY~~
10/20/22	14:30	750	HENDERSON	YOUNG RD
10/20/22	~~12~~ 15:15	1250	SEA PLANES	HAINES AIRPORT
10/21/22	14:10	750	OWENS	DOLPHIN RD
10/24/22	12:20	750	AK STATE PARKS	SEDUCTION POINT TRAIL HEAD
10/25/22	13:15	750	BUNKERT	MUNCASTER RD
10/25/22	1700	750	GILBERT	HAINES HOMER HWY.
10/26/22	16:30	750	JACOBSON	MOSQUITO LAKE
10/27/22	10:50	1000	~~BIGSBY~~ BIGSBY	MUD BAY RD
~~10~~/27/22	14:45	1000	WHITE	MUD BAY RD
10/27/22	17:05	1000	CROWE	SMALL TRACTS RD
11/02/22	14:40	750	SECON	13+ 25 MILE HOLDING TANKS
11/15/22	0920	1000	SEA PLANES	HAINES AIRPORT
12/02/22	13:30	500	BARCLAY	MUD BAY RD
12/15/22	13 10	1000	SEA PLANES	HAINES AIRPORT
12/20/22	1400	750	KATZEEK	MUD BAY RD

Chart 4.1: Haines SSS: WWTP Daily Flows & Precipitation by Month, 2022 – 2020

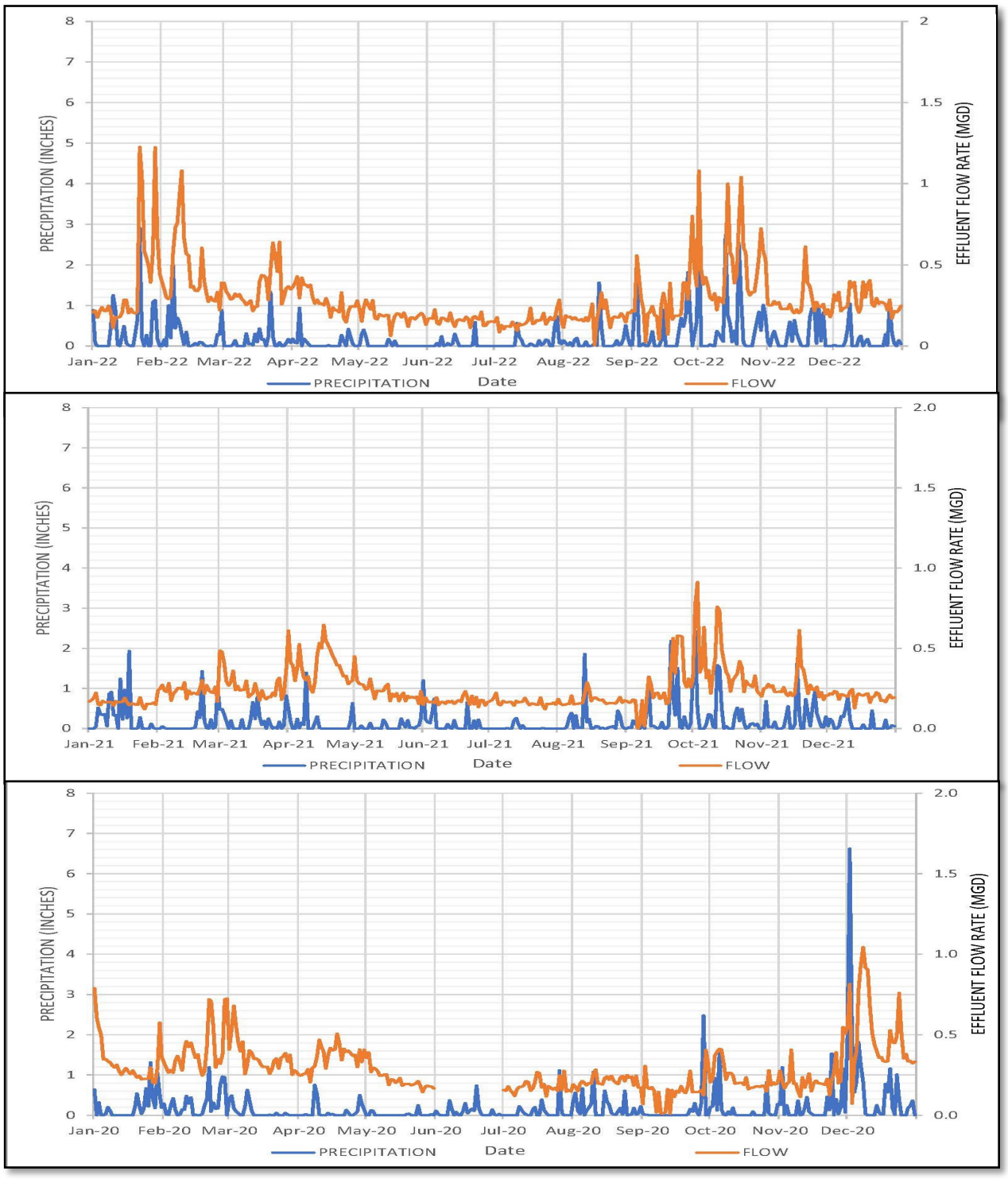
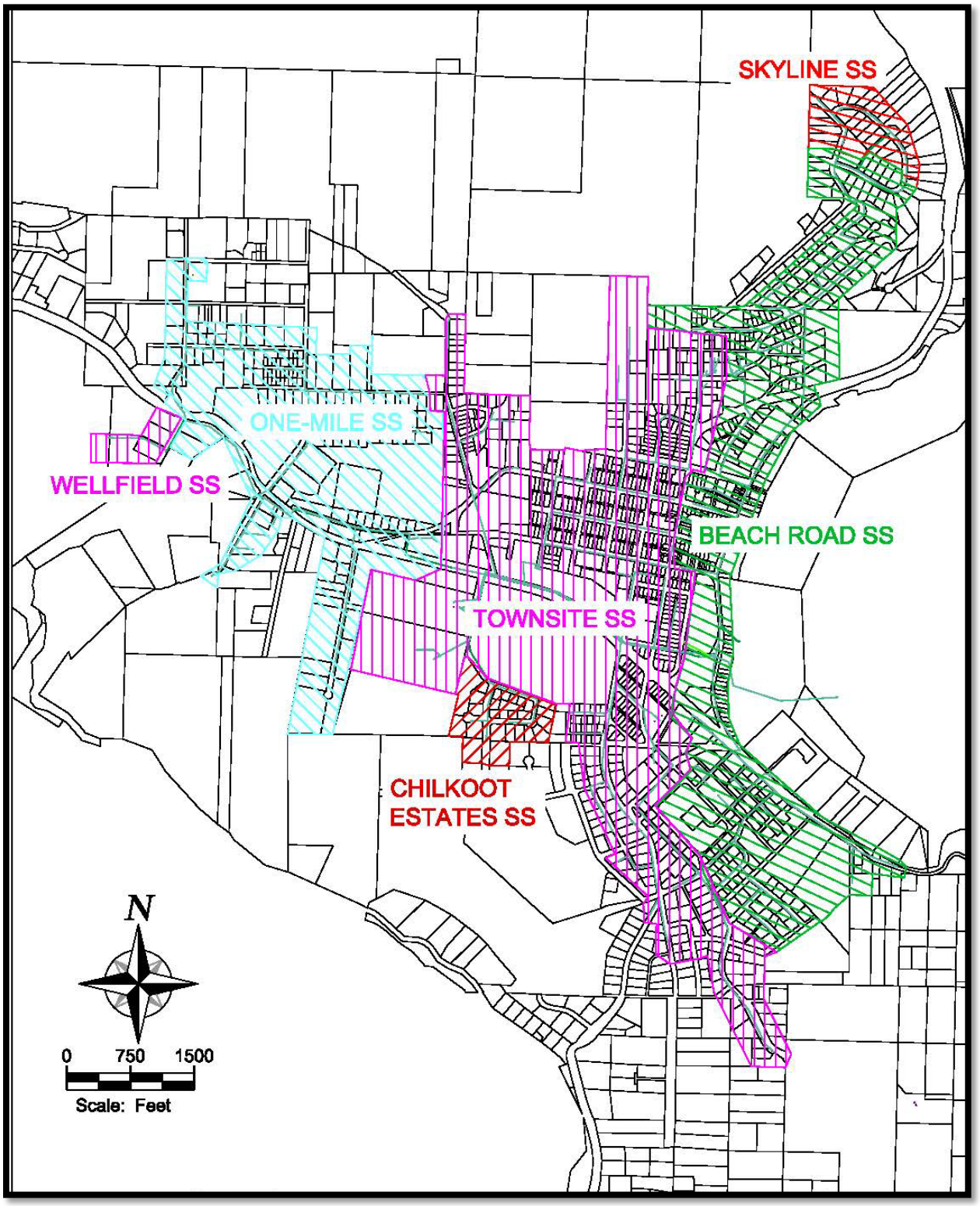


Figure 4.2: Map of Haines Sewersheds, 2023



4.3 WASTEWATER TREATMENT PLANT (WWTP)

The Haines Borough WWTP is located on Borough land on Fair Drive, off Haines Highway near the Southeast Alaska Fairgrounds. The plant provides primary treatment and has a National Pollutant Discharge Elimination System (NPDES) permit for the discharge of effluent to Portage Cove.

In 1991, the Haines Wastewater Treatment Plant was granted a waiver of the requirements for secondary treatment, or enhanced primary treatment, by the US Environmental Protection Agency (EPA) and the State of Alaska Department of Environmental Conservation (ADEC) under *Section 301(h)* of the *Clean Water Act*. This means that, instead of operating a secondary type wastewater treatment plant that uses biological processes to treat municipal wastewater, Haines was authorized to operate a primary wastewater treatment plant that uses a gravity-settling chamber (clarifier) for removal of solids (total suspended solids or TSS) and organic matter (biochemical oxygen demand or BOD_5). Montgomery Engineers prepared a 1991 report discussing WWTP and outfall modifications to comply with this change. (Montgomery, 1991)

The Haines WWTP is currently operating under an EPA permit issued in 2001. The permitted effluent levels for the Haines WWTP depend on time of the year. For October 1 through April 30 the maximum BOD_5 levels are: 140 mg/l monthly average and 200 mg/l daily maximum. For May 1 through September 30, the maximum BOD_5 levels are: 260 mg/l monthly average and 300 mg/l daily maximum. The permitted level for TSS is 140 to 2,000 mg/l.

Although **Permit #AK-002138-5** expired in December 26, 2006, EPA administratively continued the permit, which is still in effect. EPA is presently working with the Haines Borough DPW Staff and ADEC on a renewal. See ***Table 4.9*** through ***Table 4.11*** for a summary of the current permit requirements. Refer to ***Appendix B*** for a detailed description of the WWTP, including general *NPDES Permit Requirements*. (This appendix also contains the Haines Borough's response to EPA's proposed, updated permit.)

Wastewater flows into the WWTP Lift Station via gravity. This lift station uses three pumps to move the influent stream into the WWTP. The two main pumps have the capacity to pump 750 to 800 gallons per minute each.

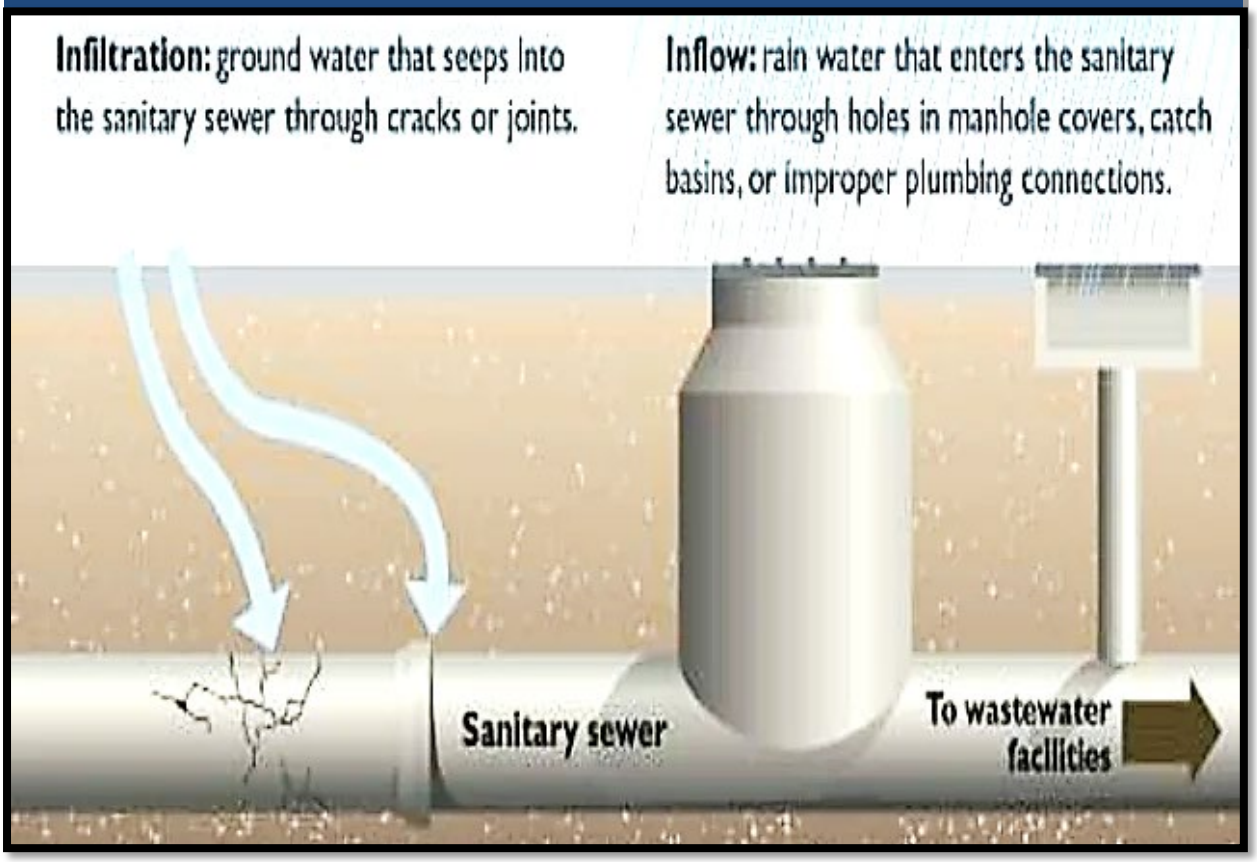
The WWTP uses two steps to physically remove contaminants from the wastewater stream. These include:

- **Screening & Grit Removal:** Two *Raptor Complete Plants, Model SO 17-114*, screen and removes large debris, such as food waste, paper towels and any other material larger than 0.0082 inches. A cylindrical chamber uses centrifugal force to remove sand, silt and other inorganic material. Each *Raptor* processes up to 550 gallons per minute, for a total load of 1,100 gallons per minute.
- **Primary Clarification:** A large, cylindrical tank slows the flow of the wastewater, allowing smaller suspended material time to settle and to be pumped out over to the sludge digestion zone of the annular space outside of the clarifier. Floatable material, such as grease and foam, are skimmed from the top of the water column as well.

Sludge is produced from the primary clarifier and is pumped to the aerobic digesters, one of four chambers in the concentric tank space outside the clarifier. (The other three chambers have holes in the partitions, and these are used for overflow.) Digested sludge is pumped to a belt filter press periodically, resulting in an average of 17 percent ± solids. Solids are hauled to the landfill for disposal. The plant typically produces approximately 132,000 pounds of 17 percent ± dewatered sludge per year, less in the winter months and more in the summer tourist months (average from 2012 through 2022). Approximately 121,300 pounds of dewatered biosolids were disposed in 2022.

Infiltration & Inflow

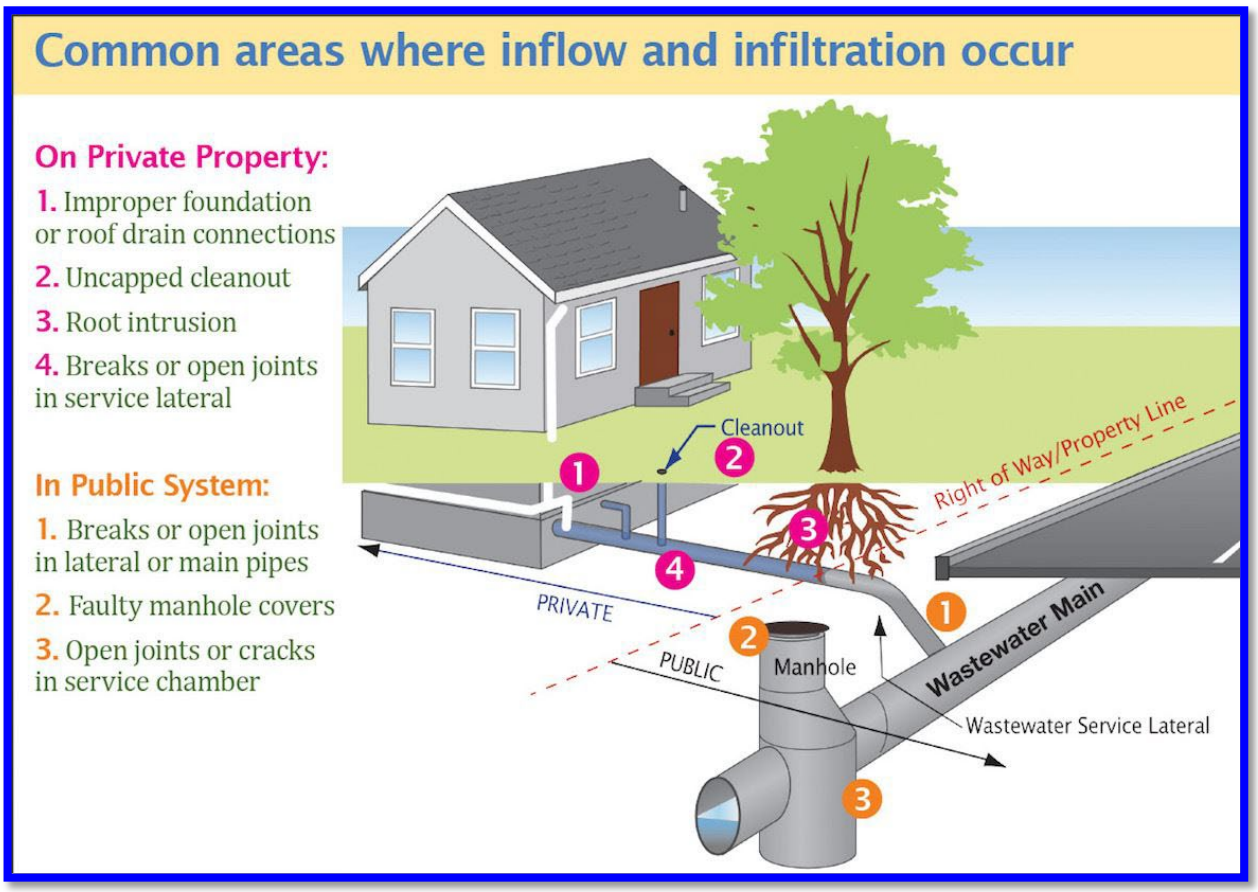
The Townsite's Sanitary Sewer System contains pipes installed multiple decades ago. Older pipes, especially those made with asbestos cement, have a tendency to crack and leak. During heavy precipitation events, water infiltrating the ground leaks into the cracks in the sewer lines as well as through manholes lacking sealed covers and vaults. This inflow creates a huge surge for the WWTP to handle. Household roof drains, sump pumps, foundation and driveway drains should be hooked up to the Storm Water Sewer System — not the Sanitary Sewer System. Disconnecting unauthorized connections will help reduce the infiltration and inflow situation.



The WWTP has a single discharge point. After treatment, effluent is discharged into Portage Cove, just southeast of the Small Boat Harbor, through a 15-inch HDPE outfall line, extending to minus 80 feet below mean lower low water (MLLW). A 15-inch, PVC pipe runs from the WWTP clarifier to Manhole 0181 near the Beach Road Lift Station. From Manhole 0181, a 15-inch HDPE pipe runs to the diffuser. The discharge line extends approximately 1,500 feet from the shoreline to the discharge point. Prior reports and studies indicate no hydraulic studies have been completed on the collection and outfall components of the Townsite Sanitary Sewer System.

The line was installed in 1985 and rerouted in 2019 with the Portage Cove Small Boat Harbor Improvement Project. There are no known structural problems associated with the outfall line. The line was last inspected in 2019 when it was re-routed and re-configured. (The diffuser design changed and the line location was modified.) Outfall inspections are difficult due to strong currents and the lack of visibility in Portage Cove.

The area surrounding the outfall is referred to as the mixing zone. It is a circular area, 1,600 meters in radius, that centers on the end of the outfall and extends off the shoreline of the Small Boat Harbor from Nukdik Point to Full Moon Cove . While the Alaska Department of Environmental Conservation recommends that citizens do not bath or consume shellfish with the mixing zone, the Borough's water quality tests show an extremely low impact on this area from the WWTP effluent. (See ***Sheet B-2*** for a drawing of the mixing zone.)



In 2022, the cost for treating 1,000 gallons of wastewater was $4.86. This number was derived with the FY2022 Proposed Wastewater Budget and the annual, metered volume of effluent from the WWTP.

4.4 WASTEWATER FLOWS

A total of 554 connections are served by the WWTP. The plant has a permitted capacity of 1.9 million gallons per day (MGD) as a monthly average and a daily maximum of 2.9 MGD.

According to the 2014 *Ten State Standards*, the Haines WWTP can handle up to 1.23 MGD at peak flow, or 449 MG per year. The clarifier is the limiting factor for high flows. The two WWTP influent pumps each have a combined capacity of 1,500 to 1,600 GPM whereas the two *Raptor* influent screens handle 1,100 GPM together. See ***Appendix B*** for specifics.

DPW Staff, experienced with the operation of the WWTP, states that 1.4 MGD is the maximum capacity of the WWTP to sustain permit compliance. Flow rates into the WWTP can vary significantly, depending on the amount of inflow. During intense rain storms, flow rates can increase to as much as 1.23 MGD, an event that can occur multiple days each year. During heavy rainstorms, inflow accounts for a significant component of the sewer system flows as illustrated in ***Chart 4.1***. Further, with heavy storm flows, I/I debris can damage the influent pumps.

I/I is believed to account for up to approximately 1 MGD of the flow entering the WWTP during extreme events. Other I/I indicators include dry-weather flows in excess of 120 GPCD or wet-weather flows of more than 275 GPCD. (EPA I/I Analysis & Project Certification, 1985) In 1986, Arctic Engineering, Inc. determined the Townsite SSS had an I/I dry-weather baseflow of 23.5 GPCD (see ***Appendix D, I/I Studies Summary***).

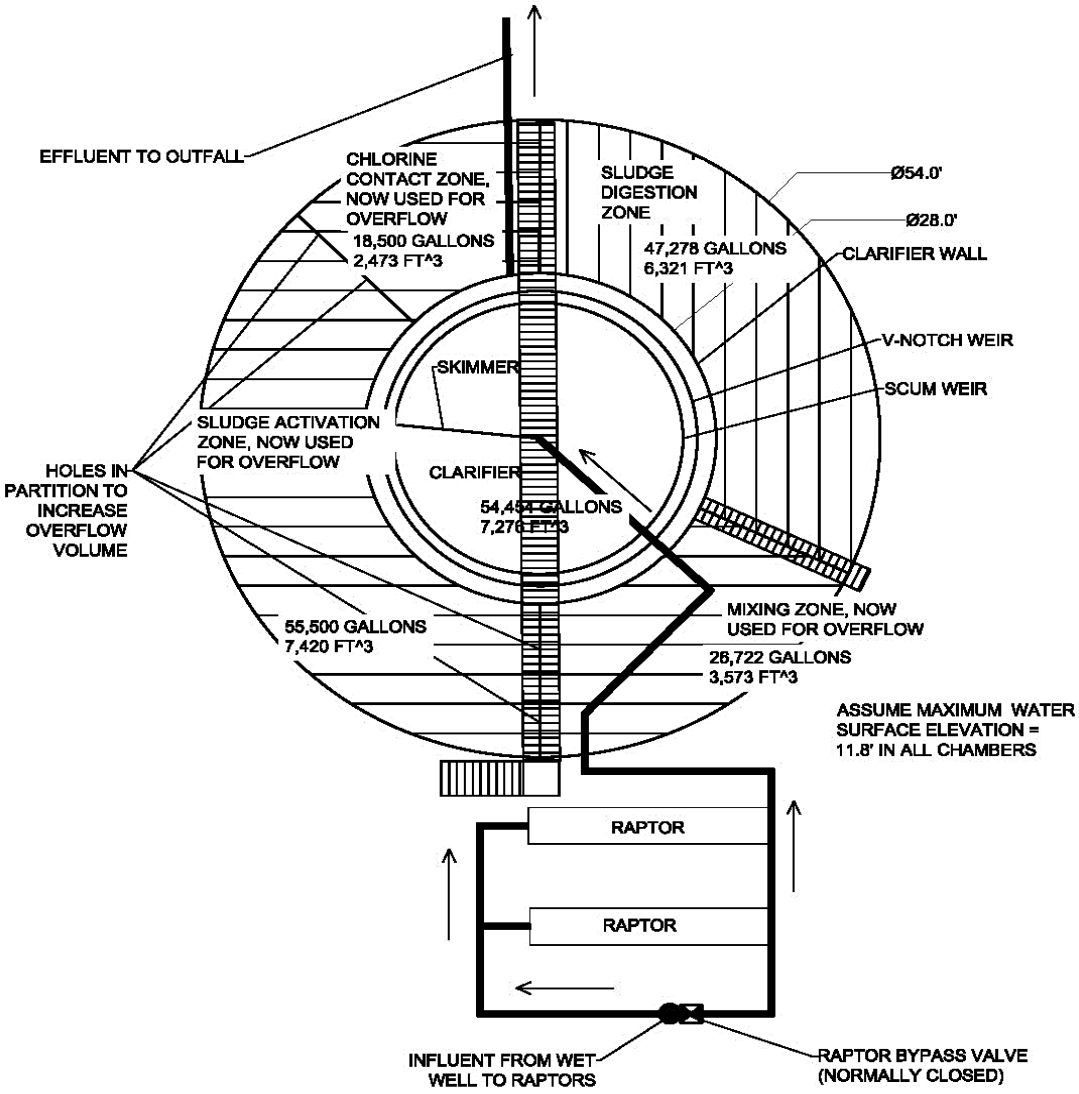
4.5 GRAVITY MAINS

All sewer lines to the WWTP join at Manhole 0017 on Fair Drive and Haines Highway. About 17.5 miles of gravity sewer main exist in the current wastewater collection system. Components of the wastewater collection system were originally constructed in the early 1970s. Gravity mains consist of ABS, AC, DI, FRP, HDPE and PVC. The majority of the gravity collection mains within the Townsite are 8-inch PVC mains as shown in ***Table 4.3***. Other pipe sizes include: 4-inch, 6-inch, 8-inch, 10-inch, 12-inch and 15-inch.

Table 4.4: ***Piping Material Life Expectancies*** provides an estimated typical lifespan of water and sewer piping materials. (Mays, 2000; Foundations for Water Research, 1988) Although numerous studies have been conducted to determine pipe life expectancies, the actual lifespan will vary depending on soil conditions, installation methods, seismic conditions, etc.

In general, the collection system appears to have sufficient capacity to handle existing sanitary sewer flows. The sewer collection system capacity, not to be confused with the WWTP capacity,

Figure 4.3: WWTP Clarifier Schematic, 2023



does not always accommodate major storm events due to I/I issues occasionally requiring usage of the WWTP bypass. Velocities throughout the system are believed to be between 2-to-8 feet per second, thus protecting the equipment and moving the solids. Very severe storm events can exceed system capacity, depending on the duration and magnitude of the inflow contribution. Planned SCADA upgrades and I/I studies will provide additional information.

Table 4.3: Active Gravity Sewer Main, Estimated Linear Feet, 2023

Diameter	Pipe Diameter (inches)						TOTAL (feet)
	4	6	8	10	12	15	
ABS	538						538
Asbestos Cement	197		221				418
Ductile Iron		291	2,844				3,135
FRP							
HDPE			893	192		2,138	3,224
PVC	1,451	10,823	64,593	3,736	45	4,288	84,937
TOTAL (feet)	2,187	11,114	68,552	3,929	45	6,427	92,252
TOTAL PIPES IN GROUND: 92,252 linear feet or 17.5 miles							

Table 4.4: Piping Material Life Expectancies

Piping Material	Estimated Installation Date (mains)	Estimated Life Expectancy (years)
Asbestos Cement	1950s – 1970s	20-30
Ductile Iron	1970s – 1990s	50+
Polyvinyl Chloride	1990s – 2019	50-70+
High-density Polyethylene	2010 - current	50-100

Table 4.5: Haines SSS: Sludge Amounts & Disposal Costs, 2017 – 2022

Year	Load Count	Sludge Weight (pounds)	Disposal Cost	
			Annual	Per Ton
2017	31	139,560	$20,262	$290
2018	43	166,780	$29,187	$350
2019	27	130,000	$17,343	$267
2020	36	149,500	$26,346	$352
2021	21	84,260	$13,550	$322
2022	31	121,300	$19,810	$327
TOTAL	189	791,400	$126,498	
6-Year Average	32	131,900	$21,083	$320

DPW Staff has taken steps in recent years to identify leaks in the sewer collection system. In 2019, Alaska Rural Water Association Staff helped canvas some areas, listening to fire hydrants with an acoustic set. Sewer lines are generally repaired only when major leaks or breakages are discovered.

About 418 feet of the Townsite wastewater collection system is constructed with AC pipe, installed in the 1970s, with some dating back to 1950s. Database records also show 2,200 feet of AC force main as shown in ***Table 4.7***. ADEC requires inventories of all AC piping in the water and sewer systems in the State of Alaska. AC pipe was not included in the list of banned asbestos-containing materials under the *1989 Toxic Substances Control Act*; however, AC pipe can deteriorate in the presence of low pH groundwater, sulfides, sulfates and chlorides.

The existing AC piping and manholes are believed to have high infiltration rates based upon the results of the most recent 1986 I/I study, *AEI Sanitary Sewer System Report Repair & Rehabilitation.*

The DPW Staff records known breakages for the sewer lines in the Public Works GIS database.

4.6 WASTEWATER PUMP STATIONS

The Haines Townsite has seven sewage pump stations. See ***Table 4.6*** for specifics. The Harbor Lift Station is not yet operational. It was installed with the recent Small Boat Harbor Improvements in 2019 – 2021, and will be operational when the new Office is developed. The other lift stations lack SCADA equipment with the exception of the WWTP lift station. Some SCADA upgrades are included for lift stations in ***Section 6 – Improvements,*** and more precise pumping data, such as gallons per minute, will be available with these upgrades.

Table 4.6: Haines SSS: Lift Station Summary, 2023

Lift Station	Name	Estimated Maximum Pumping Capacity (million gallons per day	Average Daily Flowrate 2022 (million gallons per day)	Maximum Daily Flow Rate 2022 (million gallons per day)
1	Wellfield Road	TBD	TBD	TBD
2	1 Mile Haines Highway	TBD	TBD	TBD
3	Chilkoot Estates	TBD	TBD	TBD
4	Beach Road	TBD	TBD	TBD
5	Skyline	TBD	TBD	TBD
6	Harbor	TBD	TBD	TBD
7	WWTP	1.230	0.300	1.225

4.7 FORCE MAINS

There are approximately 7,400 LF (1.4 miles) of force main in the Townsite sewage collection system. Force mains in the sewage system consist of AC, HDPE and PVC mains. Refer to ***Table 4.7***. Five-hundred feet of AC pipe were replaced with HDPE the summer of 2023.

Table 4.7: Haines SSS: Sewer Force Main, Estimated Linear Feet by Lift Station, 2023

Lift Station	Description	Pipe Material	Linear Feet of Nominal Pipe Diameter (inches)					
			2	3	4	6	8	10
1	Wellfield Road	PVC	500					
2	1 Mile Haines Highway	AC				2,200		
3	Chilkoot Estates	HDPE			500			
4	Beach Road	HDPE					3,000	
5	Skyline	PVC			600			
6	Harbor	HDPE		400				
7	WWTP							200
TOTAL (feet)			500	300	1,100	2,200	3,000	200
TOTAL: 7,400 LF or 1.4 Miles								

Table 4.8 presents the expected maximum velocity from daily flows in the WWTP for 2022. Data for the other lift stations will be captured with upcoming SCADA improvements.

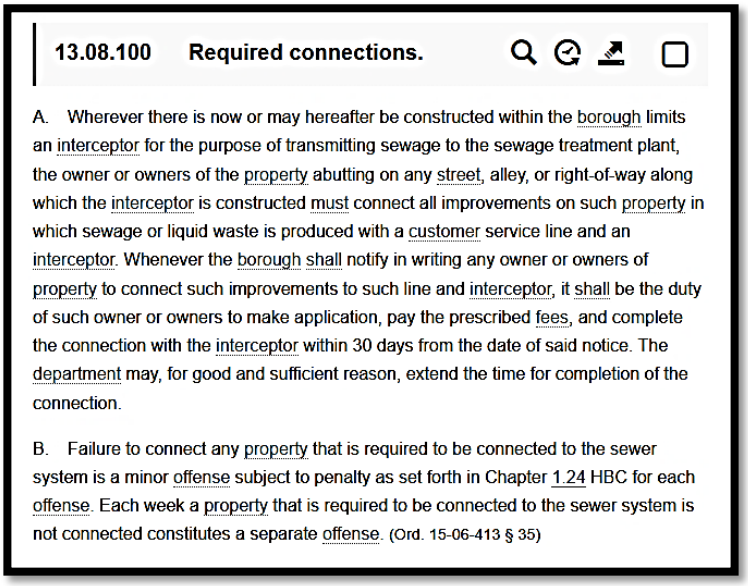
Cruise ships do not typically discharge to the Townsite sewerage. In 2022, a small cruise ship used *Community Waste Solutions* to dispose of sewage during an on-board treatment plant malfunction. There is no sewer line for ship disposal on the Cruise Ship Dock.

Table 4.8: Haines SSS: Wastewater Force Main Velocities by Lift Station, 2022

Lift Station	Description	Maximum Typical Velocity (feet per second)
1	Wellfield Road	TBD
2	1-Mile Haines Highway	TBD
3	Chilkoot Estates	TBD
4	Beach Road	TBD
5	Skyline	TBD
6	Harbor	TBD
7	WWTP	TBD

4.8 MANHOLES

There are approximately 267 manholes in the existing wastewater collection system. Manhole spacing throughout the Haines sewage collection system is generally sufficient for cleaning and maintaining sewage collection lines using existing equipment. The Borough has labeled all manholes with unique identification numbers, and these have been incorporated into the Townsite GIS Database.



13.08.100 Required connections.

A. Wherever there is now or may hereafter be constructed within the borough limits an interceptor for the purpose of transmitting sewage to the sewage treatment plant, the owner or owners of the property abutting on any street, alley, or right-of-way along which the interceptor is constructed must connect all improvements on such property in which sewage or liquid waste is produced with a customer service line and an interceptor. Whenever the borough shall notify in writing any owner or owners of property to connect such improvements to such line and interceptor, it shall be the duty of such owner or owners to make application, pay the prescribed fees, and complete the connection with the interceptor within 30 days from the date of said notice. The department may, for good and sufficient reason, extend the time for completion of the connection.

B. Failure to connect any property that is required to be connected to the sewer system is a minor offense subject to penalty as set forth in Chapter 1.24 HBC for each offense. Each week a property that is required to be connected to the sewer system is not connected constitutes a separate offense. (Ord. 15-06-413 § 35)

4.9 SERVICE CONNECTIONS

There are currently 554 connections to the Townsite sanitary sewer system. These connections typically consist of 4-inch pipe. Significant freezing problems have not been reported at sewer service connections. *HB 13.08.100* specifies when property owners must hook up to the sewer system. The Borough provides sewer service to property lines, and the remaining distance to the building is the responsibility of the property owner.

LynnVista Subdivision, within the Townsite and under development by a private citizen, will be assumed by the Haines Borough once ADEC provides final approval to operate. It is anticipated this development, which will provide up to ten additional residential lots, will be completed in 2023.

4.10 GREASE TRAPS

The DPW Staff recommends that grease traps or similar devices be installed at generating businesses and facilities to prevent downstream grease congealing into fat-bergs and clogging sewer lines. Grease traps are typically required for restaurants, hotels, hospitals, schools, garages and car washed. Within the Townsite, grease trap locations include:

- **Food Service Establishments**: The Lighthouse, Fireweed Restaurant, Field Kitchen, Fog Cutter, Bamboo Room / Pioneer Bar, Chilkat Bakery and Restaurant, American Legion, Haines School, Haines Senior Center, Haines Assisted Living
- **Government Services**: Haines Borough Harbor, Cruise Ship Dock (parking lot), Haines Borough Shop, DOTP&F Shop, Haines School Shop
- **Others**: Car Wash, Gas Stations

The Borough does not make regular inspections of the traps. The traps are ineffective if they are not regularly cleaned. Any clogging problems could be attributed to the lack of maintenance, especially for restaurant. Codification of required borough inspections of grease traps could help reduce sewer blockages.

4.11 ON-SITE WASTEWATER DISPOSAL

The Borough accepts wastewater and septage from residential and commercial sources. A recreational vehicle (RV) dump station was installed in front of the WWTP in 2022 as no local businesses currently provide this service.

Some residents and businesses use sewage holding tanks. Typically, such tanks are pumped out on a regular basis, either by the home or business owner, or a commercial septage hauler. *Community Waste Solutions*, a septage hauler, disposes of sludge at the WWTP lift station.

This business pumped 115,000 gallons of septage in 2022 and delivered it for processing at the WWTP. (Franke, 2023)

Costs for conventional residential septic systems in Haines area are estimated at between $20,000 and $30,000. If mound systems or aerobic treatment systems are required, cost are estimated between $35,000 and $50,000. If effluent disinfection is required, there is an additional cost. Engineered systems approved by ADEC are required for all residential wastewater systems within the Borough, including the Townsite area where access to the sanitary sewer system is unavailable or not required.

The percentage of Townsite residents served by on-site wastewater systems is unknown and beyond the scope of this plan. (See ***Appendix A, Sheet A-2*** for a visual representation of the existing sewer system.) Crystal Cathedral Subdivision, Cemetery Hill Subdivision, Haven Court, Mount Riley Road, Small Tracts Road are some of the areas unserved by the Townsite sewer system.

It is believed that some on-site systems in the Townsite are not maintained until a failure occurs. Many homeowners with on-site systems are unaware of the appropriate maintenance steps to ensure an optimal lifecycle. An annual public education campaign, such as a spring newspaper display ad and/or a public service announcement on the local radio station, could save residents the cost of a drain-field replacement.

There is no comprehensive data available on the types of on-site systems installed in the Townsite or the frequency of failures. ADEC has an on-site system database for those systems obtaining State of Alaska approval and registration.

4.12 SCADA SYSTEM

Controls for the WWTP, Skyline and Chilkoot Lift Stations have SCADA capabilities although a system has not been installed. The Haines Borough plans to continue expanding this sewer SCADA system with upgrades.

Figure 4.4: Beach Road Lift Station, 2022

4.13 METERS

The WWTP measures treated effluent each day to ascertain permit compliance with a master meter as influent arrives at the plant. Meters are not calibrated unless they are suspected of being inaccurate. It is recommended that major system meters be checked and calibrated periodically to ensure accurate information.

Table 4.9: Haines SSS: Wastewater: Influent / Effluent Monitoring Requirements, 2005

Parameter	Sample			
	Location	Frequency	Type	Values
Average Monthly Flow	Influent or Effluent	Continuous	Recording	MGD
BOD_5		Monthly	24-hour composite	mg per L
TSS		Weekly		
Dissolved Oxygen	Effluent		Grab	
Temperature				degrees C
pH				Standard Unit
Fecal Coliform Bacteria		Monthly		colonies per 100 mL
Copper		Each Quarter	24-hour composite	ug per L
Toxic Pollutants & Pesticides[1]		2 per Permit Term[2]		
Whole Effluent Toxicity (WET)[3]		1 per Permit Term[4]		TU_C

1: Toxic pollutants defined as 126 priority pollutants listed in *40 CFR 401.15*. Pesticides defined at *40 CFR 125.58(m).*
2: Permittee to conduct analyses during 1st and 4th quarter of permit term. First year monitoring to be conducted during dry season (July). Fourth year monitoring to be conducted during wet season (January). Samples and analysis conducted according to methods approved in 40 CFR Part 136.
3: See *Part I.C* of *AK-002138-5 NPDES Permit* for *Municipality of Haines Wastewater Treatment Facility*.
4: Monitoring to be conducted in the first year of the permit term.

Table 4.10: Haines SSS: Wastewater: Effluent Limitations, 2005

Effluent Parameter	Monthly Average	Maximum Daily	Measurement Unit
Flow	1.9	2.9	MGD
BOD_5[1] Oct 1 – Apr 30	140	200	mg per L
	2,200	3,200	lbs per day
BOD_5 May 1 – Sep 30	260	300	mg per L
	4,100	4,800	lbs per day
TSS[1]	140	200	mg per L
	2,200	3,200	lbs per day
Fecal Coliform	1,000,000	1,500,000	#FC per 100 mL
Copper	78	156	ug per L

1: Monthly average effluent loading not to exceed 70 percent of the monthly average influent loading for five-day BOD_5 and TSS.

4.14 MAINTENANCE / OPERATIONAL RECORDS

Operational information for wastewater in the system is recorded on a daily basis. The Borough has two licensed Water / Wastewater Operators: one Provisional Level 1 and one Level 2. An on-call Operator also works over weekends to make the typical rounds as well as respond to any urgent situation.

The Operators are specifically assigned to monitor and maintain the WTPs, WSTs, pump stations, WWTP, lift stations and piping systems. One Operator is required to be on-call 24 hours-a-day by radio or telephone to respond to emergencies related to the water and sewer systems. Other Borough employees and contractors assist in the maintenance and repair of the SSS as needed.

Lift Stations are monitored daily by Borough personnel. Periodic readings at the lift stations relative to pump run-time and noted conditions are addressed and recorded. The Borough keeps certain critical replacement pumps, valves, and equipment available for the WWTP and lift stations in the event of equipment failure. (*Cityworks*, an asset management software program currently under implementation into Haines Borough activities, includes inventories for extra equipment and parts.)

DPW Staff also conduct annual line cleanings with a sewage jetter. As time allows, about one month each year, staff conduct maintenance on sewer lines. Some years only problem areas are cleared due to staffing shortages.

With the assistance of various contractors, the Borough developed a GIS-based inventory of all water system and sewer system appurtenances. Data-entry work for the parcel viewers began over two decades ago. The system is used to keep track of installation dates, equipment

manufacturers, construction materials, maintenance dates and other information. This information allows the Borough to perform routine repairs and maintenance more easily as well as provide engineers with detailed information about the existing water system to accommodate design and construction of updates or expansions. Limited utility information is available to the public at: Haines Borough Parcel Viewer | Haines Alaska

A *2022 Wastewater Report,* summarizing annual highlights for the public, is also available in ***Appendix B***.

EPA retains primacy and oversight of the WWTP with ADEC's concurrence. Concurrent influent and effluent monitoring requirements for the Townsite are shown in ***Table 4.9*** through ***Table 4.11***. See ***Appendix B*** for the federal permit.

Sampling for these monitoring requirements is somewhat weather dependent, especially during stormy fall and winter months. Renting a fishing vessel in November and January is the best method for obtaining the samples, if any of the local fleet is available. Most fishing vessels are hauled out for off-season storage.

Table 4.11: Haines SSS: Receiving Water Quality Monitoring Requirements, 2005

Parameter	Station Location	Depth	Monitoring Frequency
Temperature degrees C	ZID North ZID South Reference N Reference S	Surface Every 5 meters to bottom	1 per year January: years 1,3, 5 August: years 2, 4
Salinity ppt			
Dissolved Oxygen mg per L			
pH			
Turbidity NTU			
Secchi Disk		Surface	
Fecal Coliform Bacteria			4 per year January, May, August, November
1: Samples to be collected on same day effluent sampled for FC concentrations.			

2022 Wastewater Report

Wastewater Utility

In 2001, the City of Haines was granted a National Pollution Discharge Elimination (NPDES) Permit, AK-002138-5, by the US Environmental Protection Agency. The permit authorizes the Borough's Wastewater Utility to operate and maintain a 1.9 million gallon per day primary treatment facility and seven lift stations that comprise the community's collection system. The Wastewater Treatment Plant (WWTP) processes about 200 million gallon of wastewater per year while meeting the discharge limitations and preserving quality of Lynn Canal waters. The facility is staffed by three-full time operators, who also run the Water Utility in the Department of Public Works. In addition to the operation and maintenance of the Sanitary Sewer System, these operators perform required laboratory analyses to ensure compliance with state and federal regulations.

Collection System

The Borough's Townsite wastewater collection system transports sewage from 554 customer connections to the WWTP. The collection system consists of 19 miles of underground piping, 267 manholes and 7 lift stations.

Haines Borough
PO Box 1209, Haines, Alaska 99827
907-766-2231

Parameter	Effluent Permit Limits Monthly Average	Haines Townsite Effluent Monthly Average
TSS	140 mg per L or ppm	40.0 ppm
TSS	30% minimum removal	55.0 % removal
BOD	140 ppm winter 260 in summer	52 ppm Oct-April 177 ppm May Sept
BOD	30% minimum removal	41.0% removal
FC	1,000,000 FC per 100 ml	189,542 FC per 100 ml
DO	2 to 17 ppm	6.1 ppm
pH	6.5 to 8.5	7.1
Flow	1. 9 MGD	0.289 MGD

Water Quality

Wastewater Operators are responsible for performing approximately 300 laboratory tests each year to ensure compliance with the Borough's NPDES permit. These tests include:

- **Biochemical Oxygen Demand (BOD):** A water quality measurement that indicates what demand a stream of wastewater will incur on the dissolved oxygen content in the receiving waters.
- **Total Suspended Solids (TSS):** A measure of the concentration of suspended matter present in wastewater.
- **Fecal Coliform:** An indicator bacteria indicative of warm-blooded animals and humans. The measurement shows the strength of the wastewater.
- **Dissolved Oxygen (DO)** A measure of the amount of oxygen dissolved in the wastewater. Dissolved oxygen is essential in sustaining aquatic life.
- **pH:** The measurement of the acidity or basicity of the wastewater.

2022 HAINES SEWER SYSTEM FACTS

- Annual Effluent Volume: 109.2 Million Gallons
- Average Daily Wastewater Treatment Volume: 0.288 Million Gallons
- Number of Connections: 554 Customers
- Gallons per Capita per Day: 185 Gallons per Person
- Cost to Treat 1,000 Gallons of Wastewater: $4.86
- Gravity Sewer Main: 17.5 Miles
- Force Sewer Main: 1.4 Miles
- Number of Lift Stations: 7
- Number of Manholes: 267

Treatment System

The WWTP uses two steps to physically remove contaminants from the wastewater. These include:

- **Screening & Grit Removal**

Two combined plants screen and removes large debris, such as food waste, paper towels and any other material larger than 0.0082 inches. A cylindrical chamber in each unit uses centrifugal force to remove sand, silt and other inorganic material.

- **Primary Clarification**

A large, cylindrical tank slows the flow of the wastewater, allowing smaller suspended material time to settle and to be pumped out. Floatable material, such as grease and foam, are skimmed from the top of the water column.

SLUDGE

- **Sludge Digester**

Sludge from the clarifier is moved to a digester. Then a biological process reduces the amount of organic material.

- **Sludge Dewatering**

A belt-filter press removes water, leaving the processed biosolids with about 17 percent solids-content.

- **Solids Disposal**

Each year the WWTP removes over 60 tons of solid contaminants from the wastewater. In 2022, the volume weighed 61 tons. The dewatered sludge biosolids are transported to the local landfill for depositing.

Treated Water Disposal

Once the water leaves the last stage of the treatment process, it flows to the outfall in Portage Cove. The area surrounding the outfall is referred to as the mixing zone. It is a circular area, 1,600 meters in radius that centers on the end of the outfall and extends from off the shoreline of the Small Boat Harbor. While the Alaska Department of Environmental Conservation recommends that citizens do not bath or consume shellfish with the mixing zone, the Borough's water quality tests show an extremely low impact on this area from the WWTP effluent.

Infiltration & Inflow

The Townsite's Sanitary Sewer System contains pipes installed multiple decades ago. Older pipes, especially those made with asbestos cement, have a tendency to crack and leak. During heavy precipitation events, water infiltrating the ground leaks into the cracks in the sewer lines as well as through manholes lacking sealed covers and vaults. This inflow creates a huge surge for the WWTP to handle. Household roof drain, sump pumps, foundation and driveway drains should be hooked up to the Storm Water Sewer—not the Sanitary Sewer. If you believe your home has any of these unauthorized connections, contact the Department of Public Works.

Household Hazardous Waste

Borough staff are doing their part to treat the wastewater generated in your homes. Haines citizens can help by paying attention to what they put down the drain.

- Grease and oil can build up in sewer lines and cause blockages.
- Rags, disposable wipes and paper towels can get caught in pumps causing interruptions in service and potential pump damage.
- Household hazardous waste can create serious problems when introduced into the sewer. Corrosive, toxic and flammable substances are harmful to the collection and treatment systems, Borough personnel and Portage Cove. If hazardous wastes are detected during routine sampling, additional testing is immediately required placing a tremendous financial burden while tracking down this pollution source. Fines can be levied on the Borough and the responsible individuals for violation of discharge requirements. Customers are urged to dispose of hazardous wase in a proper manner.

We thank you for your help in keeping our wastewater free of these pollutants and protecting the environment.

Please take part in the collection event to ensure proper disposal of hazardous waste.

HOW TO PROPERLY DISPOSE OF HAZARDOUS WASTE

The Borough sponsored a Household Hazardous Waste collection event on July 19—20, 2022. With your assistance, the Borough collected 995 gallons as well as 4 cubic yards of waste. The next collection even will be held summer 2023.

Eligible Items

Items that can be brought to the event free of charge include: poisons, disinfectants, solvents, herbicides, used oil, flammable liquids (gasoline, diesel fuel, Blazo, etc.), paint products, paint thinner, furniture stripper, antifreeze, acids, cleaners, pesticides, transmission fluid, wood preservatives, floor wax, printing and photographic chemicals, Ni-Cad and lithium batteries, auto batteries, and mercury.

Items not in the original container will NOT be accepted under any circumstances.

Ineligible Items

Explosives, blasting caps and gun powder, reactive such as sodium metal, infectious wastes, radioactive wastes, light bulbs of any kind, household batteries (AAA, AA, C, D, 9-volt, etc.) and any item not mentioned in the **Eligible Item** list.

FREE HOUSEHOLD HAZARDOUS WASTE COLLECTION

Table 4.12: Haines SSS: Wastewater: Influent / Effluent Testing Results, 2022

Effluent Parameter	Results		
	Monthly Average	Maximum Daily	Measurement Unit
Flow	0.289	0.617	MGD
BOD_5[1] Oct - April	52	77	mg per L
	163	747	lbs per day
BOD_5 May - Sept [1]	177	248	mg per L
	281	947	lbs per day
TSS[1]	40	71	mg per L
	89	441	lbs per day
Fecal Coliform	189,542	440,000	# FC per 100 ml
Copper	NA	NA	ug Cu per L

4.15 WWTP EFFICACY

BOD is a measure of the organic material in the WWTP influent and effluent. As mentioned earlier, the permitted limit for BOD is 140 mg per L for the months of October through April and 260 mg per L for the months of May through September. This seasonal permit effluent limit is due to higher concentrations of BOD in the influent during the summer months than occur during the winter. Consequently, the permit expects better quality effluent during the winter than during the summer.

Chart 4.2 shows the concentration of BOD in the influent over 2022 along with the percent removal. The higher concentration of BOD during the summer months is evident. ***Chart 4.3*** displays the monthly BOD levels with permit guidelines.

There was one violation of the BOD concentration permit limit in the effluent in the past year during January. Occasional violations of wastewater effluent limits are not unusual due to the variable characteristics of wastewater influent. Influent flow rates, BOD and TSS concentrations, and temperatures constantly change. Extreme flow rates or loading can cause violations of the effluent limits.

In addition to the BOD concentration limits in the permit, the plant must achieve a minimum of 30 percent removal of the influent BOD. ***Chart 4.3*** shows the acceptable percent BOD removal for the past year.

TSS is a measure of the solid material in the WWTP influent and effluent. As mentioned earlier, the permit level for TSS is 140 mg per L for the entire year. ***Chart 4.4*** shows the concentration of TSS over 2022. There were no violations of the TSS concentration permit limit in the effluent in the past year. In addition to the TSS concentration permit limit, the plant must achieve a minimum of 30 percent removal of the influent TSS. The WWTP was effective in obtaining this level of removal each month.

Fecal coliform counts is a measure of the number of this indicator bacteria per 100 ml of effluent sample. As ***Chart 4.5*** demonstrates, there were no coliform violations in 2022.

4.16 DEACTIVATED SYSTEMS

The sewer system constructed and maintained with Fort Seward was incorporated into the City of Haines sewerage in the 1970s.

4.17 STORM WATER SEWER SYSTEM

The Townsite also has a Storm Water Sewer System to direct precipitation out of the community and into the adjacent waterway. See ***Appendix A*** for a map of the current Haines SWSS.

4.18 ON-SITE RESIDENTIAL SYSTEMS

According to Haines Borough Staff, commercial and residential buildings in the Townsite total 1,277, and 554 of these are connected to the SSS. (Durr, 2023)

Some of these are facilities, not on the sanitary sewer system, use holding tanks with regular pump outs, while others rely on conventional septic systems or advanced treatment units (ATUs) with maintenance pump-outs. (Franke, 2023)

There are four marine outfalls for the Townsite. The South Tanani Bay outfall serves a 36-lot subdivision. On-site secondary wastewater treatment with disinfection is required prior discharge at the central marine outfall. This outfall consists of three outfalls currently servicing 20 lots: the main outfall with 17 lots, and two smaller outfalls serving three beachfront lots. Two of the 36 lots are not connected to an outfall. These lots were developed earlier than the marine outfall and use septic tanks with drain fields. There have been some discussion regarding the Haines Borough assuming responsibility for the Tanani Bay outfall.

The Alaska Marine Highway System also uses a marine outfall for the Haines Ferry Terminal.

Chart 4.2: Haines SSS: 5-Day BOD by Month, Percent Removal, 2022

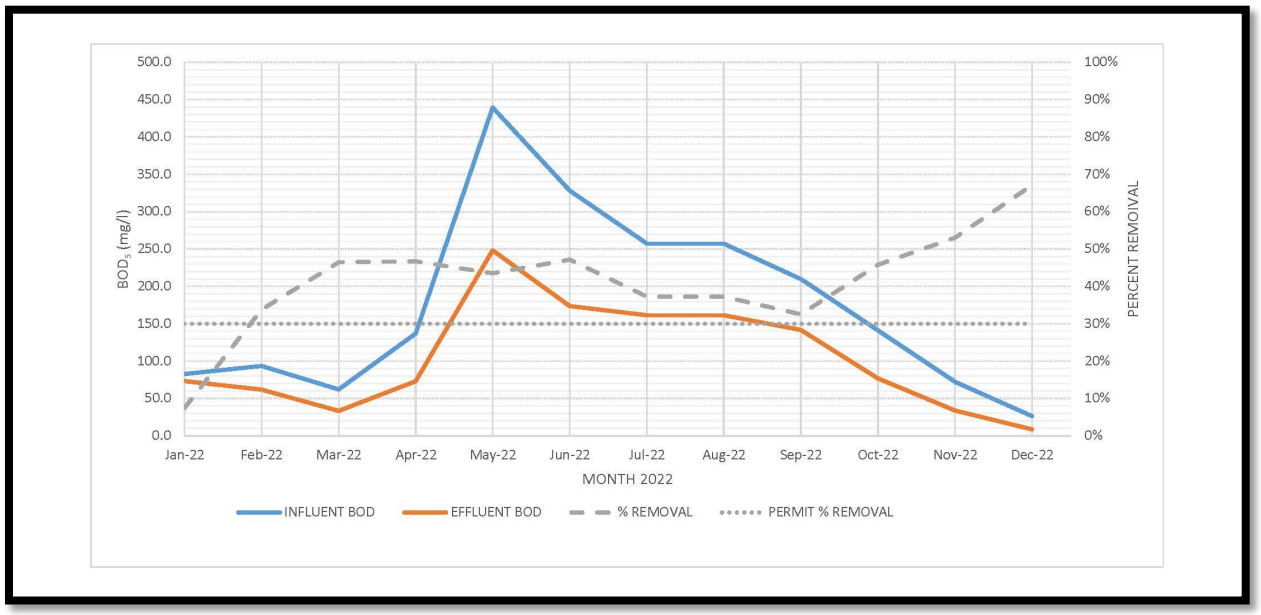


Chart 4.3: Haines SSS: 5-Day BOD by Month, Permit Limits, 2022

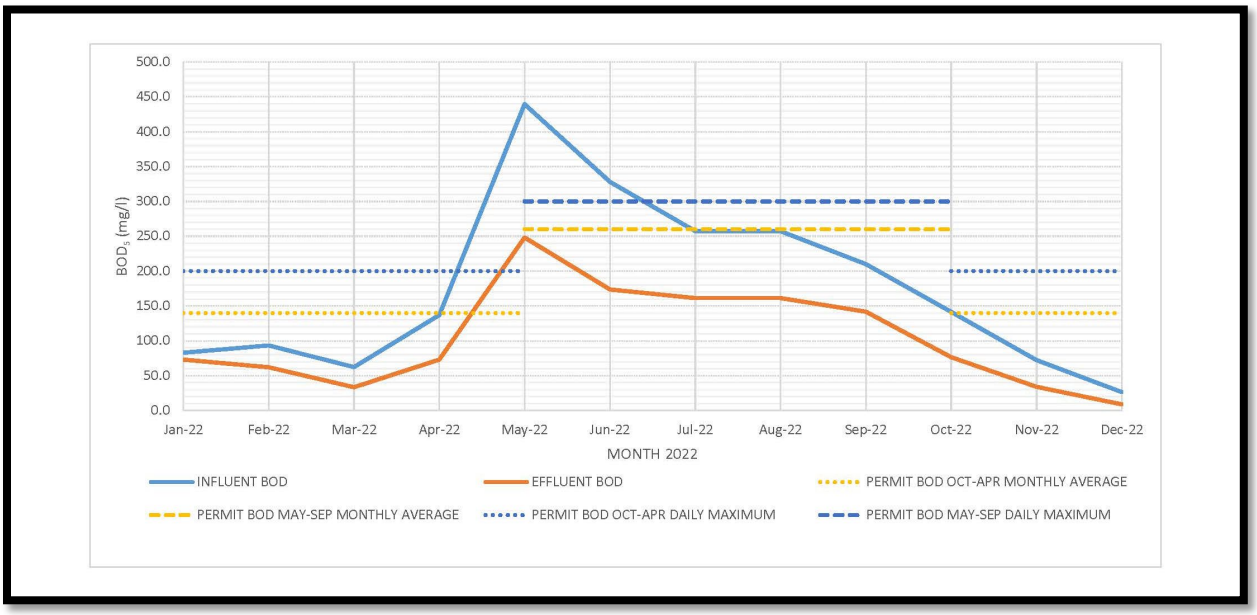


Chart 4.4: Haines SSS: Total Suspended Solids by Month, 2022

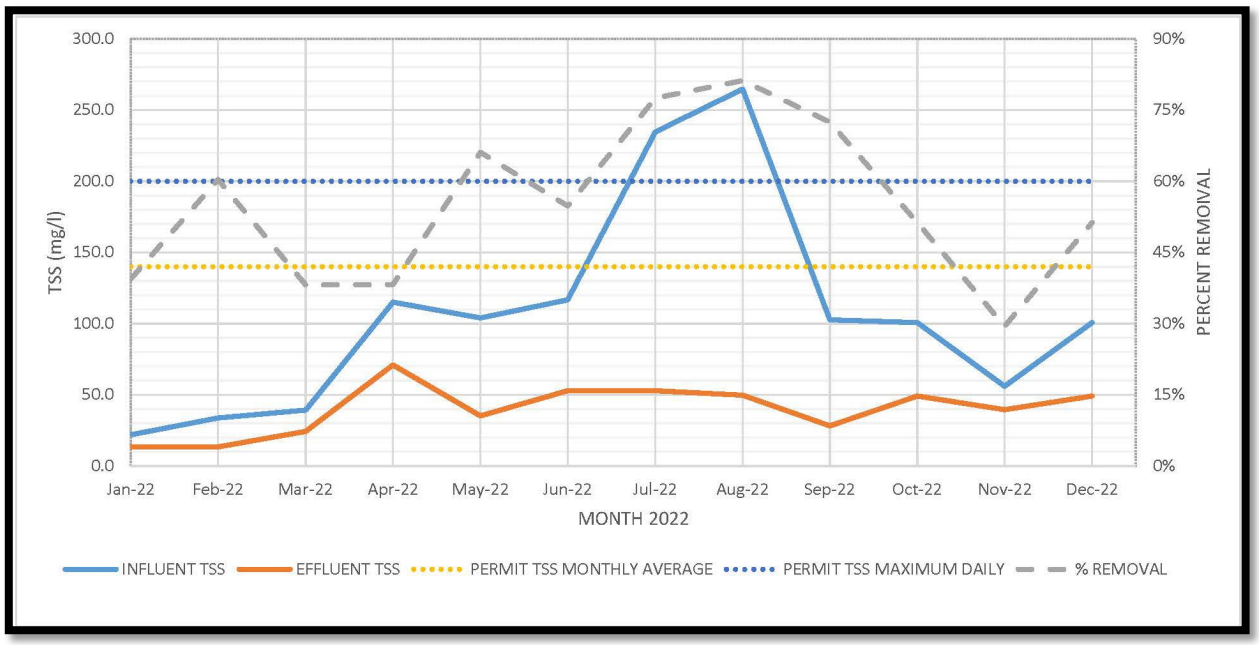
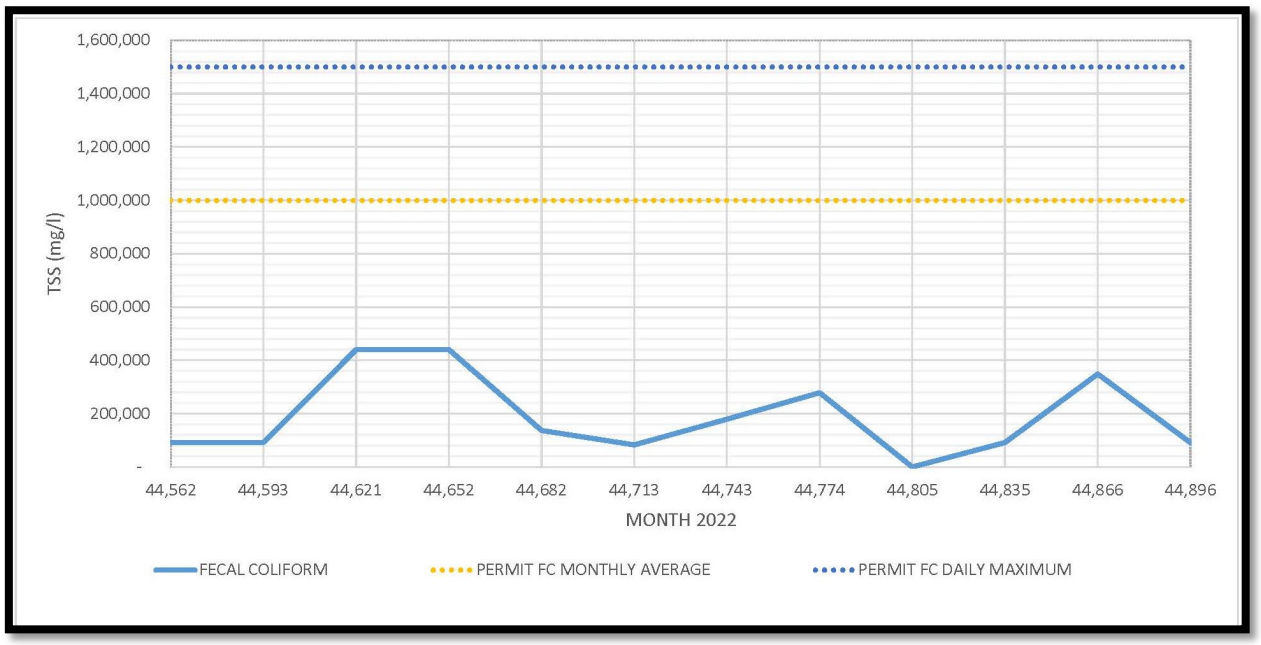


Chart 4.5: Haines SSS: Fecal Coliform Counts by Month, 2022



4.19 CRUISE SHIP WASTEWATER

The *2004 Haines Water and Sewer Master Plan* contained a capital improvement project, *S2: Cruise Ship Dock Wastewater Line* that was never constructed. A force main addition at the Cruise Ship Dock would allow ship wastewater to be pumped to the Townsite Sanitary Sewer System.

Alaska Statute 46.03.463 establishes discharge limits on fecal coliform and total suspended solids for both large and small cruise ships. Cruise ships currently have on-board wastewater treatment systems so there is little demand for the off-loading of cruise ship sewage.

4.20 OTHER SYSTEMS

There are no other sewer systems within the Haines Townsite area. The Crystal Cathedral Water and Sewer Systems were purchased by the Haines Borough in 2016, although this sewer collection system was already integrated into the Haines Sewer System.

In the Haines Borough, there are two fishing processing commercial operations with marine outfalls, Haines Packing Company in Letnikof Cove and OBI in Excursion Inlet. Doc Warner's Alaska Adventures also operates as a fishing lodge in Excursion Inlet. In 2020, this business switched from a marine outfall to a drain field for an on-site system.

5.0 CAPACITY EVALUATION

The projections for future wastewater collection and treatment needs are examined in this section and based upon information highlighted earlier. ***Table 5.1: Haines Sewer System Capacity*** summarizes the numbers used for determining the future Townsite needs. ***Chart 5.1*** shows past wastewater generation trends and projects community sewerage needs for the next two decades.

Figures used to determine system volume and treatment in this capacity analysis were discussed earlier. These include:

- **Townsite Population of Sewer Users**: **1,570** (see ***Section 3.1***)
- **Townsite Annual Growth Rate: 2 percent population growth** (see ***Section 3.2***)
- **Individual Resident Wastewater Production (GPCD): 185 gallons (**see ***Section 4.3*****)**
- **Annual WWTP Volume – 2022: 109.2 MG (**see ***Section 4.1*** and ***Section 4.2*****)**.
- **Annual Maximum WWTP Capacity – 2022**: **449 MG** (see ***Section 4.4*****)**

5.1 PROJECTED WASTEWATER PRODUCTION & TREATMENT CAPACITY

Although data from the *2020 Census* and the Alaska Department of Labor and Workforce Development indicates the local population has declined and will continue to do so, other indicators, such as a one percent growth rate of new water connections suggest the growth of at least part-time residents. This analysis makes the assumption that a similar growth rate will occur with sewer hookups. (The one percent growth rate is based on new PWS connections with multiple PWS sanitary surveys in the *2023 Haines Water Master Plan*.)

The current (2022) per capita generation of wastewater for the Haines Sanitary Sewer System is estimated to be 185 GPCD, determined with a population of 1,570 and the 2022 volume of WWTP effluent, 109.2 MG.

For comparison, the estimated per capita rate for the Petersburg Public Sewer System is 178 GPCD, based on a population of 3,080 and a 2021 volume of 200 MG. The Petersburg townsite has multiple fish-processing operations, including *Trident Seafood* and *OBI* (*Ocean Beauty* and *Icicle Seafoods, Inc.* merger). These commercial customers have seasonal work crews increasing potable water consumption as well as wastewater volumes entering the community sanitary sewer system.

The GPCD rate for the Haines SSS decreases in these future projections as it is anticipated that planned I/I mitigation efforts underway will result in the desired reduction. ***Table 5.1*** shows that the present configuration of the WWTP appears to have capacity to accommodate estimated future growth if the I/I situation improves markedly. ***Table 5.2*** contains other estimates for future wastewater flows; these 2022 values are based on monthly averages – not peak days.

Table 5.1: Haines SSS Capacity: Current & Future Projections, 2022 – 2043

Parameter	2022	2033	2043
Townsite Population 2% Growth	1,570	1,914	2,333
Townsite Service Connections 1% Growth	554	612	676
Scenario 1 – Gallons per Capita per Day Assumption: 10 percent I/I reduction per decade with no added allowance for frequency, intensity of future precipitation events	185	167	150
Scenario 2 – Gallons per Capita per Day Assumption: Intensity of future precipitation events cancels I/I reductions	185	185	185
Scenario 1 – Annual Treatment	109 MG	116.3 MG	127.7 MG
Scenario 2 – Annual Treatment	109 MG	129 MG	158 MG
Maximum Annual Treatment	449 MG	449 MG	449 MG
Permitted Maximum Annual Volume (WWTP not presently capable of this production)	693.5 MG	unknown	unknown

TABLE KEY

2 percent population growth

Scenario 1: 10 percent I/I reduction per decade; similar precipitation patterns

Scenario 2: Precipitation increases cancel I/I reductions

Table 5.2: Haines SSS: Projected Wastewater Production Rates, 2033 & 2043

Flow Type	Rate		
	2022	2033	2043
Minimum Flow	0.153 MGD		
Scenario 1		0.168	0.225
Scenario 2		0.187	0.228
Flow During a Typical Storm	0.400 MGD		
Scenario 1		0.439	0.589
Scenario 2		0.488	0.596
Average Flow	0.300 MGD		
Scenario 1		0.329	0.442
Scenario 2		0.366	0.447
Flow During a Severe Storm	0.493 MGD		
Scenario 1		0.541	0.726
Scenario 2		0.601	0.735

Figure 5.1: WWTP Influent, 2022

5.2 ADEQUACY OF OVERALL WASTEWATER SYSTEM

STATUS

- Recognized standards for wastewater utility improvements need to be followed to ensure the anticipated lifecycle for construction projects.
- Aging utility infrastructure needs planned refurbishing or replacement as elements reach the end of a functional lifecycle.
- Limited SCADA assets exist for the WWTP. Controls for the WWTP, Skyline and Chilkoot Lift Stations have SCADA capabilities although a system has not been installed. Adding data loggers to record flow multiple times through each day.
- Wastewater production per capita in the Townsite is within normal usage yet it falls within the EPA 1985 parameters of sewer systems with infiltration and inflow issues.
- Warmer temperatures and increased annual precipitation associated with climate change may impact soil conditions, groundwater levels and volumes entering the sanitary sewer and the storm water sewer. I/I increases are also anticipated. The WWTP is impacted by wet weather, including the intensity and duration of rainfall, as well as freeze-up or break-up conditions.
- Multiple inflow and infiltration studies completed for Haines have shown leakage as a problem in the Townsite. Most of the known AC waterline pipe, which is susceptible to cracks, has been removed. Asbestos cement sewer mains total 2,618 feet as shown in ***Section 4***, ***Table 4.3*** and ***Table 4.7***.
- Residential roof drains and sump pumps may contribute to the infiltration and inflow situation. The initial Haines sewer system was a combined sewer with both sanitary wastewater and storm water. When the combined sewer was split into two sewer systems in the 1970s, some homes with roof drains and sump pumps may have remained connected to the sanitary sewer system. The Haines Storm Water Sewer System is less developed than the Haines Sanitary Sewer System.
- The EPA operating permit for the sewer system is expected to be renewed in the near future with regulatory changes and increased operational costs.
- Future sanitary sewer system expansion will place additional loadings on the collection system. Over time, the capacity of some piping will be insufficient to provide for peak flowrates without overloading. Overloading must be avoided to prevent pressurized conditions (surcharging) from developing in mains, and to prevent sewer overflows into service connections and manholes.
- Complexity of sewer system continues to increase with federal permit renewal underway. Additional requirements for testing will increase DPW Staff tasks.

NEEDS

- Enact a Townsite Inflow Reduction Program to reduce I/I. Sealing leaking manholes will help with inflow from precipitation as will the identification and replacement of areas with leaking pipes. Another step is identifying illegal residential connections, including roof drains and perimeter drains, and connecting these to the Storm Water Sewer System.

- Codify recognized standards for Borough wastewater utility improvements. Consider requiring low-flow toilets and shower nozzles for newly constructed homes and businesses served by the Townsite PWS and SSS, reducing the demand on the WTP and the WWTP.
- Implement an Asset Management System for the SSS assets. Maintenance procedures for assets should be recorded and tracked.
- Create additional redundancy in the SSS when feasible, such as having a second belt-filter press for sludge.
- Incorporate climate change risk management information results, using a tool such as the EPA *Climate Resilience Evaluation and Awareness Tool for Water Utilities* (CREAT), into best management practices and capital investment decisions.
- Expand the SCADA system to cover some SSS components, providing information and monitoring alarms.
- Develop a SSS hydraulic model with appropriate software to examine future growth and the capacity of the collection and outfall systems.
- Developing an implementation plan to comply with the anticipated, new EPA permit.
- Replace AC sewer mains.
- Develop a SSS security plan consistent with federal and state guidelines.
- Develop a public education program regarding customer responsibilities for maintaining the SSS, the SWSS and residential on-site wastewater systems within the Townsite.
- Additional staff is needed to adequately and safely run the Haines SSS as there is only one Operator with the required credentials. When this individual leaves town, there is no backup.

5.3 ADEQUACY OF COLLECTION SYSTEM

STATUS

- The SSS has an infiltration and inflow problem. Multiple I/I studies were completed in the 1980s, and some efforts have been implemented to reduce the problem. Plans are underway to implement an action plan.
- No recent hydraulic studies have been completed to examine flow rates and main sizing.
- Several established residential areas in the Townsite lack sewer service.
- Carson and Dorn's *2004* and *2014 Water and Sewer Master Plans* suggest water and sewer expansion into Small Tracts Road and Mud Bay Road.

NEEDS

- Sealing leaking manholes will help with inflow from precipitation as will the identification and replacement of areas with leaking sewer pipes. Another step is identifying illegal residential connections to the SSS and connecting these to the Storm Water Sewer System.
- Review expansion of the Townsite SSS and SWSS with hydraulic modeling to assess if main sizes are adequate with anticipated growth.

- Review extension of the Townsite SSS to Small Tracts Road and Mud Bay Road with hydraulic modeling.
- Replace existing AC pipe with PVC or HDPE pipe.

5.4 ADEQUACY OF WASTEWATER TREATMENT PLANT

STATUS

- WWTP was built in the early 1970s and requires on-going maintenance and component upgrades as equipment nears the end of anticipated lifecycle. The original plant was designed for more than the maximum flow to stay within the federal permit parameters.
- WWTP should be able to handle a daily average flow of 0.6 MG and a maximum flow of 1.23 MG.
- The plant treated an average daily flow of approximately 0.23 MG in 2022.
- During intense rain storms, flow rates can increase to as much as 1.23 MGD, an event occurring several days each year. Extreme events allow for minimal treatment as the influent remains in the WWTP for a shorter time during these high flows.

NEEDS

- Reduce I/I to ensure that the capacity of the WWTP will suffice for the anticipated community growth over the next few decades.
- Continuing building-in redundancy in the WWTP as much as possible.
- After the upcoming EPA permit requirements are revealed, develop a plan to accommodate any changes for mixing zones, treatment levels and disinfection.

5.5 ADEQUACY OF EFFLUENT DISCHARGE SYSTEM

STATUS

- Current outfall appears to be satisfactory. A hydraulic study, including future population growth, will identify mains approaching peak capacity, as well as the projected capacity of the outfall. The new EPA permit may change the mixing zone, disinfection and treatment levels.

NEEDS

- After the upcoming EPA permit requirements are provided, develop a plan to accommodate any changes for the outfall mixing zone in Portage Cove.
- Replace existing AC pipe with PVC or HDPE pipe.

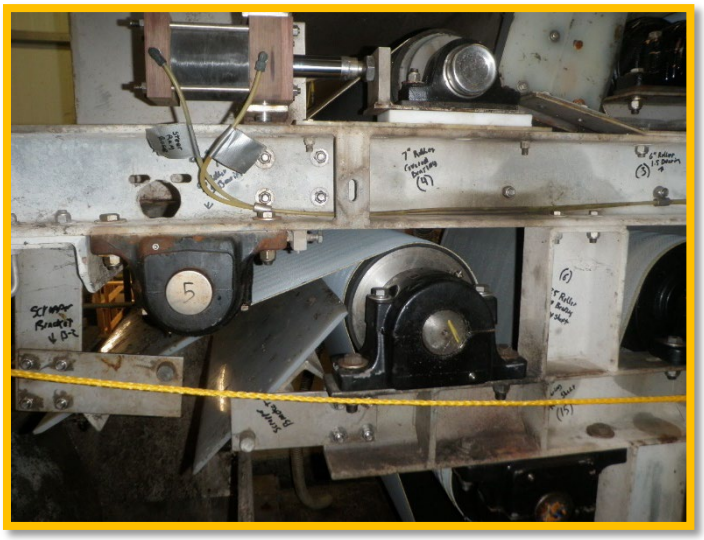


Figure 5.2: Belt Filter Press

5.6 ADEQUACY OF THE SLUDGE DISPOSAL SYSTEM

STATUS

- A belt filter press is used to dewater sludge before transporting to the Haines Landfill operated by *Community Waste Solutions*. Costs for landfill deposits are determined by weight. Annual disposal fees for sludge deposits to landfill cost the DPW $19,810 in 2022.
- When sludge is allowed to dry out longer, the weight decreases and thus reduces disposal costs. The drying area for sludge is currently limited due to little extra space in the WWTP and no other outside covered areas.

NEEDS

- As funds allow, build in redundancy with a backup belt-filter press.
- A dedicated covered area for sludge storage would allow a longer hold time for additional water-content reduction.
- Research other options for final sludge disposal: shipping containers of sludge to the Roosevelt or Arlington Landfills in the Pacific Northwest; composting options and local feasibility.

6.0 WASTEWATER SYSTEM PROJECT DEVELOPMENT

This section provide a discussion of the priority improvements selected for the Haines Sewer System and is the basis for upcoming Capital Improvement Projects (CIPs). A list of the proposed prioritized sanitation improvements is shown below, and a cost summary is shown in ***Table 6.1***. A description, cost estimate and supporting documents, when appropriate, for each improvement follows. The estimated costs for these eleven items runs $12,543,042.

S1 BOROUGH CODE UPDATE

S2 INFILTRATION & INFLOW: SYSTEM-WIDE IMPLEMENTATION

S3 ASSET MANAGEMENT SYSTEM IMPLEMENTATION & LIFECYCLE PLANNING

S4 WWTP & BEACH ROAD LIFT STATION IMPROVEMENTS

S5 WWTP IMPROVEMENTS: RECONDITIONING CLARIFIER & TANKS

S6 SCADA MONITORING: WWTP & LIFT STATIONS

S7 LIFT STATION UPGRADES: STANDARDIZING & AUXILARY POWER

S8 HYDRAULIC MODELING FOR SANITARY SEWER SYSTEM

S9 TOWNSITE SEWER MAIN EXTENSIONS

S10 SLUDGE CONTAINMENT, STORAGE & LONG-TERM STRATEGY

S11 EPA PERMIT COMPLIANCE

Table 6.1: Haines SSS Estimates for Proposed Improvements, 2023 – 2032

Improvement		Design & Construction Costs
S1	BOROUGH CODE UPDATE	$19,630
S2	INFILTRATION & INFLOW: SYSTEM WIDE IMPLEMENTATION	$328 580
S3	ASSET MANAGEMENT SYSTEM IMPLEMENTATION & LIFECYCLE PLANNING	$26,000
S4	WWTP & BEACH ROAD LIFT STATION IMPROVEMENTS	$1,404,267
S5	WWTP IMPROVEMENTS: RECONDITIONING CLARIFIER & TANKS	$560,000
S6	SCADA MONITORING: WWTP & LIFT STATIONS	$75,000
S7	LIFT STATION UPGRADES: STANDARDIZING & AUXILARY POWER	$465,000
S8	HYDRUALIC MODELING FOR SSS	$74,750
S9	TOWNSITE SEWER MAIN EXTENSIONS	$2,565,000
S10	SLUDGE CONTAINMENT, STORAGE & LONG-TERM STRATEGY	$900,000
S11	EPA PERMIT COMPLIANCE	$6,473,025
	TOTAL:	$12,543,042

S1 BOROUGH CODE UPDATE

ESTIMATED COST

$19,630

PROJECT DESCRIPTION

Update sections of the Haines Borough Code relevant to the Townsite Sanitary Sewer System including: *Title 13 Utilities, Chapter 13.08 Sewer System*

This will include references to ADEC and USEPA regulations and accepted design standards, such as *Ten States Standards*, *American Water Works Association Standards*, *National Sanitation Foundation Guidelines*, *Uniform Building Code*, *Uniform Plumbing Code* and other relevant standards. This update will ensure that new wastewater works will be compliant with required regulations and codes, preserve public health and relieve the Borough of the necessity to repair substandard work. These code updates for the Townsite will address inspection and enforcement of requirements and maintenance for grease traps, as well as roof and perimeter drains for existing buildings and new construction, and propose fees to cover the costs associated with these services.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
Lawyer	10	hour	$400	$4,000
Engineer	60	hour	$175	$10,500
HB Planner	10	hour	$60	$600
Estimated Cost				$15,100
Administration (5%), Contingency (25%)				$4,530
				$19,630

S2 INFILTRATION & INFLOW: SYSTEM-WIDE IMPLEMENTATION

ESTIMATED COST

$328,580

PROJECT DESCRIPTION

As the sanitary sewer and stormwater sewer systems continue to age, the Townsite will face an on-going problem with infiltration from deteriorating mains. Implement a system-wide program to reduce the infiltration and inflow volume entering the Haines Sanitary Sewer System. The Townsite I/I peaks during precipitation and appears to be RDII, *rainfall-derived infiltration and inflow*, the increased portion of water flow in a sanitary sewer occurring during and after a rainfall. RDII is the main cause of sanitary sewer overflows. This effort will use EPA's *Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox* to analyze capacity and conditions of the existing system, including flows to locate problem areas. A Pilot Project will identify high priority areas for implementing a multi-year action plan.

PHASE 1: PRIORITY DETERMINATIONS, DATA ANALYSIS & ACTION PLAN DEVELOPMENT

- Gather flow data from manholes and lift stations to determine areas with high I/I, establishing base flow during dry periods and wet flow during precipitation events. Older connections and those with AC lines are particularly susceptible to leaks.
- Develop a three-year action plan, beginning with older areas, specifically the Townsite and Beach Road Sewersheds. Incorporate flow data from the initial pilot project into EPA's *SSOAP Toolbox* to ascertain areas with high I/I. Include a status summary for each sewershed and priority ranking for implementing and completing abatement activities.
    - Identify deficiencies as well as needed replacement and upgrades for the existing sanitary and stormwater sewer systems.
    - Review the existing sewer and stormwater infrastructure including its capacity for extreme weather events and flows.
    - Identify permitting, inspection and regulatory requirements for sewer system connections:
        - Procedures to identify suspected illegal connections and drains
        - Processes and penalties to address illegal roof and foundation drains

PHASE 2: FIELD INSPECTION

- Inspect and photograph manholes.
- Jet and camera lines.
- Use smoke and dye as needed to find roof / storm drains connected to the sanitary sewer system.
- If feasible, fix identified leaks and cap abandoned lines that are discovered.

PHASE 3: REPAIR SEWER SYSTEM DEFICIENCIES

Implement the *I&I Action Plan*, making adjustments as needed to accommodate changing environmental and infrastructure conditions over a multi-year period.

- Fix identified leaks and cap abandoned lines that are discovered.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
Priority Determinations, Data Analysis & Action Plan Development				
Engineer / Env Specialist	400	hour	$175	$70,000
Hydraulic Model Program	1	lump sum		$5,000
GIS Specialist	50	lump sum	$175	$8,750
Field Inspection				
Summer Hire	960	hour	$30	$28,800
Engineer / Env Specialist	250	hour	$175	$43,750
Flow Meters	4	each	$10,000	$40,000
Jet, Camera, Smoke, Dye Pipes	960	hour	$40	$38,400
Repair / Rehabilitation				
Sewer Line & Manhole Repairs			TBD	TBD
Engineer / Env Specialist			TBD	TBD
Estimated Cost				$234,700
Inspection (10%), Administration & Permitting (5%), Contingency (25%)				$93,880
				$328,580

S3 ASSET MANAGEMENT SYSTEM IMPLEMENTATION

ESTIMATED COST

$26,000

PROJECT DESCRIPTION

Include the sanitary sewer system infrastructure into the Borough Asset Management System, *Cityworks*. Establish lifecycle and replacement planning for key facilities.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
Software	1	lump sum	$10,000	$10,000
Data Input	100	hour	$100	$10,000
Estimated Cost				$20,000
Administration (5%), Contingency (25%)				$6,000
				$26,000

S4 WWTP & BEACH ROAD LIFT STATION IMPROVEMENTS

ESTIMATED COST

$1,404,267

PROJECT DESCRIPTION

RESPEC 95% design for the WWTP Lift Station wet and dry wells includes:

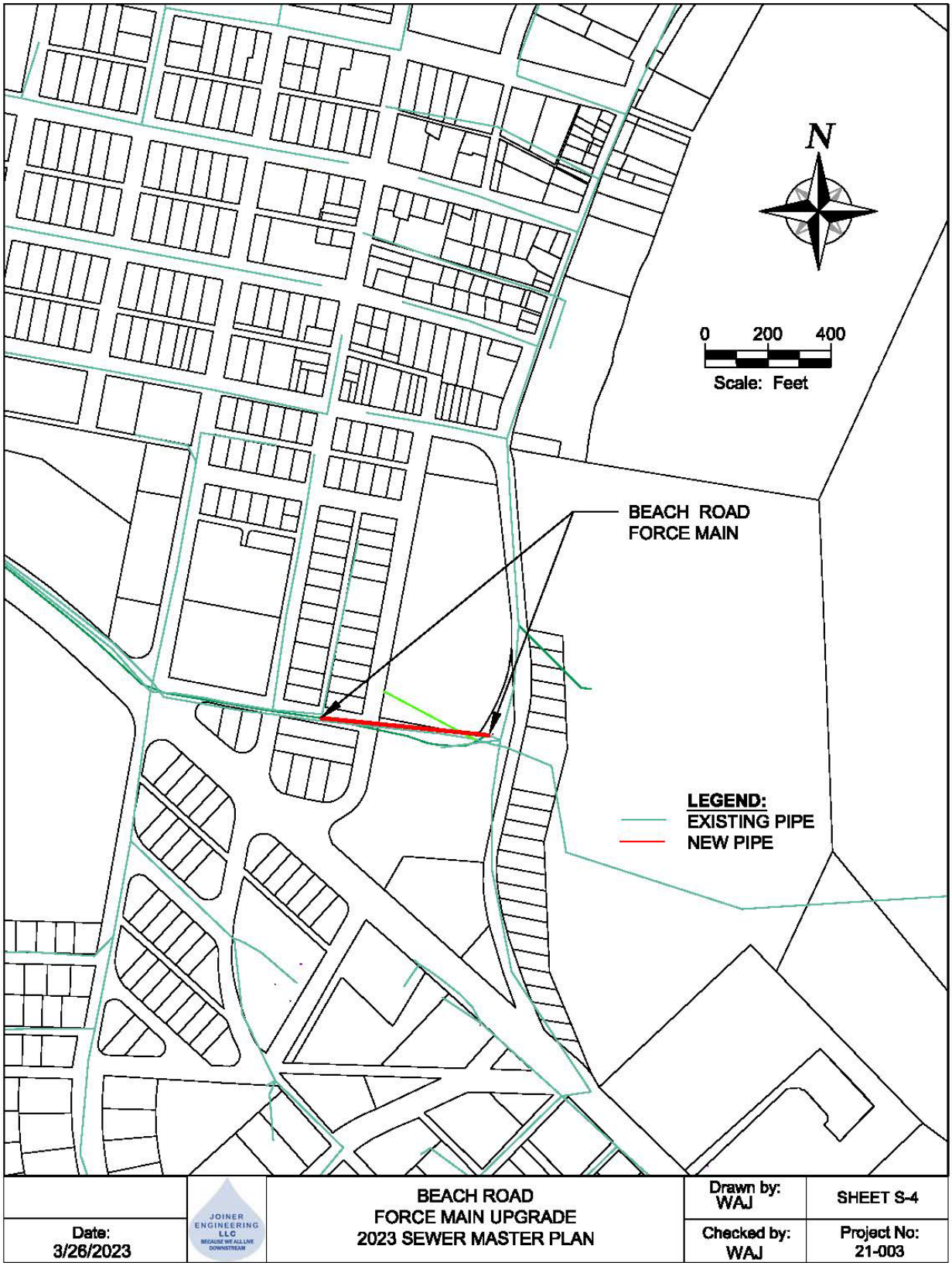
- New exterior wet well with adjacent below-grade valve vault north of existing control building.
- Relocate exiting wet well pumps to new wet well (2 existing pumps, 1 new pump)
- Install bypass around influent screens to discharge into equalization tank
- Install new commercial pumper truck and RV dump station.

Beach Road Lift Station Construction Documents prepared by RESPEC includes:

- Remove existing pumps, control panels, and abandon old force main
- Install new duplex pumps and control panel
- Install new 500-feet of 6-inch HDPE force main
- This project is in pre-bid phase.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
WWTP Direct Work	1	lump sum		$572,442
General Requirements	1	lump sum		$411,405
Site Work	1	lump sum		$19,320
Estimated Construction Cost				$1,003,167
Inspection (10%), Administration & Permitting (5%), Contingency (25%)				$401,267
				$1,404,267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Date:
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JOINER ENGINEERING LLC
BECAUSE WE ALL LIVE DOWNSTREAM
BEACH ROAD
FORCE MAIN UPGRADE
2023 SEWER MASTER PLAN
Drawn by:
WAJ
SHEET S-4
Checked by:
WAJ
Project No:
21-003

S5 WWTP IMPROVEMENTS: CLARIFIER & TANK RECONDITIONING

ESTIMATED COST

$560,000

PROJECT DESCRIPTION

Drain and close off each section of the process chambers. Repair and refurbish as needed. Recoat with approved coating.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
Labor	1	lump sum	$350,000	$350,000
Materials	1	lump sum	$50,000	$50,000
Estimated Construction Cost				$400,000
Inspection (10%), Administration & Permitting (5%), Contingency (25%)				$160,000
				$560,000

S6 SCADA MONITORING: WWTP & LIFT STATIONS

ESTIMATED COST

$75,000

PROJECT DESCRIPTION

Increase SCADA monitoring of Lift Stations, Wastewater Collection System and WWTP.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
SCADA System	1	lump sum	$50,000	$50,000
Estimated Construction Cost				$50,000
Design (10%), Inspection (10%), Administration & Permitting (5%), Contingency (25%)				$25,000
				$75,000

S7 LIFT STATION UPGRADES: STANDARDIZING / BACKUP POWER

ESTIMATED COST

$465,000

PROJECT DESCRIPTION

Install Stationary Generators for Beach Road WW Lift Station and One Mile WW Lift Station. RESPEC estimate for preliminary design and design and bid documents (1/18/2023)

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
Beach Road WWLS Generator	1	Each	$126,000	$126,000
One Mile WWLS Generator	1	Each	$184,000	$184,000
Estimated Construction Cost				$310,000
Design (10%), Inspection (10%), Administration & Permitting (5%), Contingency (25%)				$155,000
				$465,000

S8 HYDRAULIC MODELING FOR SANITARY SEWER SYSTEM

PROJECT DESCRIPTION

By developing a comprehensive model of the sanitary sewer using SWMM (or similar other programs), the Public Works Department can analysis the Townsite sewer network, examining flow rates and main sizing, to identify any existing deficiencies, such as conditions causing sanitary sewer overflows both in the WWTP and the collection system. With this tool, DPW staff can plan for future improvements and upgrades based upon community growth and development. Possible reroutes of some mains could reduce annual maintenance and pumping costs by rerouting Skyline Sewer Shed and portions of Highlands Estates directly to the WWTP instead of pumping from the Beach Road Lift Station to the WWTP.

ESTIMATED COST

$74,750

PROJECT DESCRIPTION

Conduct wastewater influent and effluent hydraulic modeling to:

- Simulate the wastewater collection system
- Calculate flows and pressures in pipe network under various scenarios
- Aid in sizing various pumps, pipes, pressure zones and lift stations

Examine UAF SNAP community climate charts and EPA SWMM program to look at possible impacts of climate change on future flow volumes.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
Model Program	1	lump sum	$5,000	$5,000
Engineer	250	hour	$175	$43,750
GIS Specialist	50	hour	$175	$8,750
Estimated Construction Cost				$57,500
Administration (5%), Contingency (25%)				$17,250
				$74,750

S9 TOWNSITE SEWER MAIN EXTENSIONS

ESTIMATED COST

$2,565,000

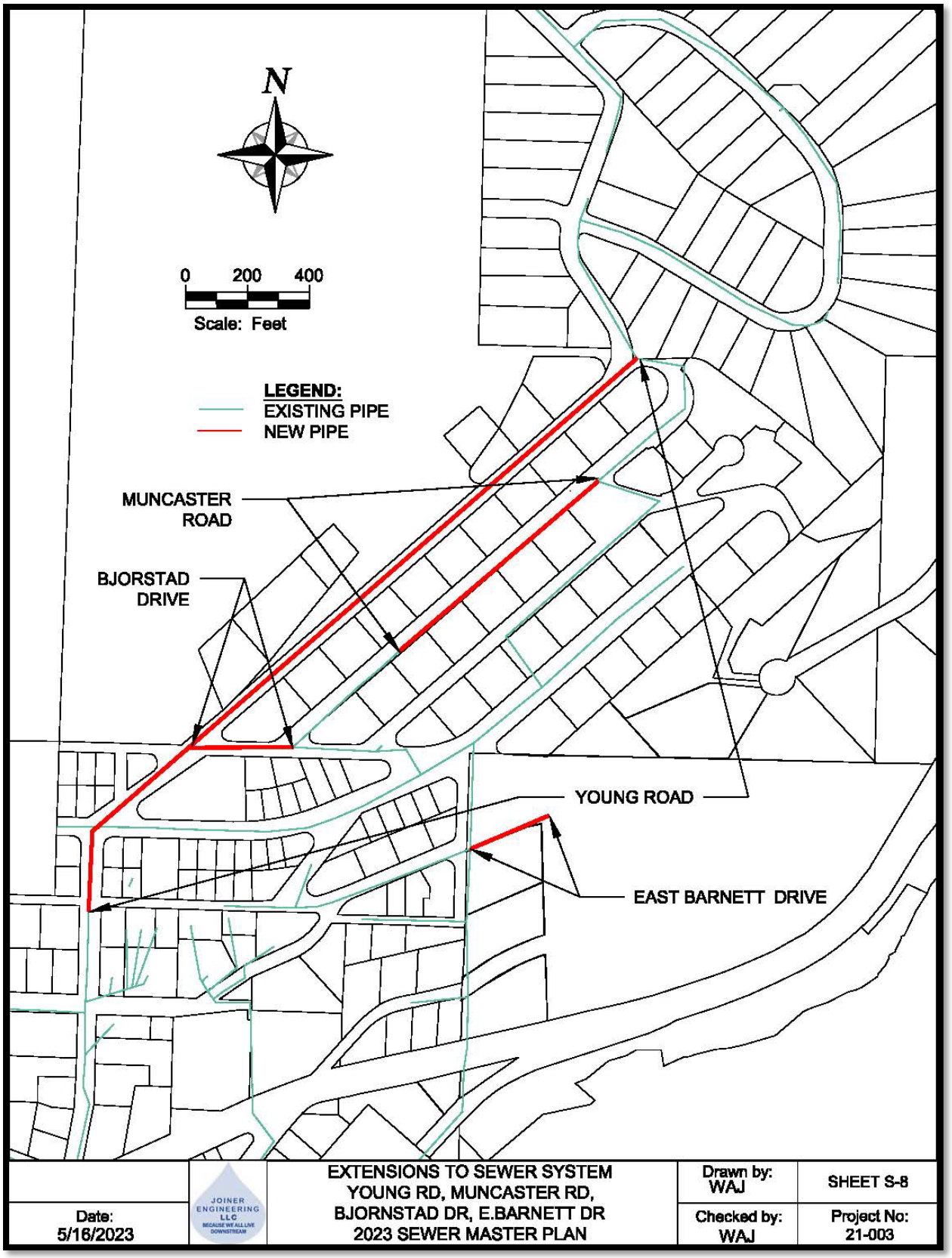
PROJECT DESCRIPTION

- Sewer Main from Young Road to Skyline Subdivision Manhole
- Muncaster Road Sewer Main Extension
- Bjornstad Drive to Muncaster Road and Young Road

Currently all the lots in the Highlands and Skyline Drive area drain to the Johnson Street sewer line and to the Beach Road Lift Station, where it is pumped in a force main to the WWTP. With this upgrade, all of Skyline Drive and lots adjacent to Young and Muncaster Roads will flow by gravity to the WWTP, saving pumping costs.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost	Lots Added
		LF	$450		
Estimated Construction Cost					
Young Road Sewer	2,600	LF	$450	$1,170,000	
Muncaster Road Sewer	850	LF	$450	$382,500	
Bjornstad – Muncaster to Young Road	350	LF	$450	$157,500	
				$1,710,000	**15**
Design (10%), Inspection (10%), Administration & Permitting (5%), Contingency (25%)				$855,000	
				$2,565,000	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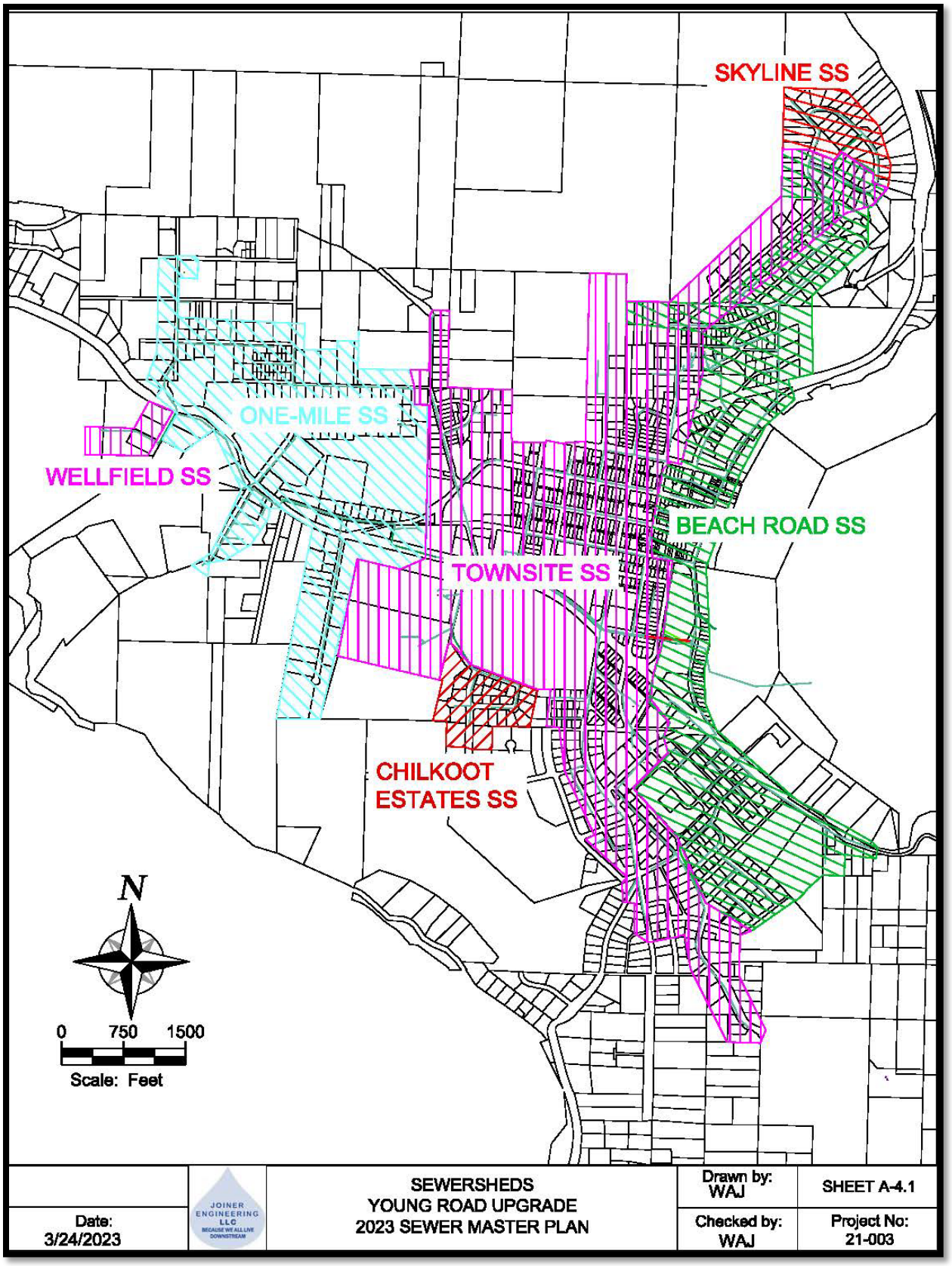
LEGEND:
EXISTING PIPE
NEW PIPE
MUNCASTER ROAD
BJORSTAD DRIVE
YOUNG ROAD
EAST BARNETT DRIVE
EXTENSIONS TO SEWER SYSTEM
YOUNG RD, MUNCASTER RD,
BJORNSTAD DR, E.BARNETT DR
2023 SEWER MASTER PLAN
Drawn by: WAJ
SHEET S-8
Date: 5/16/2023
Checked by: WAJ
Project No: 21-003


SKYLINE SS
ONE-MILE SS
WELLFIELD SS
BEACH ROAD SS
TOWNSITE SS
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Date:
3/24/2023
JOINER ENGINEERING LLC
BECAUSE WE ALL LIVE DOWNSTREAM
SEWERSHEDS
YOUNG ROAD UPGRADE
2023 SEWER MASTER PLAN
Drawn by:
WAJ
SHEET A-4.1
Checked by:
WAJ
Project No:
21-003

S10 SLUDGE CONTAINMENT, STORAGE & LONG-TERM STRATEGY

ESTIMATED COST

$900,000

PROJECT DESCRIPTION

Build a 1,500-square-foot, covered storage area to hold 60-plus cubic yards of sludge storage and/or soil remediation. Building needs to have wide, barn-style doors and enough height to accommodate a loader.

COST DETAIL

Description	Quantity	Unit	Cost/Unit	Cost
Sludge Storage Building	1,500	square foot	$400	$600,000
Estimated Construction Cost				$600,000
Design (10%), Inspection (10%), Administration & Permitting (5%), Contingency (25%)				$300,000
				$900,000

S11 EPA PERMIT COMPLIANCE

ESTIMATED COST

$6,473,025

PROJECT DESCRIPTION

In May 2023, EPA released the proposed version of the 301(h) waiver renewal. The Haines Borough submitted a response to this federal agency, clarifying the Borough's ability to implement these changes. If disinfection is required, most likely chlorination and de-chlorination, significant resources will be needed as such a system needs to be designed and constructed. Mixing zone requirements and monitoring requirements are also changing. An estimate of the costs associated with the proposed permit changes over the next five years follows, including the additional testing costs over the previous permit.

COST DETAIL

Total Costs of Additional 301(h) Testing for AK0021385 Annual Cost with Capital Cost for Disinfection / De-Chlorination				
Parameter	**Additional Annual Testing**	**In-House Staff**	**Contractor**	**Total**
Wastewater Treatment Plant – Annual Costs				
Total Flow	1	$31,720	$0	$31,720
Fecal Coliform	12	$15,132	$10,452	$15,132
Enterococcus -- Final	24	$30,264	$9,516	$30,264
Copper	8	$1,248	$2,392	$3,640
Temperature	Continuous	$30,732	$0	$30,732
Ammonia	4	$624	$962	$1,586
PFAS	6	$936	$6,864	$7,800
Whole Effluent Toxicity	1.8	$432	$19,710	$20,142
Toxic Pollutant Scan	0	$0	$0	$0
			Annual Total	**$141,016**
			5 – Year Total	**$705,080**
Wastewater Treatment Plant – Disinfection (Capital Cost & 5 Years O&M)				
Disinfection System	Continuous			$3,900,000
Staffing & Chemicals	Continuous			$1,091,350
			5 – Year Total	**$4,991,350**
Receiving Water Monitoring				
Temperature, Salinity, DO, pH, Turbidity, Sechhi Disk	18	$6,474	$0	$6,474
Fecal Coliform	39	$13,078	$0	$13,078
Enterococcus	55	$28,210	$0	$28,210
Benthic Infauna & Sediment Analysis	0.8	$333	$62,530	$62,863
			Annual Total	**$110,625**
			5 – Year Total	**$553,125**
Scheduled Submissions – Plans				
Draft Permit Review & Mixing Zone Determination	Pre-Permit			$49,660
Quality Assurance Plan	First 180 Days			$49,660
O&M Plan	First 180 Days			$49,660
ER&PN Plan	First 180 Days			$49,660
Disinfection Compliance Plan				$24,830
			5 – Year Total	**$223,470**
			Total Estimated 5 – Year Cost	**$6,473,025**

Wastewater plants in Haines and other Southeast cities likely to need upgrades to control bacteria

May 10, 2023 by Yereth Rosen, Alaska Beacon

Haines, Alaska, is seen on the morning of May 29, 2014. (James Brooks/Alaska Beacon)

Alaska's coastal communities are home to more than a third of the U.S. wastewater plants that are still allowed to treat their sewage at the lowest and most basic technological level. But six cities in Southeast Alaska may soon have to invest in improvements to better clean their wastewater before discharging it into the ocean.

That is the message from draft permits that have been released or are to be released by the Environmental Protection Agency, which has determined that too much bacteria is going from the sites into marine waters.

The agency last week issued a draft permit for the Haines Borough's wastewater plant that calls for disinfection of bacteria in the treated discharge. As of now, there is no disinfection at the Haines plant, and its discharges contain high levels of fecal coliform and enterococcus bacteria, common pollutants in sewage, EPA said. To meet state water-quality standards, the plant relies on a large "mixing zone" in Portage Cove, EPA said.

7.0 SEWER SYSTEM RECOMMENDATIONS

This section highlights recommendations for the Haines Sewer System. These sanitation suggestions are potential future projects beyond the scope of the ten-year Capital Improvement Project list shown in ***Section 6***. The recommendations focus on a 20-year period, 2023 to 2042. A summary of each follows.

SR1 HYDRAULIC MODELING & CLIMATE CHANGE UPGRADES FOR STORM WATER SEWER SYSTEM

SR2 RESIDENTIAL LEAK DETECTION & ABATEMENT

SR3 SSS & SWSS UPGRADES FOR CLIMATE CHANGE IMPACTS

SR4 SURVEY OF ON-SITE WW SYSTEMS IN TOWNSITE

SR5 INVESTIGATE RECONFIGUATION & UPGRADES TO WWTP

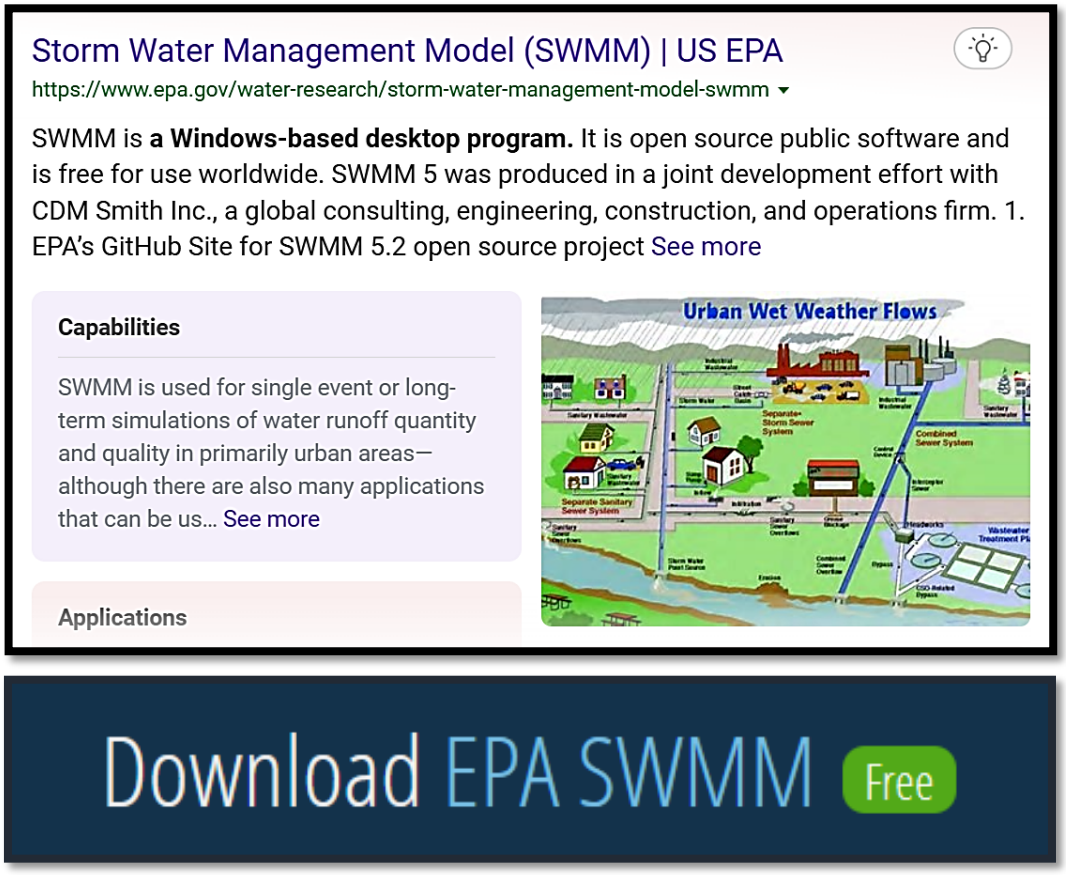
SR6 PUBLIC EDUCATION CAMPAIGN REGARDING SEWER BMPs

SR7 IMPROVING EFFICIENCES WITH SCADA & STAFFING

SR1 HYDRAULIC MODELING FOR STORM WATER SEWER

PROJECT DESCRIPTION

By developing a comprehensive model of the storm water sewer system using SWMM (or other similar programs), the Public Works Department can analysis the Townsite SWSS network, examining flow rates and main sizing, to identify any problem areas. With annual precipitation amounts increasing, this modeling can help identify problem areas and prevent community flooding.



SR2 RESIDENTIAL LEAK DETECTION & ABATEMENT

PROJECT DESCRIPTION

I/I continues to be an issue for the loading on the WWTP. Efforts in 1985 and 1986 identified steps to mitigate the added volume, yet the problem continues as demonstrated by the correlation of high flows with local precipitation (see ***Section 4***, ***Chart 4.1***).

A three-fold approach seems appropriate. Recommendation ***WR3 – Leak Detection & Abatement*** in the *2023 Haines Water Master Plan* uses residential meters with leak detection capabilities to locate leaks from curb stops to residential customer connections.

Sewer laterals in the Townsite, some of which may be more than a century old, could contribute to the I/I situation. Although some material for sewer pipe have lifecycles of a hundred years, a plan to review a sampling of laterals in older Townsite areas would provide insight into pipe integrity. Tree roots, extreme temperatures and corrosion can impact sewer laterals.

In addition to draining difficulties in a home, sewer issues can produce:

- mushy areas in a yard
- new, green vegetation growing on a property
- strong sewer gas smell in a basement
- a wet or moldy basement
- new foundation cracks

Sewer water, leaking from a pipe joint or broken pipe, washes away the soil supporting the drain system. Eventually the leak undermines the lateral line, causing sags or separations. Leaking sewer water can also lead unsanitary ponding on residential property. If problems are detected, dye testing, hydrostatic pressure testing and static leak isolations testing are further options.

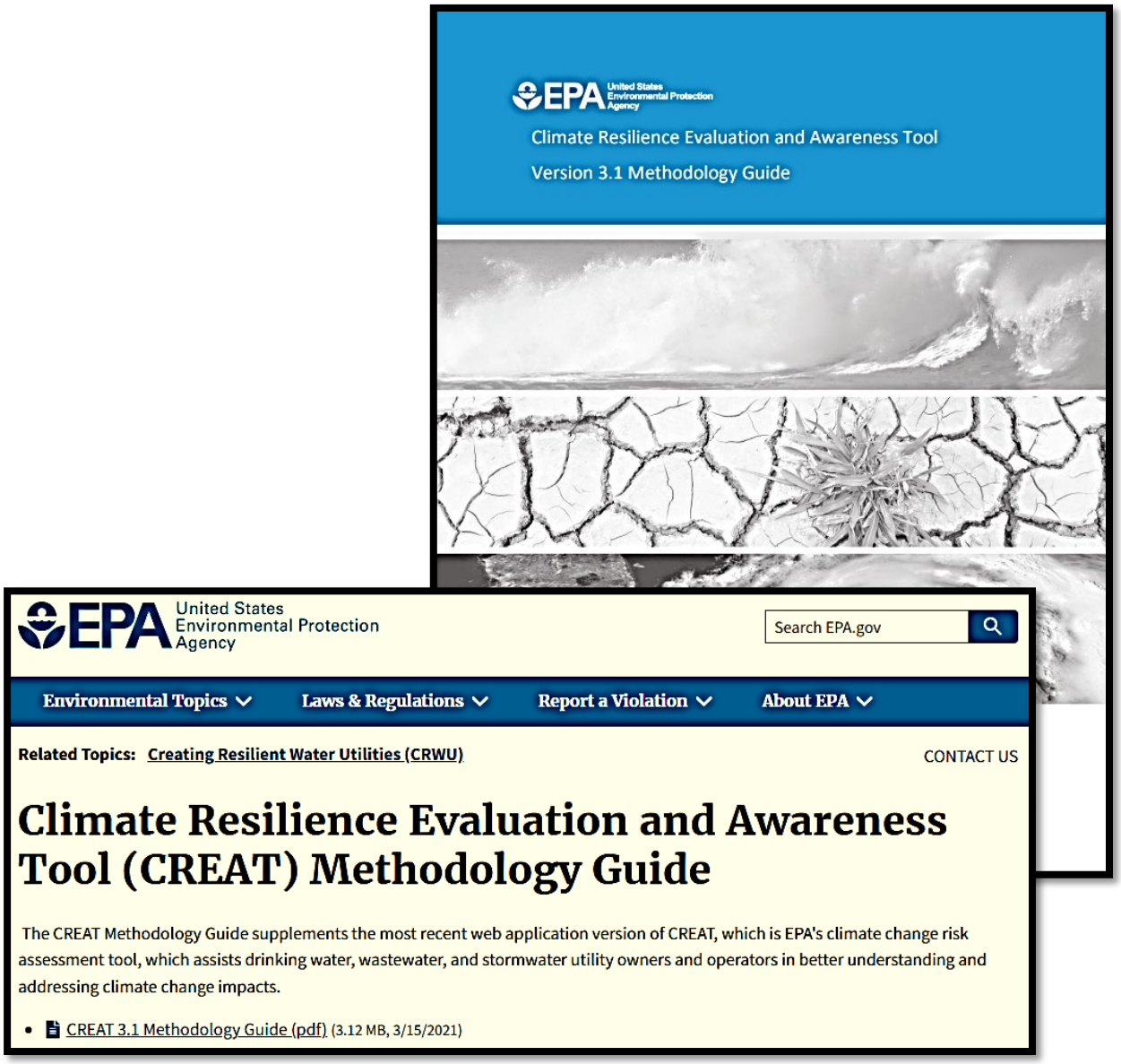
The third effort involves a program to identify stormwater sources remaining connected to the sanitary sewer system. Ensuring roof drains and sump pumps are routed to the stormwater sewer system is another useful tool.

In 1986, the City of Haines employed a Force Account Crew to address the stormwater connections that remained connected to the sanitary sewer system. All the stormwater connections identified by EMPS in 1985 and AEI in 1986 attached to the sanitary sewer were disconnected according to AEI's *Sanitary Sewer System Report – Repair & Rehabilitation*. (See ***Appendix B*** for a ***I/I Studies Summary***.) Yet these studies and repairs were completed over three decades ago. Some of the remaining AC pipe, which is prone to leaks, may have been in use over 70 years.

SR3 SSS & SWSS UPGRADES FOR CLIMATE CHANGE IMPACTS

PROJECT DESCRIPTION

Assess the Haines SSS with available software tools, such as EPA *CREAT*. Develop strategies for coping with anticipated changes for the seven sewersheds and the WWTP capacity in the Townsite area.

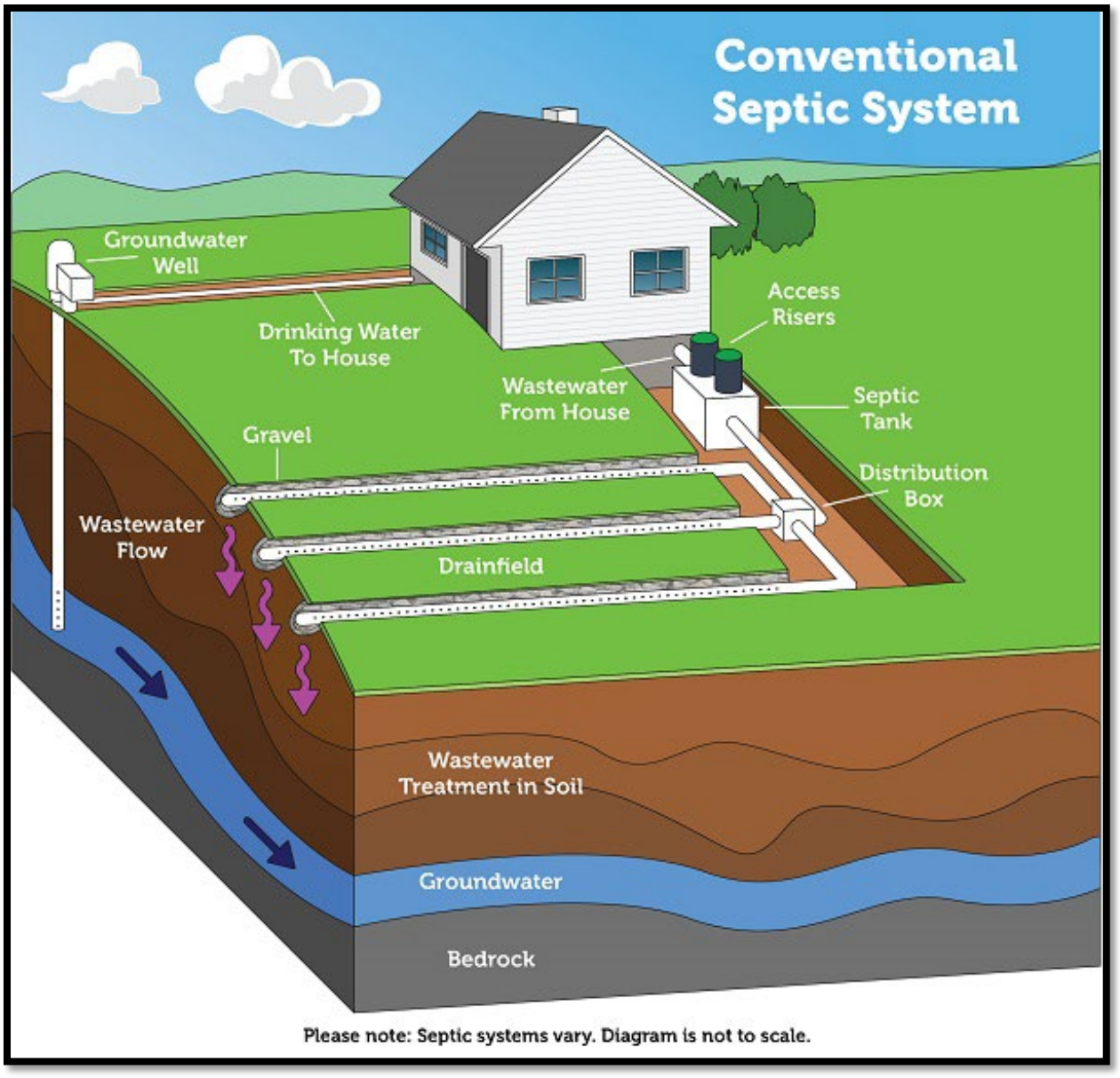


SR4 SURVEY OF ON-SITE WW SYSTEMS IN TOWNSITE

PROJECT DESCRIPTION

There may be numerous on-site residential wastewater treatment systems in the Townsite. Obviously, those homes who do not receive a monthly sewer utility bill are on some other system. *HB Code 13.08.100 Required Conditions* states the requirements for residents to hook up to the SSS.

On-site systems have limited applications in densely populated areas as drain fields have finite life spans and require separation distances to other utilities.



SR5 INVESTIGATE RECONFIGUATION & UPGRADES TO WWTP

PROJECT DESCRIPTION

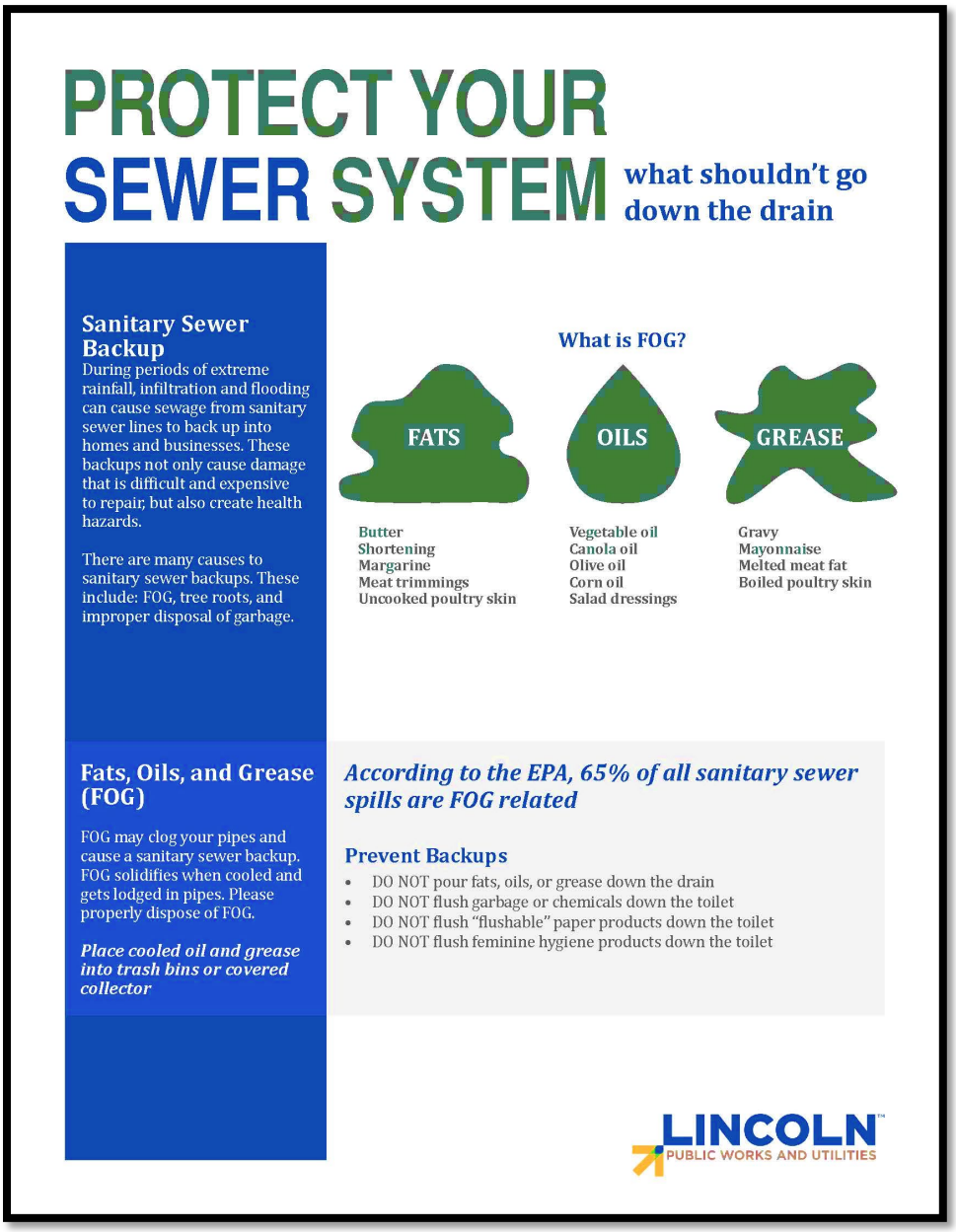
Depending on the outcome of the updated EPA *301(h)* waiver, additional treatment may be required. Further, if I/I is not reduced and population on the Townsite SSS continues to increase, there may be future capacity issues. Currently, the clarifier appears to be the bottleneck in the treatment train. If the WWTP capacity needs to be increased at some future point, evaluating the options for increasing the clarifier capacity seems appropriate.

Improvements that create additional redundancy, such as a back-up belt-filter press, is another consideration.

SR6 PUBLIC EDUCATION CAMPAIGN REGARDING SEWER BMPs

PROJECT DESCRIPTION

Consumers can make a difference in how well the community sanitary sewer system runs. Some items should not be disposed in the sewer. Some communities produce an annual Wastewater Utility Annual Report summarizing the highlights of the past year. See ***Appendix B*** for a Haines versions.) This communication provides an avenue to remind consumers of the best practices to minimize problems in the SSS.

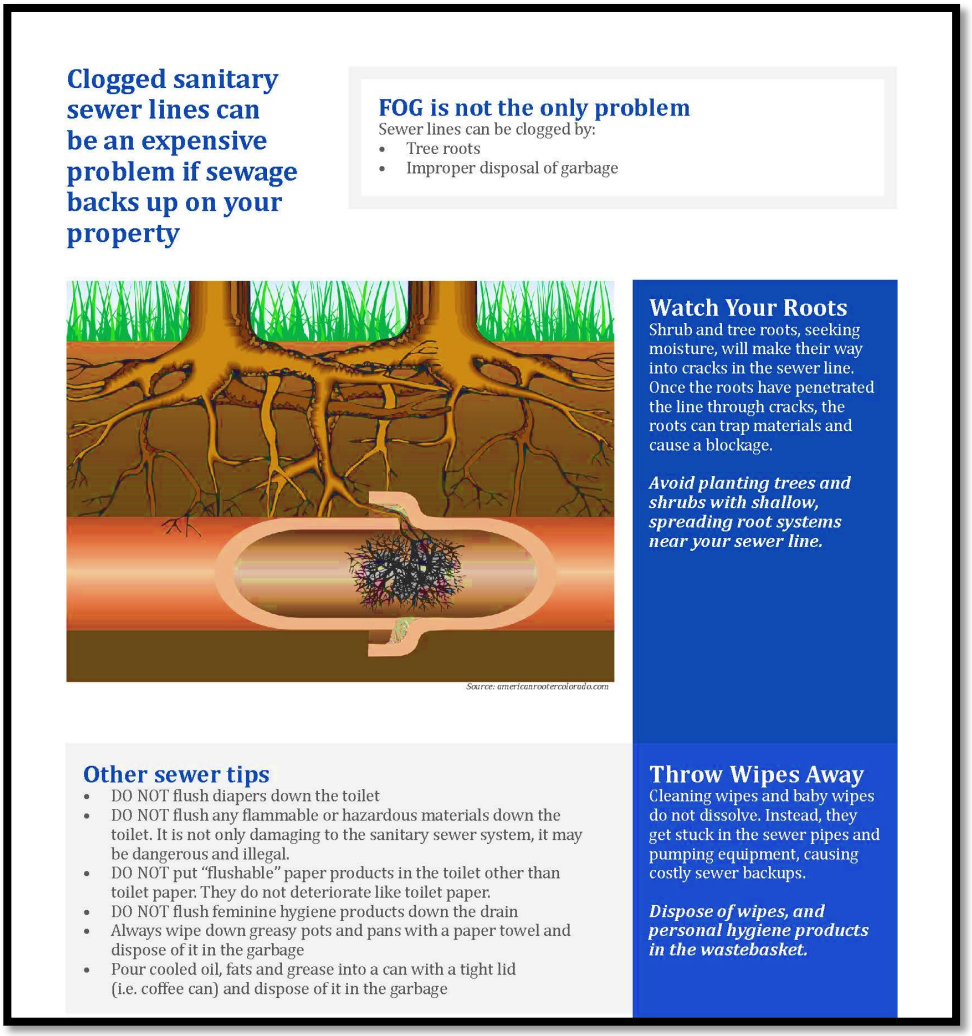


SR7 IMPROVING EFFICIENCES WITH SCADA & STAFFING

PROJECT DESCRIPTION

Complexities of this SSS require improved efficiencies to run and maintain the utility adequately. Proposed SCADA upgrades will help Operators with data collection and equipment malfunctions. Even so, additional staffing is warranted to ensure current DPW Staff is able to perform all required tasks for permit compliance. Further, when a DPW Staff member takes leave, there should be enough certified Operators to adequately run the system. This means having more than one certified Operator. If the credentialed individual takes leave and travels out-of-town, this Operator is unavailable on-call and a permit violation occurs.

One option is to consider cross-training. Perhaps other DPW employees could be trained to fill in on an as-needed basis to ensure adequate staffing patterns for the SSS operation.



8.0 FUNDING, PERMITS & OTHER APPROVALS

8.1 FUNDING SOURCES

Potential funding for future public water and sewer projects in the State of Alaska include, but may not be limited to:

- ADEC grants and/or revolving loan funds
- ADOT&PF
- Alaska Legislative Direct Appropriation Grant(s)
- Municipal Bond Issues (includes the Alaska Municipal Bond Bank and Private Sector Bonding)
- Rural Utility Service (RUS) Water and Environmental Programs (administered by the US Department of Agriculture). These include federal grant/loan programs, including Farmer's Home Administration programs available to communities with fewer than 10,000 residents. Low interest loans are made available for water and wastewater disposal systems. Public bodies and not-for-profit corporations are eligible. Funds may also be used for solid waste disposal and storm drainage systems, as well as training. Some applicants may qualify for grant funds to supplement a loan. US Department of Agriculture Rural Development Staff in Alaska can be contacted at (907) 761-7705.
- The USEPA and RUS provide funding to organizations that provide training and technical assistance to small water and wastewater systems. These organizations include the National Rural Water Association, the Rural Community Assistance Program and the National Drinking Water Clearinghouse.

8.2 PERMITS & APPROVALS

There are several permits and approvals that would be required prior to the construction of the proposed improvements. These permits and approvals include, but may not be limited to:

- ADEC plan review, approval to construct and operate wastewater improvements
- ADNR and ADF&G approval for construction activities that cross streams and other water bodies
- ADOT&PF approval for work in state rights-of-way (ROWs) and road crossings
- Federal Aviation Administration (FAA) approval for work in the boundaries of the airport and its vicinity
- USACE permits for work in shorelines or wetlands; Section 401 Water Quality Certification
- Easement from individual property owners and public agencies
- Archeological clearance from SHPO

9.0 REFERENCES

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10.0 APPENDICES

APPENDIX A: DRAWING

- Sheet A-1: Aerial Photo of Haines Sewer System
- Sheet A-2: Proposed Sanitary Sewer Improvements
- Sheet A-3: Townsite & Zoning Designations
- Sheet A-4: Sanitary Sewershed Zones
- Sheet A-5: Storm Water Sewer System

APPENDIX B: HAINES WASTEWATER SYSTEM

- Existing EPA 301(h) Waiver
- Proposed 301(h) Waiver Comments
  - Haines Borough July 3, 2023 Letter
  - Attachment 1 for July 3, 2023 Letter
- 2001 Versus 2023 Sample Schedules for Permits
  - Effluent Limits & Monitoring Requirements
  - PFAS Chemical To Be Analyzed
  - Receiving Water Monitoring Requirements
- Sanitary Sewer Details
  - Collection System Pumps
  - WWTP Clarifier Schematic
  - Mixing Zone Schematic
  - 2023 Sewer Fee Schedule
- Sanitary Sewer Reports
  - I/I Studies Summary
  - Site Visit Photo Log – November 9 – 11, 2022
  - Annual Wastewater Utility Report: 2022

APPENDIX C: MAPS

- Flood Risk
- Tsunami Inundation Risk

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APPENDIX A: DRAWINGS

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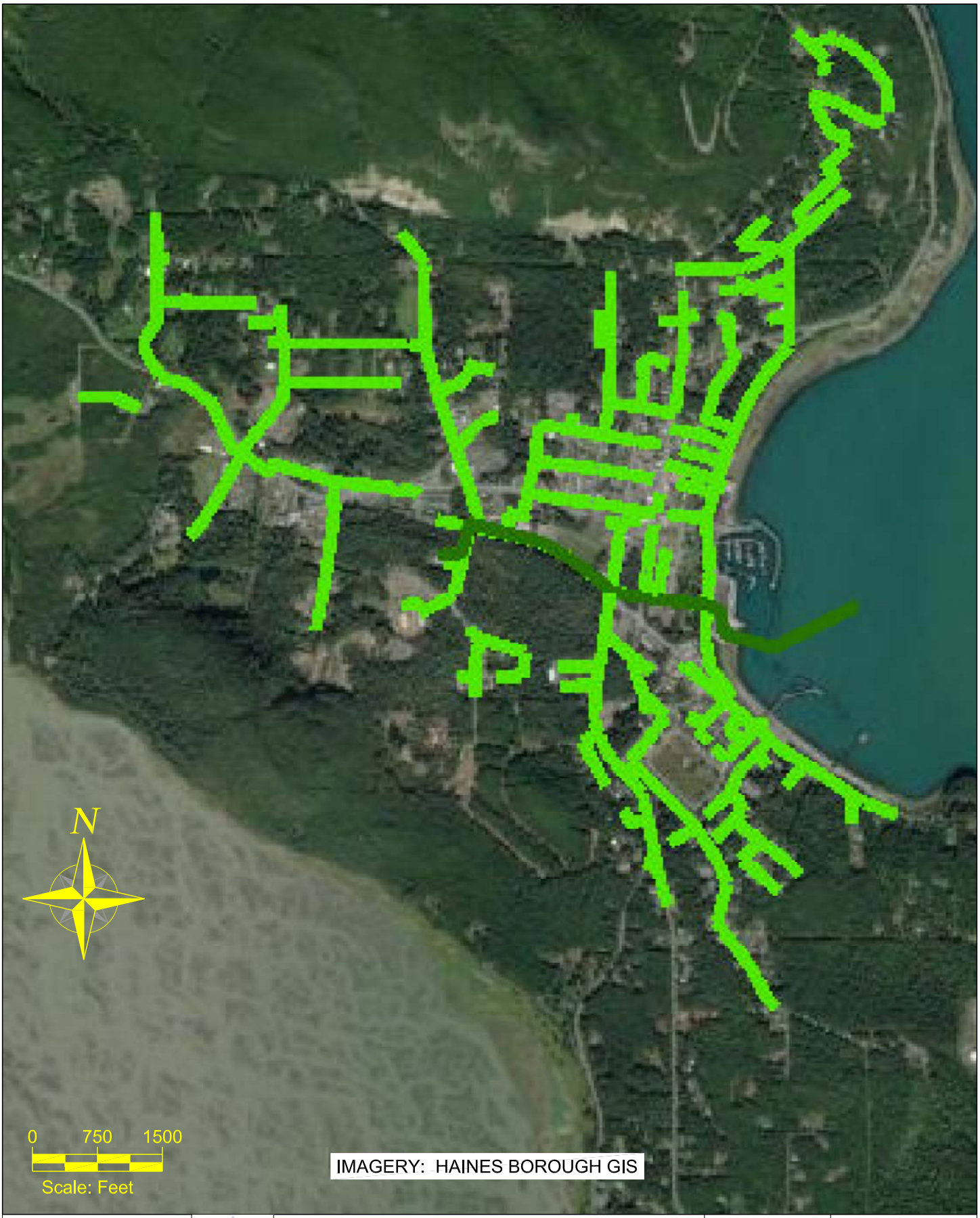
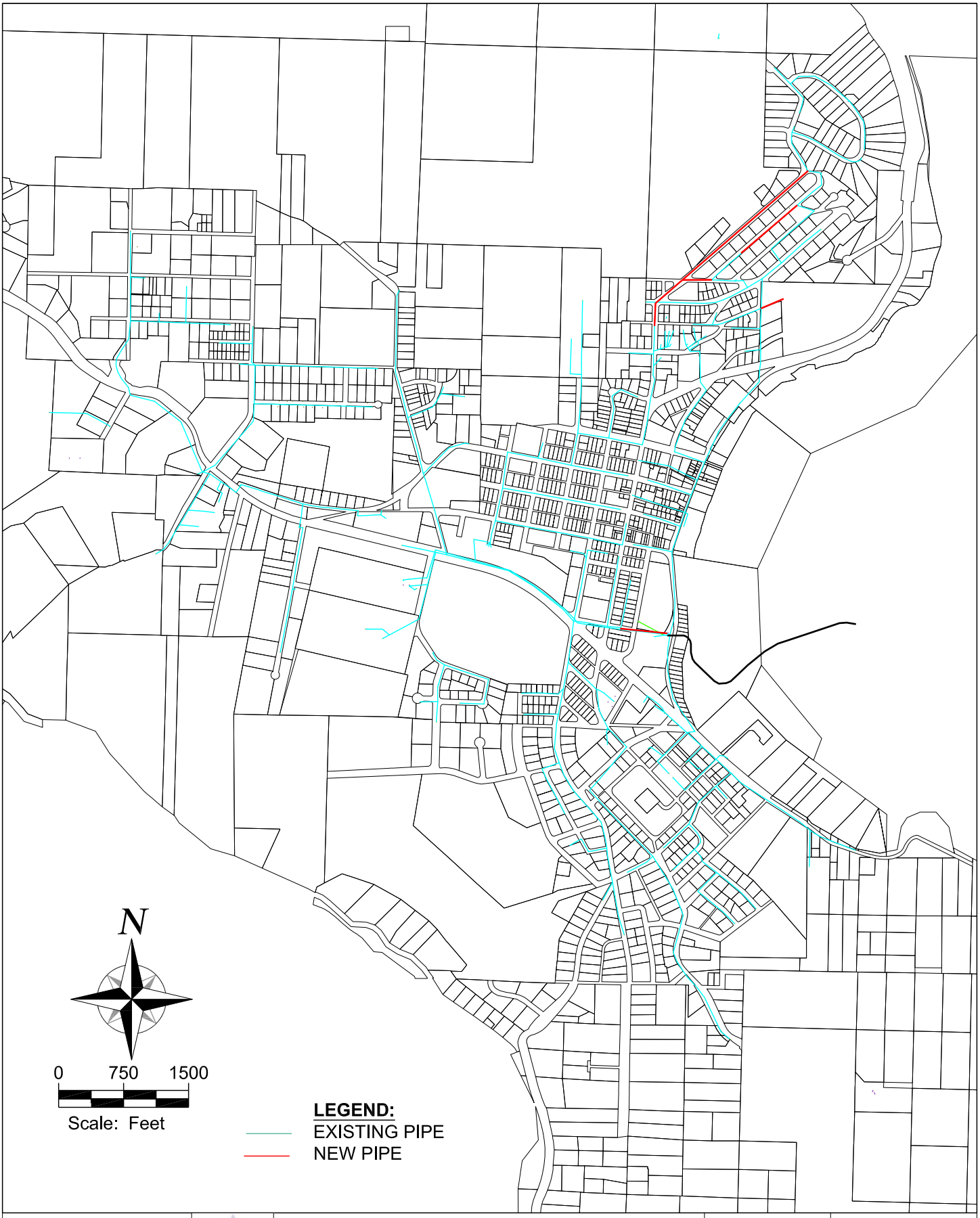
- **Sheet A-4: Sanitary Sewershed Zones**
- **Sheet A-5: Storm Water Sewer System**

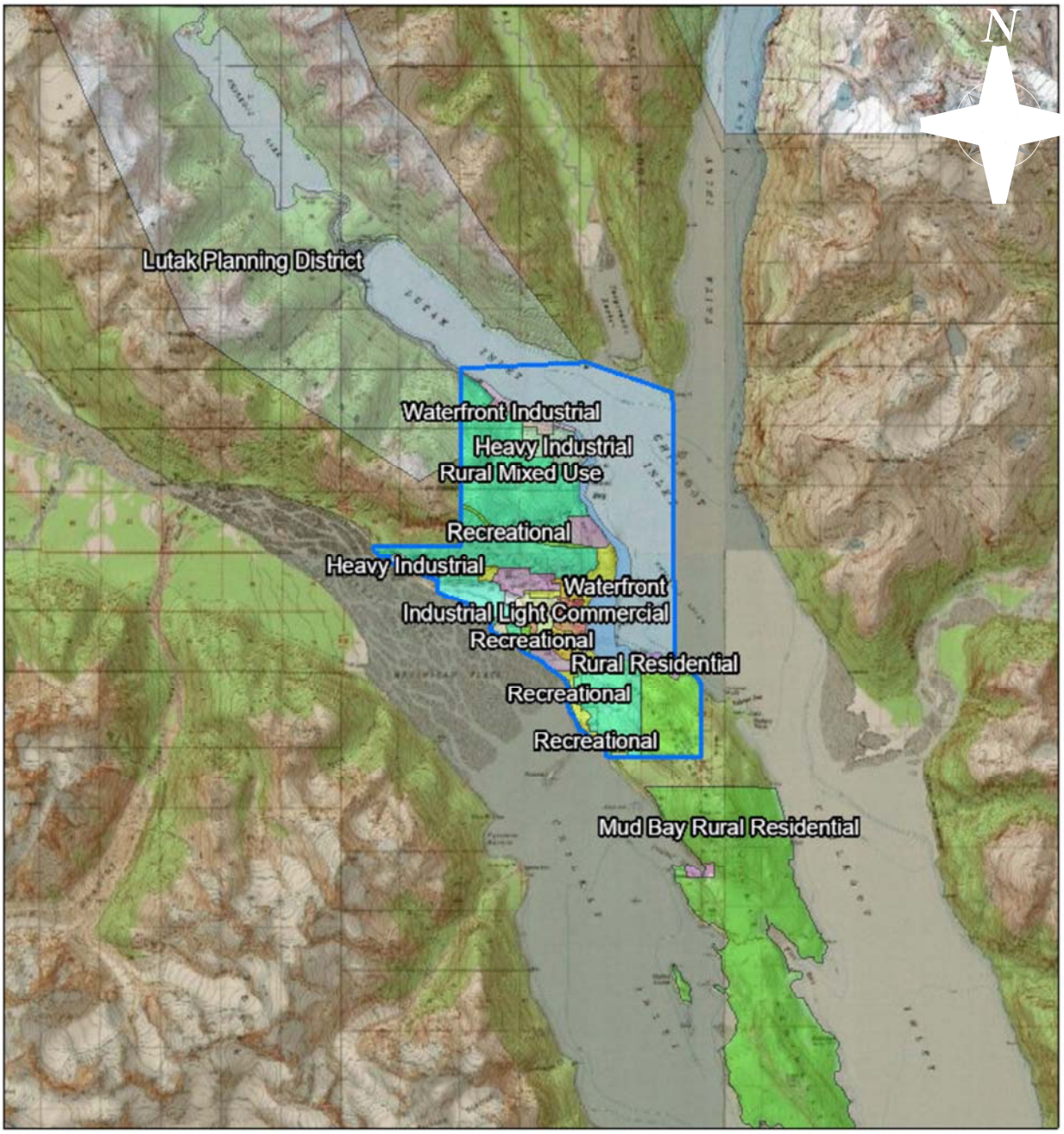


	JOINER ENGINEERING LLC BECAUSE WE ALL LIVE DOWNSTREAM	AERIAL PHOTO OF HAINES BOROUGH SEWER SYSTEM 2023 WATER SYSTEM MASTER PLAN	Drawn by: WAJ	Sheet A-1
Date: 3/26/2023			Checked by: WAJ	Project No: 21-003



		EXTENSIONS TO SEWER SYSTEM 2023 SEWER MASTER PLAN	Drawn by: WAJ	SHEET A-2
Date: 5/16/2023	JOINER ENGINEERING LLC BECAUSE WE ALL LIVE DOWNSTREAM		Checked by: WAJ	Project No: 21-003

Townsite and Zone Boundaries



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0 1.25 2.5 5 mi

0 2 4 8 km

Townsite Service Area Boundary

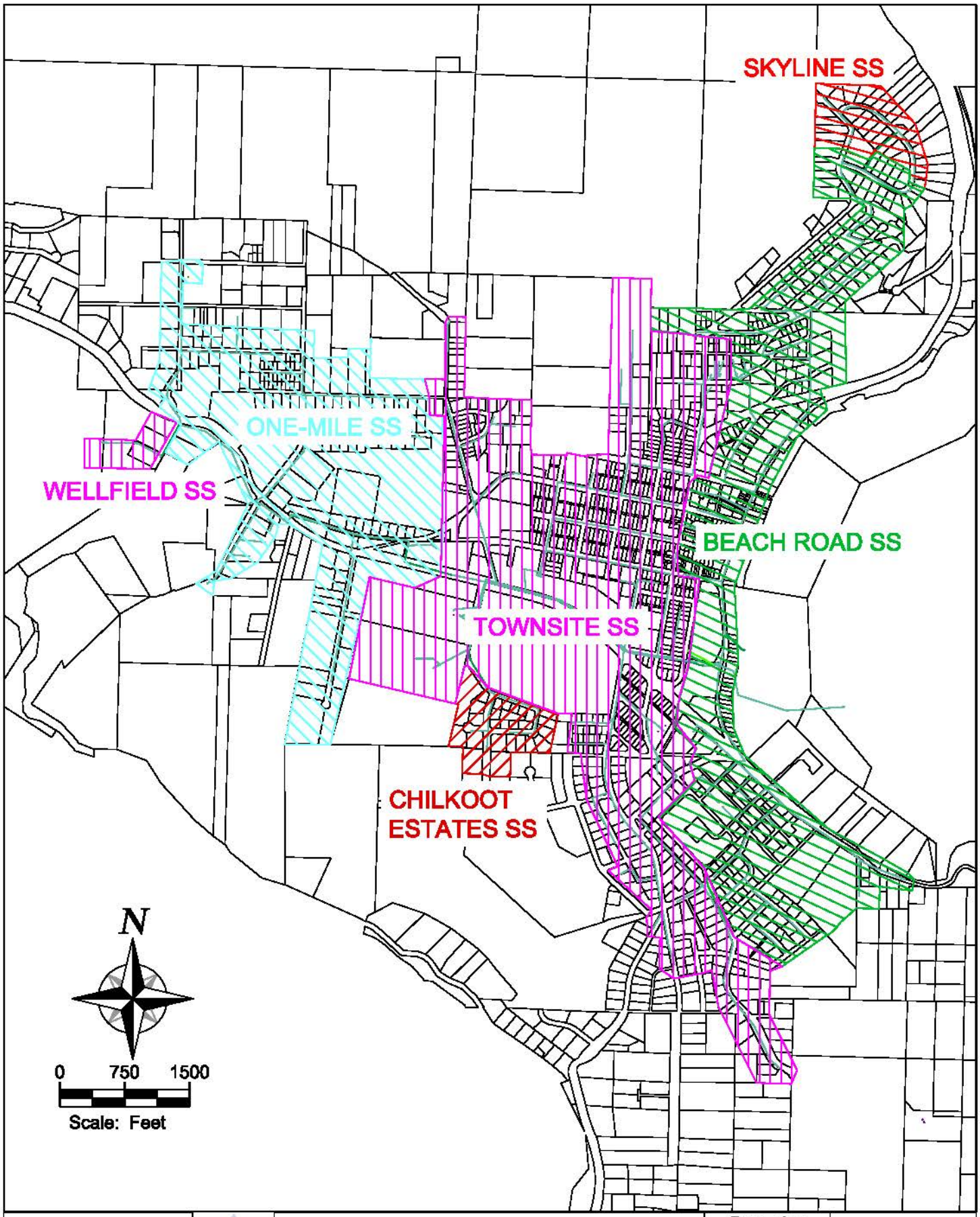
Zoning

- Recreational
- Heavy Industrial
- Rural Residential
- Single Residential
- Mud Bay Rural Residential
- Rural Mixed Use
- Commercial
- Multiple Residential
- General Use
- Industrial Light Commercial

Web AppBuilder for ArcGIS

ADFG SF GIS | USDA Forest Service - Alaska Region and Proponent (Unrecognized Southeast Alaska Native Communities) | Alaska Map Company, LLC

	JOINER ENGINEERING LLC BECAUSE WE ALL LIVE DOWNSTREAM	TOWNSITE & ZONING BOUNDARIES HAINES BOROUGH WATER SYSTEM 2023 SEWER MASTER PLAN	Drawn by: WAJ	Sheet A-3
Date: 3/18/2023			Checked by: WAJ	Project No: 21-003



	JOINER ENGINEERING LLC BECAUSE WE ALL LIVE DOWNSTREAM	SEWERSHEDS 2023 SEWER MASTER PLAN	Drawn by: WAJ	SHEET A-4
Date: 3/24/2023			Checked by: WAJ	Project No: 21-003

NOT TO SCALE	JOINER ENGINEERING LLC BECAUSE WE ALL LIVE DOWNSTREAM	STORM WATER SEWER SYSTEM 2023 SEWER MASTER PLAN	Date: 3/26/2023	Sheet A-5
			Drawn By: WAJ	Project No: 21-003
			Checked By: WAJ	

10.0 APPENDICES

APPENDIX B: HAINES WASTEWATER SYSTEM

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APPENDIX B: HAINES WASTEWATER SYSTEM

- **Existing EPA 301(h) Waiver**

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the "Act", the

Municipality of Haines
Wastewater Treatment Facility

is authorized to discharge from a facility located at **Haines, Alaska** (latitude: 59° 13: 59"; longitude: 135° 25: 44")

to receiving waters named **Portage Cove**,

in accordance with the discharge point, effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective December 24, 2001.

This permit and the authorization to discharge shall expire at midnight, December 26, 2006.

Signed this 20 day of November, 2001.

/s/ Mike Bussell
Director, Office of Water, Region 10
U.S. Environmental Protection Agency

TABLE OF CONTENTS

I. SPECIFIC LIMITATIONS AND REQUIREMENTS

A. Effluent Limitations

1. During the effective period of this permit, the permittee is authorized to discharge from outfall 001, subject to the restrictions set forth herein. This permit does not authorize the discharge of any waste streams, including spills and other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility as disclosed in the permit application, or any pollutants that are not ordinarily present in such waste streams.

2. There shall be no discharge of floating solids, visible foam, or oily wastes which produce a sheen on the surface of the receiving water.

3. The pH shall not be less than 6.5 standard units nor greater than 8.5 standard units.

4. The dissolved oxygen (D.O.) shall not be less than 2.0 mg/L nor greater than 17 mg/L.

5. The following effluent limits shall apply at all times:

Table 1. EFFLUENT LIMITATIONS

Effluent Parameter	Unit of Measurement	Monthly Average	Maximum Daily
Flow	MGD	1.9	2.9
Biochemical Oxygen Demand (BOD_5)[1] May 1 - September 30	mg/L	260	300
	lbs/day	4100	4800
Biochemical Oxygen Demand (BOD_5)[1] October 1 - April 30	mg/L	140	200
	lbs/day	2200	3200
Total Suspended Solids (TSS)[1]	mg/L	140	200
	lbs/day	2200	3200
Fecal Coliform	# FC/100 mL	1,000,000	1,500,000
Copper	µg/L	78	156

1. The monthly average effluent loading shall not exceed 70 percent of the monthly average influent loading for five day biological oxygen demand (BOD5) and total suspended solids (TSS).

6. If a chlorination process is added at the facility as a method of disinfection, the permittee shall notify the Environmental Protection Agency and the Alaska Department of Environmental Conservation and the following limitations shall become effective: maximum daily total residual chlorine shall not exceed 0.11 mg/L with sampling (grab) required once per week.

B. Monitoring Requirements

1. Overview

The permittee shall implement the plant influent/effluent, water quality, biological, and toxics control monitoring programs as described below. The primary objectives of these programs are as follows:

- Determine compliance with the NPDES Permit
- Determine compliance with State water quality criteria
- Aid in assessing water quality at discharge point
- Characterize toxic substances
- Monitor plant performance
- Determine compliance with the regulatory criteria of Section 301(h) of the Clean Water Act
- Determine level of bacteria concentration in nearshore waters
- Monitor for changes in sediment quality (organic enrichment, grain size distribution alteration, and pollutant contamination)
- Determine if pollutants from the discharge are accumulating in exposed biological organisms
- Provide data for evaluating reissuance of this permit

2. Annual Reporting

Influent and effluent monitoring (Part B.3.) must be reported monthly on the Discharge Monitoring Report as required under Part II.C. of this permit. A report summarizing the results for Receiving Water Quality Monitoring Requirements (Part B.4.) and Biological Monitoring (Part B.5.) must be submitted to EPA Region 10 by December 31 of each year in which samples are collected. In addition, the reports shall explain how the objectives cited above in Part B.1. have been met.

3. Influent and Effluent Monitoring Requirements

During the effective period of this permit, the following monitoring requirements shall apply:

Table 2. 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, lb/day	Influent & Effluent	Monthly	24-hour composite
TSS, mg/L, lb/day	Influent & Effluent	Weekly	24-hour composite
Dissolved Oxygen, mg/L	Effluent	Weekly	Grab
Temperature, °C	Effluent	Weekly	Grab
pH, S.U.	Effluent	Weekly	Grab
Fecal Coliform Bacteria, Colonies/100 mL	Effluent	Monthly	Grab
Copper, µg/L	Effluent	1/quarter	24-hour composite
Toxic Pollutants and Pesticides[1]	Effluent	2/permit term[2]	24-hour composite
Whole Effluent Toxicity (WET)[3], TU_c	Effluent	1/permit term[4]	24-hour composite

1. "Toxic pollutants" are defined as the 126 priority pollutants listed in 40 CFR 401.15. "Pesticides" are defined at 40 CFR 125.58(m).
2. The permittee shall conduct analyses of the effluent for toxic pollutants and pesticides during the first and fourth year of the permit term. Monitoring during the first year shall be conducted during the dry season in the month of July. Monitoring during the fourth year shall be conducted during the wet season in the month of January. Samples shall be 24-hour composite samples. Sampling and analysis shall be conducted according to methods approved in 40 CFR Part 136.
3. See Part I.C.
4. Whole Effluent Toxicity monitoring shall be conducted in the first year of the permit term.

Influent and effluent monitoring results shall be reported monthly as specified in Part II.C. (Reporting of Monitoring Results).

4. Receiving Water Quality Monitoring Requirements

a. Water Quality Monitoring. Water quality shall be monitored once per year for temperature, salinity, dissolved oxygen, pH, turbidity, and Secchi disk (see Table 3). Monitoring in years 1, 3, and 5 shall be conducted in January (wet season) while monitoring in years 2 and 4 shall be conducted in August (dry season). Four stations shall be sampled. Based on the sampling completed during the last permit, these sampling stations have been identified as ZID North (North boundary of zone of initial dilution); ZID South (South boundary of zone of initial dilution); Ref North (Reference station north of zone of initial dilution); and Ref South (Reference station located 1000 m southeast of the outfall), respectively. These previously-established stations shall continue to be sampled under this permit.

Table 3 identifies parameters, sampling depths, locations, and sampling frequency. The dissolved oxygen, pH, salinity, and temperature zone of initial dilution (ZID) is defined as a rectangle 63.7 m (209 ft) long (perpendicular to shore) and 54.9 m (180 ft) wide centered on the diffuser.

b. Fecal Coliform Monitoring. Water quality shall be monitored four times per year for fecal coliform bacteria, once in each of the following months: January, May, August, and November. Monitoring for fecal coliform bacteria is required on the outside edge of the mixing zone (see Table 3). Samples must be collected at a minimum of four locations: on the North, East, and South edges of the mixing zone, and one shoreline sample within the mixing zone. If fecal coliform bacteria concentrations monitored at the edge of the mixing zone do not exceed a monthly average of 14 FC/100mL and the daily maximum of 43 FC/100mL during the first two years of monitoring, then the required monitoring frequency for fecal coliform will be reduced to once per year in each subsequent year, performed on the same day as the water quality monitoring of Section I.B.4.a. above.

c. Reporting. Monitoring of temperature, salinity, dissolved oxygen, pH, turbidity, and Secchi disk shall be reported on the annual report required under paragraph I.B.2 above. Monitoring of fecal coliform shall be reported on monthly DMRs and also in the annual report.

The annual report of the data collected in this section shall:

- note any observed surfacing of the effluent plume in a visible boil, the presence of floatable material, or any surface film, sheen, or discoloration;
- include a narrative description of the sampling procedures and locations;
- include a map of the sampled locations that also shows the outfall and ZID; and
- include a copy of all data collected during each sampling period.

Fecal coliform monitoring reports shall also include a description of the weather conditions at the time of sampling.

Table 3. RECEIVING WATER QUALITY MONITORING REQUIREMENTS

Parameter	Station location	Depth	Monitoring Frequency
Temperature, °C	ZID North ZID South Reference North Reference South	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4
Salinity, ppt	ZID North ZID South Reference North Reference South	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4
Dissolved Oxygen (DO), mg/L	ZID North ZID South Reference North Reference South	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4
pH	ZID North ZID South Reference North Reference South	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4
Turbidity, NTU	ZID North ZID South Reference North Reference South	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4
Secchi disk	ZID North ZID South Reference North Reference South	Surface	1/year; during January in years 1,3, and 5, and during August in years 2 and 4
Fecal coliform bacteria[1]	North, East, and South edges of the fecal coliform bacteria mixing zone and one shoreline station within the mixing zone	Surface	4/year, January, May, August, and November (may be reduced to 1/year in year 3, see Section I.B.4.b)

1. Samples shall be collected on the same day that effluent is sampled for FC concentrations. The mixing zone for fecal coliform bacteria is defined as an arc of a circle of 1600 meter radius, centered on the outfall going from one shoreline to the other extending on either side of the outfall line and over the diffuser. Outside this mixing zone the fecal coliform concentrations shall not exceed a monthly average of 14 FC/100 mL, and a daily maximum of 43 FC/100 mL. Also, fecal coliform concentrations shall not exceed 200FC/100mL at the shoreline within the designated mixing zone.

5. Biological Monitoring for Benthic Infauna and Sediment Analyses

a. Sediment sampling for TVS and benthic infauna shall occur in August of the fourth year of the permit. The sampling shall be coordinated, to the extent practicable, with the sampling times for the water quality monitoring program. Samples shall be collected from the following 3 stations:

- Station 1, within the ZID
- Station 2, a reference station
- Station 3, beyond the ZID boundary (within 5 m of the boundary)

The reference station shall be at the same location as one of the reference stations used for the water column monitoring (as specified in I.D.2.a.), and have the same sediment type as that present at the outfall. Appropriate stations have been previously established during the 1998 biological survey conducted by Carson Dorn, Inc. These previously established stations should continue to be sampled to ensure that comparisons can be made to previous biological sampling results.

Once on site, sampling stations shall be verified using an electronic navigational aid that ensures that sampling stations occupied are the same stations sampled during the August, 1998, biological survey.

b. Sample collection for TVS and benthic infauna.

(1) At each sampling station three (3) replicate sediment samples for TVS and five (5) replicate samples for benthic infauna shall be collected.

(2) TVS core samples shall be taken adjacent to the samples for benthic fauna.

(3) Sediment core samples shall be collected for TVS analysis by means of a core sampler with an approximate volume of 250 to 500 ml. The core sampler should be inserted vertically into the sediment without disturbing the surface layer to allow collection of an undisturbed sample of the surface layer. Equal volumes shall be collected for each TVS core sample. The TVS core samples shall be taken to a sediment depth of no more than approximately 5 to 7 cm.

(4) Benthic infauna samples shall be collected with a cylindrical core sampler with a cross-sectional area of 0.015 m^2 (a two pound coffee can may be used). Samples shall be taken to a depth of 10 cm (4 inches).

(5) The diver collecting samples shall be qualified to make observations of the benthic community, as demonstrated, for example, by an educational background that includes marine invertebrate zoology. To the extent possible, the same diver should be used for all sampling efforts, to assure consistent observation.

c. Sample Processing for TVS and benthic infauna

(1) Sediment samples for TVS shall be processed as follows:

- Within four (4) hours of collection, approximately 25 - 50 g of sediment core (corresponding to the top 1 inch (2.5 cm) of the sediment) shall be removed from each replicate sample and placed in an individual plastic bag or glass jar, labeled, and frozen.

- TVS analysis using procedures approved at 40 C.F.R. 136 shall be completed within one month of collection. The same procedures shall be used for both years' analyses of TVS.

- If wood chips or other large organic debris (bark) are present in the sample, the sediment used for TVS analysis shall be passed through a coarse screen (approximately 1/4 inch mesh) using a minimum amount of seawater as washwater. TVS analysis shall then be conducted on the screened sediment, the washwater, and any gravel, shells, or pebbles retained by the screen.

- The dry weight of any wood chips or other large organic debris within the entire sediment core shall be noted as well as the surface area and volume of the core samples.

(2) Sediment samples for benthic infauna shall be processed as follows:

- Samples shall be sieved through a 1.0 mm screen. Material remaining on the screen shall be placed in individual glass jars or plastic bags, labeled with the collection site and date, and preserved with buffered 10% formalin (buffered with borax) within four hours of collection.

- Within one week of collection the formalin shall be carefully poured from these samples and replaced with 70% ethanol.

- Stored samples for benthic community analysis shall be inspected every two to three months and any ethanol which has evaporated from the jars shall be replaced.

- Analysis of stored benthic infauna samples may be required in the future if EPA Region 10 determines that substantial changes have occurred in the TVS content of sediments in the area of the discharge. The decision on whether or not the stored sediment samples must be analyzed for benthic species composition will be made after Region 10 has reviewed diver observations and TVS analyses.

d. Biological monitoring reports for TVS and benthic infauna shall:

(1) be submitted to EPA Region 10 by December 31st of the second and fourth years of this permit term;

(2) include a map of the sampled locations that also shows the outfall and the ZID;

(3) include detailed field observations of the biological and sediment conditions at all of the sampled stations (including, but not limited to, the numerically dominant species, the approximate number of individuals of each species, differences in appearance of surface sediments at the locations sampled, etc.);

(4) include notes regarding sampling procedures, number of samples collected, and location where the samples were collected; and

(5) include the results of the benthic community and TVS analyses from each location.

After EPA Region 10 reviews the above information, a list of organisms found in each replicate sample collected for benthic community analysis may be required. If required, the archived benthic infauna samples shall be identified to the species level and enumerated for each replicate. The species identification and enumeration for each replicate sample shall be submitted to EPA Region 10 within four months of the date it is requested.

C. Whole Effluent Toxicity (WET) Testing Requirements.

The Permittee shall conduct chronic toxicity testing for determining the toxicity of the effluent from outfall 001 in accordance with subsections 1-7 below. Testing shall be conducted in the first year of the permit term.

1. The Permittee shall conduct chronic toxicity testing with one of the following organisms:

   a. Sand dollar (Dendraster excentricus)
   b. Green, purple or red sea urchin (Strongylocentrotus droehbachiensis, Strongylocentrotus purpuratus, Strongylocentrotus franciscanus, respectively)
   c. Pacific oyster (Crassostrea gigas)
   d. Bay mussel (Mytilus edulis)

   Species shall be selected based on availability of organisms in spawning condition. However, previous WET test have been conducted with the purple urchin, Strongylocentrotus purpuratus, and it is recommended that future tests also be conducted with this species.

   The presence of chronic toxicity shall be estimated as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms*. EPA/600/R-95/136, August 1995.

   Results shall be reported in TUc (chronic toxic units). TUc = 100/No Observed Effect Concentration (NOEC) in percent effluent concentration.

2. Toxicity Trigger

   Chronic toxicity testing requirements are triggered when the NOEC equals or exceeds 53 TUc. When chronic toxicity testing requirements are triggered, the permittee shall comply with the requirements set out in Parts 5 and 6 below.

3. Quality Assurance

   a. A series of five dilutions and a control shall be tested. The series shall include the receiving water concentration (RWC), 1.9 percent effluent, two dilutions above the RWC, and two dilutions below the RWC.

   b. If organisms are not cultured in-house, concurrent testing with reference toxicants shall be conducted. Where organisms are cultured in-house, monthly reference toxicant testing is sufficient.

   c. If either the reference toxicant tests or the effluent tests do not meet all test acceptability criteria (TAC) as specified in the test methods manual, then the permittee must re-sample and re-test as soon as possible.

   d. Reference toxicant tests shall be conducted using the same test conditions as the effluent toxicity test (i.e., same test duration, etc.).

   e. Control and dilution water shall be laboratory water as described in the manual. If the dilution water used is different from the culture water, a second control, using culture water shall also be used. Receiving water may be used as control and dilution water upon notification of EPA. In no case shall water that has not met test acceptability criteria be used as dilution water.

   f. Chemical testing for the parameters listed in Part I.A.1 of this permit shall be performed on a split sample collected for WET testing. To the extent that the timing of sample collection coincides with that of the sampling required in Part I.A.1. of this permit, chemical analysis of the split sample will fulfill the requirements of Part I.A.1.

4. Preparation of Initial Investigation Toxicity Reduction Evaluation (TRE) Plan

Prior to initiation of the toxicity testing required by this permit, the permittee shall submit to EPA a copy of the permittee's initial investigation TRE workplan. This plan shall describe the steps the permittee intends to follow in the event that toxicity testing requirements as described in Part I.C.2. above, are detected, and should include at a minimum:

a. A description of the investigation and evaluation techniques that would be used to identify potential causes/sources of toxicity, effluent variability, treatment system efficiency;

b. A description of the facility's method of maximizing in-house treatment efficiency, good housekeeping practices, and a list of all chemicals used in operation of the facility; and

c. If a toxicity identification evaluation (TIE) is necessary, who will conduct it (i.e., in-house or other).

5. Accelerated testing

a. If chronic toxicity testing requirements as defined in Part I.C.2. above are triggered, the permittee shall implement the initial investigation workplan. If implementation of the initial investigation workplan indicates the source of toxicity (for instance, a temporary plant upset), then only one additional test is necessary. If toxicity is detected in this test, then the following paragraph (C.5.b.) shall apply.

b. If chronic toxicity testing requirements as defined in Part I.C.2. above are triggered, and toxicity is detected in the test required under Part I.C.5.a. above, then the permittee shall conduct six more tests, bi-weekly (every two weeks), over a twelve-week period. Testing shall commence within two weeks of receipt of the sample results of the exceedance

6. Toxicity Reduction Evaluation (TRE)

a. If chronic toxicity, as defined Part I.C.2., is detected in any of the six additional tests required under Part I.C.5.b., then, in accordance with the permittee's initial investigation workplan and EPA manul EPA 833-B-99-002 (Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants), the permittee shall initiate a TRE within fifteen (15) days of receipt of the sample results of the exceedance. The permittee will develop as

expeditiously as possible a more detailed TRE workplan, which includes:.

i. further actions to investigate and identify the cause of toxicity;
ii. actions the permittee will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and
iii. a schedule for these actions.

b. The permittee may initiate a toxicity identification evaluation (TIE) as part of the overall TRE process described in the EPA acute and chronic TIE manuals EPA/600/6-91/005F (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III).

c. If none of the six tests required under Part I.C.5.b. above indicated toxicity, then the permittee may return to the normal testing frequency.

d. If a TIE is initiated prior to completion of the accelerated testing, the accelerated testing schedule may be terminated, or used as necessary in performing the TIE.

7. Reporting:

a. Results of toxicity tests, including any accelerated testing conducted during the month, shall be reported on the Discharge Monitoring Report (DMR) for the month in which the tests are conducted.

b. The full report shall be submitted by the end of the month in which the DMR is submitted.

c. The full report shall consist of : (1) the toxicity test results; (2) the dates of sample collection and initiation of each toxicity test; (3) the flow rate at the time of sample collection; and (4) the results of the effluent analysis for chemical parameters required for the outfall as defined in Part I.A.1. of the permit.

d. Test results for chronic tests shall be reported according to the chronic manual chapter on Report Preparation.

D. Sewage Sludge Management Requirements

The permittee shall ensure that an updated biosolids permit application (Form 2S) is on file with EPA.

E. Nonindustrial Source Control Program

1. The permittee shall review and if necessary update its public education program. Print and/or electronic media may be used in addition to, or instead of, pamphlets.

   The program shall address such issues as:

   · non-hazardous alternatives to hazardous household products and pesticides,

   · proper disposal of hazardous wastes.

   Public education program information shall be made available to all new service connections.

2. Twice yearly (April and November) the permittee shall publish a citizen's advisory concerning use and maintenance of above ground home heating fuel tanks.

3. A report shall be submitted annually by December 31st, summarizing the actions undertaken during the previous year to control nonindustrial sources of toxic pollutant and pesticides (including, but not limited to, the activities outlined in paragraph 1 above).

F. Operation and Maintenance Plan Review

1. Within 180 days after the effective date of this permit, the permittee shall review its operation and maintenance (O&M) plan and ensure that it includes appropriate best management practices (BMPs); the plan must be reviewed annually thereafter. BMPs include measures which prevent or minimize the potential for the release of pollutants to Portage Cove. The O&M Plan shall be retained on site and made available to EPA and ADEC upon request.

2. The permittee shall develop a description of pollution prevention measures and controls appropriate for the facility. The appropriateness and priorities of controls in the O&M Plan shall reflect identified potential sources of

pollutants at the facility. The description of BMPs shall address, to the extent practicable, the following minimum components:

- Spill prevention and control;
- Optimization of chemical usage;
- Preventive maintenance program;
- Minimization of pollutant inputs from industrial users;
- Research, develop and implement a public information and education program to control the introduction of household hazardous materials to the sewer system; and
- Water conservation.

G. Quality Assurance Requirements

1. The Permittee shall develop a Quality Assurance Plan. The primary purpose of the Quality Assurance Plan shall be to assist in planning for the collection and analysis of samples in support of the permit and in explaining data anomalies when they occur.

2. Throughout all sample collection and analysis activities, the Permittee shall use the EPA approved quality assurance, quality control, and chain-of-custody procedures described in:

   a. *Requirements for Quality Assurance Project Plans,* EPA QA/R-5 EPA, and
   b. *Guidance on Quality Assurance Project Plans*, EPA QA/G-5

   The following reference may be helpful in preparing the Quality Assurance Plan for this permit: *The Volunteer Monitors Guide to Quality Assurance Project Plans* EPA 841-B-96-003, September 1996.

3. The plan shall be completed within 120 days of the effective date of this NPDES permit. The Permittee shall keep a copy of the permit on site at all times.

4. At a minimum the plan shall include the following:

   - Sampling techniques (field blanks, replicates, duplicates, control samples, etc).
   - Sampling preservation methods.
   - Sampling shipment procedures.
   - Method of station location and relocation.

- Instrument calibration procedures and preventive maintenance (frequency, standard, spare parts).
- Qualification and training of personnel.
- Analytical methods (including quality control checks, quantification/detection levels).

5. Name(s), address(es) and telephone number(s) of the laboratories, used by or proposed to be used by the Permittee, shall be specified in the Quality Assurance Plan.

H. Shoreline Sign

The Permittee shall place signs on the shoreline near the mixing zone and outfall line. The signs should state that treated domestic wastewater is being discharged, the name and owner of the facility and the approximate location and size of the mixing zone. The signs should inform the public that certain activities, such as the harvesting of shellfish for raw consumption and bathing should not take place in the mixing zone and give a contact number for additional information.

I. Definitions

1. "Average monthly discharge limitation" means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

2. "Average weekly discharge limitation" means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week.

3. "Biosolids" means any sludge or material derived from sludge that can be beneficially used. Beneficial use includes, but is not limited to, land application to agricultural land, forest land, a reclamation site or sale or give away to the public for home lawn and garden use.

4. "Chronic toxicity" measures a sublethal effect (e.g., reduced growth, reproduction) in an effluent or ambient waters compared to that of the control organisms.

5. "Chronic toxic unit (TU_c)" is a measure of chronic toxicity. The number of chronic toxic units in the effluent is calculated as 100/NOEC, where the NOEC is measured in percent effluent.

6. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

7. "Dry Weight-basis" means 100 percent solids (i.e., zero percent moisture).

8. A "Grab" sample is a single sample or measurement taken at a specific time or over as short a period of time as is feasible.

9. "Inhibition concentration (IC)" is a point estimate of the toxicant concentration that causes a given percent reduction (p) in a non-quantal biological measurement (e.g., reproduction or growth) calculated from a continuous model (e.g., the EPA Interpolation Model).

10. "IC_{25}" means the estimated toxicant concentration that would cause a 25 percent reduction in a nonlethal biological measurement of the test organisms, such as reproduction or growth.

11. "mgd" means million gallons per day.

12. "Maximum daily discharge limitation" means the highest allowable "daily discharge".

13. "Method detection limit (MDL)" is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero as determined by a specific laboratory method (40 CFR 136).

14. "No observed effect concentration (NOEC)" is the highest concentration of toxicant to which organisms are exposed in a chronic test, that causes no observable adverse effect on the test organisms (e.g., the highest concentration of toxicant to which the values for the observed responses are not statistically significant different from controls.)

15. "Pathogen" means an organism that is capable of producing an infection or disease in a susceptible host.

16. "Pollutant", for the purposes of this permit, is an organic substance, an inorganic substance, a combination of organic and inorganic substances, or

pathogenic organisms that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food-chain, could, on the basis of information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction), or physical deformations in either organisms or offspring of the organisms.

17. "Sewage sludge" means solid, semi-solid, or liquid residue generated during the treatment of domestic sewage and/or a combination of domestic sewage and industrial waste of a liquid nature in a Treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the incineration of sewage sludge or grit and screenings generated during preliminary treatment of domestic sewage in a Treatment Works. These must be disposed of in accordance with 40 CFR 258.

18. "Suites of tests" means the two or three species used for testing during the permit term.

19. A "24-hour composite" sample shall mean a flow-proportioned mixture of not less than eight discrete aliquots. Each aliquot shall be a grab sample of not less than 100 mL and shall be collected and stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.

20. A "TRE" is a site-specific study conducted in a stepwise process to narrow the search for effective control measures for effluent toxicity.

21. "Toxic pollutants" are those substances listed in 40 CFR 401.15.

22. "Pesticides" are Demeton, Guthion, Malathion, Mirex, Methoxychlor and Parathion (as listed in 40 CFR 125.58).

23. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

24. "Vector attraction" is the characteristic of sewage sludge that attracts rodents, flies, mosquitos or other organisms capable of transporting infectious agents.

25. The "ZID" is the Zone of Initial Dilution. The ZID is defined as a rectangle 63.7 m (209 ft) long (perpendicular to shore) and 54.9 m (180 ft) wide centered on the diffuser.

II. MONITORING, RECORDING, AND REPORTING REQUIREMENTS

A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under Part I shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under 40 CFR 136, unless other test procedures have been specified in this permit.

C. Reporting of Monitoring Results. Monitoring results shall be summarized each month on the Discharge Monitoring Report (DMR) form. The reports shall be submitted monthly and are to be postmarked by the 10th day of the following month. Legible copies of these, and all other reports, shall be signed and certified in accordance with the requirements of Part IV.J. Signatory Requirements, and submitted to the Director, Office of Water and the State agency at the following addresses:

original to: United States Environmental Protection Agency (EPA)
Region 10
NPDES Compliance Unit
1200 Sixth Avenue, OW-133
Seattle, Washington 98101

copy to: Alaska Department of Environmental Conservation
Division of Air and Water Quality
410 Willoughby Avenue, Suite 303
Juneau, Alaska 99801
(907)465-5300
(907)465-5274 (fax)
May be submitted via scanned and saved (.pdf, .bmp or .tif) document to :wqpermit@envircon.state.ak.us

D. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

E. Records Contents. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements,

2. The individual(s) who performed the sampling or measurements,

3. The date(s) analyses were performed,

4. The individual(s) who performed the analyses,

5. The analytical techniques or methods used, and

6. The results of such analyses.

F. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time. Data collected on-site, copies of DMRs, and a copy of this NPDES permit must be maintained on-site during the duration of activity at the permitted location.

G. Twenty-four Hour Notice of Noncompliance Reporting

1. The following occurrences of noncompliance shall be reported to EPA and ADEC by telephone within 24 hours from the time the permittee becomes aware of the circumstances:

   a. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part **III.G. Bypass of Treatment Facilities**),

   b. Any upset which exceeds any effluent limitation in the permit (See Part **III.H. Upset Conditions**), or

   c. Violation of a maximum daily discharge limitation for those toxic or hazardous pollutants identified within Table1 of Section I.A.

2. A written submission shall also be provided to EPA and ADEC within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause,

   b. The period of noncompliance, including exact dates and times,

c. The estimated time noncompliance is expected to continue if it has not been corrected, and

d. Steps taken or planned to reduce, eliminate, and prevent re-occurrence of the noncompliance.

3. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the NPDES Compliance Unit in Seattle, Washington, by phone, (206) 553-1846.

4. Reports shall be submitted to the addresses in Part **II.C. Reporting of Monitoring Results**.

H. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.C. are submitted. The reports shall contain the information listed in Part II.H.2.

I. Inspection and Entry. The permittee shall allow the Director or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit,

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit,

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for:

enforcement action; permit termination, revocation and re-issuance, or modification; or denial of a permit renewal application. The permittee shall give advance notice to the Director and ADEC of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions

1. Civil and Administrative Penalties. Any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall be subject to a civil or administrative penalty, not to exceed the maximum amounts authorized by Sections 309(d) and 309(g) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note).

2. Criminal Penalties

a. Negligent Violations. Any person who negligently violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(1) of the Act.

b. Knowing Violations. Any person who knowingly violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(2) of the Act.

c. Knowing Endangerment. Any person who knowingly violates a permit condition implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine and/or imprisonment as specified in Section 309(c)(3) of the Act .

d. False Statements. Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Act or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this Act, shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(4) of the Act.

C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize, or prevent, any discharge, or sludge use or disposal, in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed, or used, by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. Removed Substances. Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

G. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2 and 3 of this section.

2. Notice

a. Anticipated Bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least 10 days before the date of the bypass.

b. Unanticipated Bypass. The permittee shall submit notice of an unanticipated bypass as required under Part **II.G. Twenty-four Hour Notice of Noncompliance Reporting**.

3. Prohibition of Bypass

a. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

(1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage,

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance, and

(3) The permittee submitted notices as required under paragraph 2 of this section.

b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determined that it will meet the three conditions listed above in paragraph 3.a. of this section.

H. Upset Conditions

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph 2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

2. Necessary upset demonstration conditions. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and that the permittee can identify the cause(s) of the upset,

b. The permitted facility was at the time being properly operated,

c. The permittee submitted notice of the upset as required under Part **II.H. Twenty-four Hour Notice of Noncompliance Reporting**, and

d. The permittee complied with any remedial measures required under Part **III.D. Duty to Mitigate**.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

IV. GENERAL REQUIREMENTS

A. Notice of New Introduction of Pollutants

1. The permittee shall provide adequate notice to the Director, Office of Water, and ADEC of:

   a. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to sections 301 or 306 of the Act if it were directly discharging those pollutants, and

   b. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

2. For the purposes of this section, adequate notice shall include information on:

   a. The quality and quantity of effluent to be introduced into such treatment works, and

   b. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from such publicly owned treatment works.

B. Control of Undesirable Pollutants.

Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

1. Wastes which will create a fire or explosion hazard in the treatment works;

2. Wastes which will cause corrosive structural damage to the treatment works, but in no case, wastes with a pH lower than 5.0, unless the treatment works is designed to accommodate such wastes;

3. Solid or viscous substances in amounts which cause obstructions to the flow in sewers, or interference with the proper operation of the treatment works;

4. Waste waters at a flow rate and/or pollutant discharge rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency; and

5. Any pollutant, including oxygen demanding pollutants (e.g., BOD, etc.) released in a discharge of such volume or strength as to cause interference in the treatment works.

C. Requirements for Industrial Users. The permittee shall require any industrial user of these treatment works to comply with any applicable requirements of sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR 403.

D. Planned Changes. The permittee shall give notice to the Director and ADEC as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit. Notice is also required when the alteration or addition results in a significant change in the permittee's sludge use or disposal practices, including notification of additional use or disposal sites not reported during the permit application process.

E. Anticipated Noncompliance. The permittee shall give advance notice to the Director and ADEC of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

F. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and re-issuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

G. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

H. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine

whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

I. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director or ADEC, it shall promptly submit such facts or information.

J. Signatory Requirements

1. All applications, reports, or information submitted to the Director shall be signed and certified.

2. All permit applications shall be signed by either a principal executive officer or ranking elected official.

3. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Director, and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

4. Changes to authorization. If an authorization under paragraph IV.J.3 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph IV.J.3. must be submitted to the Director prior to, or together with, any reports, information, or applications to be signed by an authorized representative.

5. Certification. Any person signing a document under this section shall make the following certification:

"*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*"

K. Availability or Reports. Except for data determined to be confidential under 40 CFR 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, and effluent data shall not be considered confidential.

L. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the Act.

M. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private infringement of federal, state, or local laws or regulations.

N. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

O. Transfers. This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date,

2. The notice includes a written agreement between the existing and new permittee's containing a specific date for transfer of permit responsibility, coverage, and liability between them, and

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

P. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by section 510 of the Act.

Q. Reopener Provision. This permit is subject to modification, revocation and reissuance, or termination at the request of any interested person (including the permittee) or upon EPA initiative. However, permits may only be modified, revoked or reissued, or terminated for the reasons specified in 40 CFR Parts 122.62, 122.63 or 122.64, and 40 CFR Part 124.5. This includes new information which was not available at the time of permit issuance and would have justified the application of different permit conditions at the time of issuance and includes, but is not limited to, future monitoring results. All requests for permit modification must be addressed to EPA in writing and shall contain facts or reasons supporting the request.

10.0 APPENDICES

APPENDIX B: HAINES WASTEWATER SYSTEM

- **Proposed 301(h) Waiver Comments**
  - **Haines Borough July 3, 2023 Letter**
  - **Attachment 1 for July 3, 2023 Letter**

HAINES BOROUGH, ALASKA
P.O. BOX 1209, HAINES, ALASKA 99827
Public Works 907.766.6414

July 3, 2023

Abigail Conner
conner.abigail@epa.gov
NPDES Permits Section
Environmental Protection Agency, Region 10

Dear Ms. Conner:

This letter addresses concerns the Haines Borough has regarding the proposed draft 301(h) Waiver, NPDES Permit #AK0021385, released in May 2023 by the United States Environmental Protection Agency (EPA) for the Wastewater Treatment Plant (WWTP) in Haines, Alaska. Outlined below are our comments about the proposed changes for the NPDES permit we have operated under since 2001.

- **Financial Impact to Local Government and Users**

The proposed changes in the draft permit, especially the increased sampling and the disinfection requirement, will produce substantial rate increases for individual users of the Haines Townsite Sanitary Sewer System. *Haines Borough Ordinance No. 22-02-609* increased user rates for sewer approximately 3 percent each year between 2022 to 2025. For the Haines Borough to implement these proposed permit requirements, without any other financial support such as federal or state grants, will require doubling, tripling or even quadrupling the current monthly user fees, both residential and commercial. (See *Attachment 1* for a spreadsheet and explanatory outline detailing the anticipated additional costs beyond the scope of the current permit.)

As stated in the ARRI Report, *Water Quality Measures in Alaska's Ports and Shipping Lanes: 2020 Annual Report,* prepared for the Alaska Department of Environmental Conservation (ADEC), samples taken at the edge of the mixing zone for Haines-Chilkoot Inlet have results less than the proposed permit's final limits of 200 fecal coliform per 100 ml and 665 enterococcus per 100 ml. This report summarizes samples taken in June 2020, showing a maximum value for fecal coliform of 5 per 100 ml, more than an order of magnitude less than the proposed final limit. For enterococcus, the values reported were two orders of magnitude less – 5 MPN per 100 ml. Further, the average temperature noted by ARRI for the Haines-Chilkoot Inlet ranged from 11.4 to 12.4 degrees; C. Fecal coliform bacteria prefer 37 to 45 degrees C. The ARRI Report records levels without disinfection.

Chlorination may cause effects beyond wastewater treatment. Disinfection with chlorine may kill pathogenic bacteria and other disease-causing microbes in the Haines WWTP effluent. However, this disinfectant may also kill other microbes essential to the aquatic environment in the mixing zone and beyond, endangering the survival of species dependent on these other microbes.

- **Increased Sampling Necessitates Additional Staff and Increased Lab Costs**

As outlined in *Attachment 1*, the proposed sampling requirements place significant additional expenses on our community for little apparent gain in water quality. Further, if one set of tests yields satisfactory results for the WET series as well as the five ZID stations, why does this costly testing for these parameters warrant multiple annual repeats? (See *Attachment 1*, *Section 1*, last bullet.) Moreover, for the ZID area, the accuracy of the specific GPS locations for the five sample sites will be impossible to maintain in a boat with variable weather and sea conditions.

We also must build contingencies into our sampling programs. Between weather issues with sampling and sample transportation to labs, multiple sets must be retaken each year as hold times are exceeded. If sample results are unsatisfactory for whatever reason, this triggers additional sampling, requiring more staff time with added transportation and lab fees.

- **Proposed Sampling Substantially Scaled Up**

The type and frequency of sampling increases significantly with the proposed permit. For example, the number of samples for enterococcus in receiving waters goes from zero in the current permit to 55 per year. The Water and Sewer Department staff includes only three operators. This testing will place an additional sampling burden on staff with a heavy work load, creating a need for additional personnel. Please explain what useful data will be gathered by taking samples five times a year from 11 different sites within a thousand meters of the effluent discharge outfall in Portage Cove. We request that the number of sites and/or the frequency of sampling for this parameter be reduced.

- **Some Sampling Schedules Lack Flexibility and Viability**

The proposed sediment and benthic survey, with the requirement to only be conducted in August, is a narrow timetable for Water and Sewer Department staff to comply. Maintenance and improvement projects that can only be completed during summer months have priority. There are also concerns about storms and boating safety. August can have severe inclement weather. A timeframe of May through September would allow more flexibility for staff scheduling and weather conditions.

- **Inclement Weather and Limited Transportation Options for Sample Integrity**

All samples requiring processing in Juneau labs and beyond place a challenge on our community due to hold times and the few flights from Haines to Juneau, especially in the winter with frequent storms. The last time a WET test was completed for Haines, it took four sets of samples to make the hold time to a Pacific Northwest lab, and this effort required special courier services with expediting fees. Each set of samples necessitated contract services with an out-of-community diver.

- **Disinfection Requires Substantial Upfront Capital and Ongoing Maintenance Costs**

Please explain why disinfection is needed for the WWTP effluent outfall in Portage Cove, an area with significant tidal influence and limited recreational activity due to cold water temperatures and boating traffic. Fecal coliform test results from previous monitoring of the outfall mixing zone do not indicate a public health concern in these receiving waters. Incorporating disinfection into the current Haines WWTP will require a substantial capital improvement as the current facility would require design and construction of a disinfection system. Further, there will be additional annual costs for chemicals, labor and maintenance. Purchasing and delivering the chlorine will run at least $200 per day or $73,000 per year.

- **De-Chlorination May be Required to Protect Lynn Canal Fisheries**

If disinfection is required, given the importance of the salmon, halibut, crab and shrimp fisheries in this area, de-chlorination may be an essential system component. The projected costs for a disinfection system with de-chlorination will run over four million dollars, requiring a significant, financial investment by the community. (See *Attachment 1*, page 8 of 23.)

- **More Reporting Requirements Decreases Staff Time for Regular Operations**

The proposed increased monitoring for temperature requires an annual data dump after the end of each year. Current staffing levels make additional reporting demands onerous. We suggest that this reporting be replaced with the Haines Borough maintaining five years of data on-site at the WWTP, readily available for EPA and ADEC personnel to review.

- **Lack of Standard Monitoring Parameters and Requirements for Alaska 301(h) Waiver Communities**

State of Alaska Water Quality Standards are statewide. Please explain why there are ranges of values for the same parameters listed in the proposed 301(h) draft permits for Wrangell, Sitka and Haines. For instance, why does Wrangell's WWTP effluent and receiving waters have a proposed final fecal coliform count more than seven times higher than the one EPA is proposing for Haines: 1,568 FC per 100 ml versus 200 FC per 100 ml?

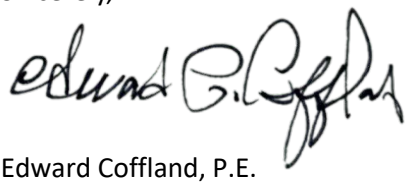
In closing, we ask that you review and consider the entirety of *Attachment 1* as it details anticipated annual costs to the Haines community for the changes EPA is proposing without any financial assistance. This supplement provides further details and comments in two sections. The first contains a list of general comments with six bulleted items.

The second section organizes proposed changes in 12 sub-sections with anticipated costs shown in 15 tables. Our responses, whether acceptance, partial acceptance or objection with a justification statement, are shown here. A cover spreadsheet summarizes the expenses from the 15 tables.

We view some of these changes as acceptable- the ones with minimal budget impacts and those required by updated State of Alaska Water Quality Standards. Yet the permit elements requiring substantial costs to implement place a financial burden on the Haines Borough, while producing minimal benefits to the community's environment and public health.

We appreciate the opportunity to comment on the proposed NPDES permit changes and look forward to continuing a dialogue with EPA to find a workable solution that best serves our community and residents while protecting the local environment and public health.

Sincerely,



Edward Coffland, P.E.
Director of Public Facilities
Haines Borough

Attachment 1

Review Comments re: Public Notice Issued May 4, 2023

Draft NPDES Permit #AK0021385

Haines Borough, Haines, Alaska, Wastewater Treatment Plant

This document contains comments and questions regarding factual accuracy, and operational and cost feasibility concerning the May 4, 2023 Draft NPDES Permit #AK0021385.

Our comments are organized in two sections. The first contains a list of general comments including noted inaccuracies in the proposed permit. The second section reviews changes from the current permit the Haines Borough is operating under, and includes projected expenses to implement the proposed changes. These are organized in 12 sub-sections with 15 tables summarizing the financial impact to the Haines Borough for implementation.

SECTION 1: GENERAL COMMENTS

- Page 1 of 54: Latitude and longitude needs to be corrected. Latitude: 59.232,647 degrees; Longitude: -135.430,868 degrees WGS 84
- Page 17 of 54, Table 3: Secchi Disk is measured to the depth where the disk is no longer visible, not every 5 meters to the bottom. Table 3 does not include metals, dissolved organic carbon, conductivity and hardness, as mentioned on page 19 of 54, item 9. What is the actual requirement?
- Page 44 of 54 and Page 45 of 54, Receiving Water Monitoring Maps: Diffuser location: see first bullet above, Page 1 of 54. Latitude and longitude of other sites need verification. Current information based on effluent pipe discharge location. End of pipe location based on PND Engineers, Inc., Haines Borough Portage Cove Harbor Expansion, Wastewater Outfall Plan & Profile, 2.01, Sheet 8 of 32, September 2018 As-Built Drawing. EPA location is approximately 1,600 ft NE from PND location.
- Page 7 of 54, Table 1 – PFAS: Table 1 shows sampling frequency of 2 per year whereas footnote 10 states 2 years (8 quarters). Which one is the actual proposed sampling frequency?
- The November 13, 2022 ADEC recreational water quality limits for contact and secondary activities in marine waters are 35 enterococcus in 100 ml (30-day geometric mean) for contact recreation and 200 FC in 100 ml for secondary recreation (30-day geometric mean) respectively. Why is the proposed effluent discharge level at the Haines WWTP outfall in Portage Cove, which is 56 feet below sea level, being changed from a monthly average of 977,000 FC per 100 ml (in the current permit) to 200 FC per 100 ml - the same value as the secondary contact recreation standard – when significant dilution occurs with tidal action? This is nearly a five-thousand-fold decrease. In contrast, the proposed enterococcus level for WWTP effluent is 19-times higher than the ADEC contact recreation standard of 35 enterococcus in 100 ml.
- Proposed testing requirements are expected to increase costs significantly as documented in *Section 2*. What are the potentials for waivers and/or reductions in testing after completing a specific number of tests with satisfactory results? A specified process for potential waivers would be useful.

For instance, the current permit states: *If fecal coliform bacteria concentrations monitored at the edge of the mixing zone do not exceed a monthly average of 14 FC per 100 ml and a daily maximum of 43 FC per 100 ml during the first two years of monitoring, then the required monitoring frequency for fecal coliform will be reduced to once per year in each subsequent year, performed on the same day as the water quality monitoring of Section 1.B.4.a above.* (See page 7 of 32 of Permit #AK-002138-5.)

Total Costs of Additional 301(h) Testing for AK0021385
Annual Cost with Capital Cost for Disinfection / De-Chlorination

Parameter	Additional Annual Testing	In-House Staff	Contractor	Total
Wastewater Treatment Plant – Annual Costs				
Total Flow	1	$31,720	$0	$31,720
Fecal Coliform	12	$15,132	$10,452	$15,132
Enterococcus -- Final	24	$30,264	$9,516	$30,264
Copper	8	$1,248	$2,392	$3,640
Temperature	Continuous	$30,732	$0	$30,732
Ammonia	4	$624	$962	$1,586
PFAS	6	$936	$6,864	$7,800
Whole Effluent Toxicity	1.8	$432	$19,710	$20,142
Toxic Pollutant Scan	0	$0	$0	$0
			Annual Total	**$141,016**
			5 – Year Total	**$705,080**
Wastewater Treatment Plant – Disinfection (Capital Cost & 5 Years O&M)				
Disinfection System	Continuous			$3,900,000
Staffing & Chemicals	Continuous			$1,091,350
			5 – Year Total	**$4,991,350**
Receiving Water Monitoring				
Temperature, Salinity, DO, pH, Turbidity, Sechhi Disk	18	$6,474	$0	$6,474
Fecal Coliform	39	$13,078	$0	$13,078
Enterococcus	55	$28,210	$0	$28,210
Benthic Infauna & Sediment Analysis	0.8	$333	$62,530	$62,863
			Annual Total	**$110,625**
			5 – Year Total	**$553,125**
Scheduled Submissions – Plans				
Draft Permit Review & Mixing Zone Determination	Pre-Permit			$49,660
Quality Assurance Plan	First 180 Days			$49,660
O&M Plan	First 180 Days			$49,660
ER&PN Plan	First 180 Days			$49,660
Disinfection Compliance Plan				$24,830
			5 – Year Total	**$223,470**
			Total Estimated 5 – Year Cost	**$6,473,025**

The following 15 tables detail the cost breakdown for the parameters listed above.

SECTION 2: CONTENTS

1) TOTAL FLOW

Proposed Permit Requirement: Changes from ***Influent or Effluent*** to ***Influent and Effluent*****,** requiring a total of two flow meters.

Response: Unacceptable, as this is an added expense providing little additional information. Only a minimal amount of sludge is removed from the WWTP influent.

Justification: The additional monitoring each month will require at least one extra 10-hour shift for daily monitoring with an on-going need for meter calibration with flow testing. Since there is negligible loss of effluent through the WWTP, what data are gained by measuring the WWTP flows twice?

Budget Option: In-House

Permit Year	Quantity	Time	Additional
2001	1	Continuous	
2023	2	Continuous	1
Difference:	Measure both influent and effluent instead of just one		

Description	Quantity	Unit	Cost/Unit	Annual Cost
In-House				
Labor:	120	hours/year	$60	$7,200
Equipment & Supplies:	1	each	$5,000	$5,000
Laboratory Fees:				$0
Other Contractual:		each		$12,200
Σ				$24,400
Contingency (30%):				$7,320
TOTAL				**$31,720**

Contract Laboratory	
Labor:	$0
Equipment & Supplies:	$0
Laboratory Fees:	$0
Other Contractual:	$0
Σ	$0
Contingency (30%):	$0
TOTAL	**$0**

2) FECAL COLIFORM: Interim & Final Limits

Proposed Permit Requirement: This parameter is included in the current permit with one grab sample per month. This proposed change is two-fold: 1) Sampling increased to twice per month, 2) Lower interim limit and a much lower final limit, one requiring disinfection to achieve.

Response: Two samples per month is acceptable. Final lower limit count of 200 fecal coliform per 100 ml unacceptable (see **DISINFECTION / DE-CHLORINATION**, page 9).

Justification: The additional testing each month increases labor costs. To achieve the proposed final limit, engineering services will be required to develop a design for a disinfection / de-chlorination process. Then there will be the accompanying equipment procurement and construction and/or remodeling to accommodate this new treatment. Public would be adversely impacted by chlorination as many residents rely on subsistence fisheries in Lynn Canal waters, requiring the addition of de-chlorination.

Budget Option: In-House

Permit Year	Quantity	Time	Additional	Additional/Year
2001	1	Month		
2023	2	Month	1	12
Difference:	One grab sample per month to two grab samples per month			

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
		In-House			
Labor:	12	hours/month	$60		$8,640
Equipment & Supplies:	1	each	$3,000		$3,000
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$11,640
Contingency (30%):					$3,492
TOTAL					**$15,132**

		Contract Laboratory			
Labor:	4	hours/month	$60		$2,880
Equipment & Supplies:					$0
Laboratory Fees:	2	each month	$115	$100	$5,160
Other Contractual:					$0
Σ					$8,040
Contingency (30%):					$2,412
TOTAL					**$10,452**

3) ENTEROCOCCUS: Final Limit

Proposed Permit Requirement: This is a new parameter not included in the current permit.

The ADEC November 13, 2022 Water Quality Standards *18 AAC 70* set the enterococcus level at no more than 35 per 100 ml for marine water involving contact recreation (swimming, diving and water skiing). Recreation in the Portage Cove area mostly consists of secondary recreation: boating, camping, hunting, hiking, wading, recreational fishing (does not include fish consumption). The secondary recreation standard involves only fecal coliform and the level is no more than 200 FC per 100 ml.

NOTICE:

HAINES BOROUGH ALASKA

The Haines Borough Wastewater Treatment Facility located on East Fair Drive, is discharging treated domestic wastewater into the Portage Cove mixing zone. The mixing zone is a 1600 meter radius centered on the outfall, which includes this area. We recommend that activities involving direct water contact and harvesting of shellfish for raw consumption should not take place in the mixing zone. The HB Sewer Department monitors the mixing zone for water quality and fecal coliform bacteria. No discharge permit violations have been reported to the U.S. EPA during this permitted period. This notice is made as a precautionary measure required by our NDPES permit.

For more information or questions please contact the HB Sewer Dept. at 1-907-766-6452

Haines has an annual January 1 New Year's Day Polar Bear Swim where several people participate in contact reaction: diving and swimming. Even so, the ARRI 2020 Report shows the Haines-Chilkoot Inlet with enterococcus levels of 5 MPN per 100 ml, well below the new 35 standard as well as the 665 FCU per 100 ml level in the draft permit. At least one rugged individual regularly swims in Portage Cove daily for about 20 minutes year-round although this person keeps their head above water.

Response: Acceptable as this is a new indicator organism and recreation in Portage Cove creates some limited, potential risk to public health.

Justification: If we elect to do the testing in-house, additional equipment and staff time will be required. If these samples are shipped to a Juneau lab for processing, there will be additional cost for shipping and contract services as well as more staff time required to acquire the samples.

Budget Option: In-House

Permit Year	Quantity	Time	Additional	Additional/Year
2001	0	Month		
2023	2	Month	2	24
Difference:	New analyte, not previously tested			

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
		In-House			
Labor:	12	hours/month	$60		$17,280
Equipment & Supplies:	1	each	$6,000		$6,000
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$23,280
Contingency (30%):					$6,984
TOTAL					**$30,264**
		Contract Laboratory			
Labor:	4	hours/month	$60		$2,880
Equipment & Supplies:					$0
Laboratory Fees:	2	each month	$85	$100	$4,440
Other Contractual:					$0
Σ					$7,320
Contingency (30%):					$2,196
TOTAL					**$9,516**

4) DISINFECTION / DE-CHLORINATION

Proposed Permit Requirement: This is a new requirement to meet the proposed fecal coliform and enterococcus levels for the Haines Borough.

Response: Please explain why the acceptable bacteria levels proposed for effluent were reduced nearly 5,000-fold.This change will place considerable cost upon our community, causing a financial hardship. This proposal is unacceptable without grants.

Justification: To achieve the proposed final limits for fecal coliform and enterococcus counts, engineering services will be required to develop a design for a disinfection process. Then there will be the accompanying equipment procurement and construction and/or remodeling to accommodate this new treatment process. Because of fisheries concerns, a de-chlorination process will be included in this system. We are estimating the WWTP expansion to accommodate this system will run over four million dollars.

Budget Option: In-House

Permit Year	Quantity	Time	Additional
2001	0		
2023	1		
Difference:	New requirement to meet proposed fecal coliform & enterococcus limits		

Description	Quantity	Unit	Cost/Unit	Annual Cost
In-House				
Labor:	1	hour/day	$60	$21,900
Chemicals -- Chlorine	50	lbs/day	$4	$73,000
Chemicals -- De-Chlorinate	50	lbs/day	$4	$73,000
Σ				$167,900
Contingency (30%):				$50,370
TOTAL				**$218,270**
Contract Laboratory				
Labor:				$0
Equipment & Supplies:				$0
Laboratory Fees:				$0
Other Contractual:				$0
Σ				$0
Contingency (30%):				$0
TOTAL				**$0**
Capital Costs				
Building / System	2500	ft^2	$400	$3,000,000
Σ				$3,000,000
Contingency (30%):				$900,000
TOTAL				**$3,900,000**

5) COPPER: Lower Limit

Proposed Permit Requirement: Current permit requires quarterly monitoring. Proposed changes require monthly monitoring. Maximum daily limit and monthly average are substantially reduced.

Response: We object to the eight additional tests per year, preferring quarterly tests.

Justification: Community cannot afford to substantially increase sewer rates for consumers to support the proposed increased number of tests for several parameters. Copper analyses are sent to a contract laboratory. There will also be additional staff workload to collect and ship the samples. Another SE Alaska community similar in size to Haines and operating with a 301(h) permit for their WWTP, is being asked only to monitor this parameter in their proposed permit.

Budget Option: In-House and Contract Laboratory

Permit Year	Quantity	Time	Additional
2001	4	Year	
2023	12	Year	8
Difference:	Quarterly 24-hour composite sample to monthly grab sample		

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
In-House					
Labor:	2	hours/sample	$60		$960
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$960
Contingency (30%):					$288
TOTAL					**$1,248**
Contract Laboratory					
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:	1	each sample	$130	$100	$1,840
Other Contractual:					$0
Σ					$1,840
Contingency (30%):					$552
TOTAL					**$2,392**

6) TEMPERATURE: Continuous Monitoring

Proposed Permit Requirement: Current permit requires weekly monitoring of the WWTP. The change to continuous monitoring will require set-up costs for a probe, conduit and cable, as well as a data logger.

Response: We object as we do not see any added value for these additional expenses. Please explain what this information will be used for.

Justification: More tasks for a small Public Works Staff with a heavy workload. Budget constraints make the hiring of additional personnel to accommodate the increased work load created by additional sampling for multiple parameters problematic. Previous data show that temperature fluctuations are based on seasonality and storms.

Budget Option: In-House

Permit Year	Quantity	Time	Additional
2001	1	Week	
2023	1	Continuous	>>
Difference:	Weekly grab sample to continuous monitoring		

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
In-House					
Labor:	12	hours/month	$60		$8,640
Equipment & Supplies:	1	each	$15,000		$15,000
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$23,640
Contingency (30%):					$7,092
TOTAL					**$30,732**

Contract Laboratory	
Labor:	$0
Equipment & Supplies:	$0
Laboratory Fees:	$0
Other Contractual:	$0
Σ	$0
Contingency (30%):	$0
TOTAL	**$0**

7) AMMONIA: Quarterly Monitoring

Proposed Permit Requirement: This is a new parameter.

Response: We object as there is no maximum contaminant level for ammonia. Please explain why this data collection is required.

Justification: These quarterly samples would be sent to a Juneau lab, creating additional contractual expense as well as more staff time to collect and ship samples.

Budget Option: In-House and Contract Laboratory

Permit Year	Quantity	Time	Additional
2001	0	Year	
2023	4	Year	4
Difference:	New analyte, not previously tested		

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
In-House					
Labor:	2	hours/sample	$60		$480
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$480
Contingency (30%):					$144
TOTAL					**$624**
Contract Laboratory					
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:	1	each sample	$85	$100	$740
Other Contractual:					$0
Σ					$740
Contingency (30%):					$222
TOTAL					**$962**

8) PFAS – INFLUENT, EFFLUENT & SLUDGE

Proposed Permit Requirement: This is a new parameter, requiring testing of influent, effluent (composite samples) and sludge (grab sample) twice per year.

Response: We object as there are no standards for PFAS levels in wastewater or sediment presently.

Justification: These semi-annual samples will be sent to a lab for analysis, creating added expense. Staff time will be needed to collect samples.

Budget Option: In-House and Contract Laboratory

Permit Year	Quantity	Time	Additional
2001	0	Year	
2023	2	Year	2
Number of Sample Sites			3
Σ Samples			6
Difference:	New analyte -- test influent, effluent & sludge		

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
In-House					
Labor:	2	hours/sample	$60		$720
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$720
Contingency (30%):					$216
TOTAL					**$936**
Contract Laboratory					
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:	1	each sample	$780	$100	$5,280
Other Contractual:					$0
Σ					$5,280
Contingency (30%):					$1,584
TOTAL					**$6,864**

9) WHOLE EFFLUENT TOXICITY (WET)

Proposed Permit Requirement: The proposed permit increases the WET testing from one composite sample every five years to ten composite samples every five years (two per year).

Response: We object as previous sample results showed no violation of limits. Please explain what benefit these additional samples will provide.

Justification: The last time Public Works Staff did a WET sample, it took four tries for the contract lab to receive the samples within the allowable hold time, creating significant expense for contract divers, staff time and sample transportation. The estimate below includes a cushion for repeat samples and shipping as our rural location makes samples reaching out-of-state laboratories in a timely manner difficult.

Budget Option: In-House and Contract Laboratory

Permit Year	Quantity	Time	Additional	Additional/Year
2001	1	5 Years		
2023	10	5 Years	9	1.8
Difference:	One sample in 5 years to 2 samples per year			

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
In-House					
Labor:	2	hours/sample	$60		$216
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$216
Contingency (100%):					$216
TOTAL					**$432**
Contract Laboratory					
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:	1	each sample	$5,375	$100	$9,855
Other Contractual:					$0
Σ					$9,855
Contingency (100%):					$9,855
TOTAL					**$19,710**

10) TOXIC POLLUTANT SCAN

Proposed Permit Requirement: The proposed permit maintains the same level of testing as the current permit for this parameter, once every five years.

Response: Acceptable

Justification: No change from current permit.

Budget Option: No additional cost

Permit Year	Quantity	Time	Additional	Additional/Year
2001	2	5 Years		
2023	2	5 Years	0	0
Difference:	No change -- two 24-hour composite samples per 5 years			

Description	Quantity	Unit	Cost/Unit	Shipping	Annual Cost
In-House					
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$0
Contingency (30%):					$0
TOTAL					**$0**
Contract Laboratory					
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$0
Contingency (30%):					$0
TOTAL					**$0**

11) RECEIVING WATERS MONITORING: Expanded from 8 to 9 Parameters with 3 Additional Testing Sites at 6 Additional Depths

Proposed Permit Requirement: The proposed permit requires more sampling sites as well as more frequent sampling. See following four tables for specific details regarding sample types and frequency. These tables contain information for physical parameters, fecal coliform, enterococcus, and benthic infauna monitoring and sediment analysis. These tables also detail projected costs for these proposed changes.

Response: We object to the additional tests, although we are willing to take on limited enterococcus testing to show we meet the November 13, 2022 Alaska Water Quality Standards *18 AAC 70* for marine water recreation.

Justification: The sampling for these parameters is significantly increased from the current permit. It is unfeasible with the variable sea and weather conditions in the Portage Cove area to accurately secure samples from five different sites within a 100-ft radius.

Budget Option: In-House and Contract Laboratory

Receiving Water Monitoring **Temperature, Salinity, DO, pH, Turbidity, Sechhi Disk**			
Permit Year	**Quantity**	**Time**	**Additional**
2001	4	Year	
2023	7	Year	3
Depth -- 0, every 5 m	6	Σ	18
Difference:	Four sites once per year every 5 m to 7 sites once per year every 5 m		

Description	**Quantity**	**Unit**	**Cost/Unit**	**Annual Cost**
In-House				
Labor:	16	hours/site	$60	$2,880
Equipment & Supplies:	1	each site	$200	$600
Laboratory Fees:				$0
Other Contractual:	1	each site	500	$1,500
Σ				$4,980
Contingency (30%):				$1,494
TOTAL				**$6,474**
Contract Laboratory				
Labor:				$0
Equipment & Supplies:				$0
Laboratory Fees:				$0
Other Contractual:				$0
Σ				$0
Contingency (30%):				$0
TOTAL				**$0**

Receiving Water Monitoring Fecal Coliform					
Permit Year	**Quantity**	**Time**	**Additional**	**Sites**	Σ
2001	4	Year		4	16
2023	5	Year	1	11	55
Depth -- Surface	1	Σ	1	Δ	39
Difference:	Four sites, 4 samples per year to 11 sites, 5 samples per year				

Description	**Quantity**	**Unit**	**Cost/Unit**	**Shipping**	**Annual Cost**
		In-House			
Labor:	4	hours/sample	$60		$9,360
Equipment & Supplies:	1	each	$200		$200
Laboratory Fees:					$0
Other Contractual:	1	each site	500		$500
Σ					$10,060
Contingency (30%):					$3,018
TOTAL					**$13,078**
		Contract Laboratory			
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$0
Contingency (30%):					$0
TOTAL					**$0**

Receiving Water Monitoring Enterococcus					
Permit Year	**Quantity**	**Time**	**Additional**	**Sites**	**Σ**
2001	0	Year		4	0
2023	5	Year	5	11	55
Depth -- Surface	1	Σ	5	Δ	55
Difference:	New analyte, 11 sites, 5 samples per year				

Description	**Quantity**	**Unit**	**Cost/ Unit**	**Shipping**	**Annual Cost**
		In-House			
Labor:	4	hours/sample	$60		$13,200
Equipment & Supplies:	1	each	$6,000		$6,000
Laboratory Fees:					$0
Other Contractual:	1	each	500		$2,500
Σ					$21,700
Contingency (30%):					$6,510
TOTAL					**$28,210**
		Contract Laboratory			
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$0
Contingency (30%):					$0
TOTAL					**$0**

Receiving Water Monitoring Benthic Infauna & Sediment Analysis					
Permit Year	**Quantity**	**Time**	**Additional**	**Sites**	**Σ**
2001	1	5 Years		3	3
2023	1	5 Years	0	7	7
Depth -- Bottom	1	Σ	0	Δ	4
Difference:	Three sites per 5 years to 7 sites per 5 years				

Description	**Quantity**	**Unit**	**Cost/Unit**	**Shipping**	**Annual Cost**
		In-House			
Labor:	2	hours/sample	$60	$100	$256
Equipment & Supplies:					$0
Laboratory Fees:					$0
Other Contractual:					$0
Σ					$256
Contingency (30%):					$77
TOTAL					**$333**
		Contract Laboratory			
Labor:					$0
Equipment & Supplies:					$0
Laboratory Fees:	4	each	$30,000		$48,000
Other Contractual:	1	each	$500		$100
Σ					$48,100
Contingency (30%):					$14,430
TOTAL					**$62,530**

12) SCHEDULED SUBMISSIONS: Reviews / Plans

Proposed Permit Requirement: The proposed permit requires the development of multiple plans as specified on page 2 of 54 of the draft permit. We also were required to provide specific details about the mixing zone from a software program, and to review / comment on the draft permit.

Response: Acceptance with reservations. Current workloads for staff lack time for preparing these documents. We will need to use contractual services with some staff involvement, creating significant additional costs.

Justification: Due to the in-house staff workload and budget constraints, we prefer the timeline for some of these plans to have greater flexibility than 180 days from permit finalization.

Budget Option: In-House and Contract Services

DRAFT PERMIT REVIEW & MIXING ZONE DETERMINATION					
Description	**Quantity**	**Unit**	**Cost/Unit**	**Cost**	
In-House Staff	40	hour	$80	$3,200	
Engineer	200	hour	$175	$35,000	
Estimated Cost				$38,200	
Administration (5%), Contingency (25%)				$11,460	
				$49,660	**$49,660**
QUALITY ASSURANCE PLAN (QAP)					
Description	**Quantity**	**Unit**	**Cost/Unit**	**Cost**	
In-House Staff	40	hour	$80	$3,200	
Engineer	200	hour	$175	$35,000	
Estimated Cost				$38,200	
Administration (5%), Contingency (25%)				$11,460	
				$49,660	**$49,660**
OPERATION & MAINTENANCE (O&M) PLAN					
Description	**Quantity**	**Unit**	**Cost/Unit**	**Cost**	
In-House Staff	40	hour	$80	$3,200	
Engineer	200	hour	$175	$35,000	
Estimated Cost				$38,200	
Administration (5%), Contingency (25%)				$11,460	
				$49,660	**$49,660**
EMERGENCY RESPONSE & PUBLIC NOTICE (ER&PN) PLAN					
Description	**Quantity**	**Unit**	**Cost/Unit**	**Cost**	
In-House Staff	40	hour	$80	$3,200	
Engineer	200	hour	$175	$35,000	
Estimated Cost				$38,200	
Administration (5%), Contingency (25%)				$11,460	
				$49,660	**$49,660**
DISINFECTION COMPLIANCE PLAN					
Description	**Quantity**	**Unit**	**Cost/Unit**	**Cost**	
In-House Staff	20	hour	$80	$1,600	
Engineer	100	hour	$175	$17,500	
Estimated Cost				$19,100	
Administration (5%), Contingency (25%)				$5,730	
				$24,830	**$24,830**

10.0 APPENDICES

APPENDIX B: HAINES WASTEWATER SYSTEM

- 2001 Versus 2023 Sample Schedules for Permits
  - Effluent Limits & Monitoring Requirements
  - PFAS Chemical To Be Analyzed
  - Receiving Water Monitoring Requirements

Table 1. Effluent Limits and Monitoring Requirements -- 2001 & 2023

Parameter	Units	Effluent Limitations					Monitoring Requirements						Additional Testing
		2001		2023			2001			2023			
		Monthly Average	Maximum Daily	Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Sample Location	Sample Frequency	Sample Type	Sample Location	Sample Frequency	Sample Type	
Total Flow	MGD	1.9	2.9	1.9	--	2.9	Influent or Effluent	Continuous	Recording	Influent and Effluent	Continuous	Recorded	1 /year
BOD_5, May 1 – September 30	mg/L	260	300	278	417	--	Influent & Effluent	Monthly	24-hour composite	Influent and Effluent	1/month	24-hour composite	0
	lbs/day	4100	4800	4401	6602	--	Influent & Effluent	Monthly	24-hour composite			Calculation[1]	0
BOD_5, Oct 1 – April 30	mg/L	140	200	164	266	--	Influent & Effluent	Monthly	24-hour composite	Influent and Effluent	1/month	24-hour composite	0
	lbs/day	2200	3200	2596	4210	--	Influent & Effluent	Monthly	24-hour composite			Calculation[1]	
BOD_5, % removal	%	Minimum 30% removal		Minimum 30% removal						Influent and Effluent	1/month	Calculation[2]	
Total Suspended Solids (TSS)	mg/L	140	200	90	190	--	Influent & Effluent	Weekly	24-hour composite	Influent and Effluent	1/week	24-hour composite	0
	lbs/day	2200	3200	1426	3010	--	Influent & Effluent	Weekly	24-hour composite			Calculation[1]	
TSS, % removal	%	Minimum 30% removal		Minimum 30% removal						Influent and Effluent	1/month	Calculation[2]	
Fecal Coliform[3] (Interim Limit)	# FC/100 mL			977,000[4,5] (geomean)	--	1,141,000[4,7] (instant. max)				Effluent	2/month[8]	Grab	
Fecal Coliform[3] (Final Limit)	# FC/100 mL	1,000,000	1,500,000	200[5,9]	400	800[7,9]	Effluent	Monthly	Grab	Effluent	2/month[8]	Grab	12 /year
Enterococcus[3] Final Limit	#/100 mL			665[5,9,10] (geomean)	--	2470[7,9,11] (instant.				Effluent	2/month[8]	Grab	24 /year
pH	s.u.	Between 6.5 – 8.5		Between 6.5 – 8.5			Effluent	Weekly	Grab	Effluent	1/week	Grab	0
Dissolved Oxygen	mg/L	Between 2.0 – 17.0		Between 2.0 – 17.0			Effluent	Weekly	Grab	Effluent	1/week	Grab	0
Copper	µg/L	78	156	21		64	Effluent	1/quarter	24-hour composite	Effluent	1/month	Grab	8 /year
	lbs/day			0.33		1.01						Calculation[1]	
Temperature	°C			--	Report	Report	Effluent	Weekly	Grab	Effluent	Continuous	Meter	Continuous
Ammonia	µg/L			--						Effluent	1/quarter	Grab	4 /year
Per-and Polyfluoroalkyl Substances (PFAS)	ng/L			Report	--	Report				Influent and effluent	2/year[10]	24-hour composite	4 /year
	mg/kg dry weight			--	--	Report				Sludge	2/year[10]	Grab	2 /year
Whole Effluent Toxicity (WET)[11], TU	See Permit Part I.C.						Effluent	1/permit term[4]	24-hour composite	Effluent	2/year[12]	24-hour composite	9 /5 years
Toxic Pollutant Scan[13]	--						Effluent	2/permit term[2]	24-hour composite	Effluent	Twice every 5 years[14]	24-hour composite	0

Notes from 2001 Permit:

1. "Toxic pollutants" are defined as the 126 priority pollutants listed in 40 CFR 401.15. "Pesticides" are defined at 40 CFR 125.58(m).
2. The permittee shall conduct analyses of the effluent for toxic pollutants and pesticides during the first and fourth year of the permit term. Monitoring during the first year shall be conducted during the dry season in the month of July. Monitoring during the fourth year shall be conducted during the wet season in the month of January. Samples shall be 24-hour composite samples. Sampling and analysis shall be conducted according to methods approved in 40 CFR Part 136.
3. See Part I.C.
4. Whole Effluent Toxicity monitoring shall be conducted in the first year of the permit term.

Influent and effluent monitoring results shall be reported monthly as specified in Part II.C. (Reporting of Monitoring Results).

Notes from 2023 Draft Permit:

[1] Loading (in lbs/day) is calculated by multiplying the concentration (in mg/L) by the corresponding flow (in mgd) for the day of sampling and a conversion factor of 8.34. For more information on calculating, averaging, and reporting loads and concentrations see the *NPDES Self-Monitoring System User Guide* (EPA 833-B-85-100, March 1985).

[2] Percent Removal. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month using the following equation:

Table 2. PFAS Chemicals to be Analyzed

Target Analyte Name	Abbreviation	CAS Number
Perfluoroalkyl carboxylic acids		
Perfluorobutanoic acid	PFBA	375-22-4
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorononanoic acid	PFNA	375-95-1
Perfluorodecanoic acid	PFDA	335-76-2
Perfluoroundecanoic acid	PFUnA	2058-94-8
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluorotridecanoic acid	PFTrDA	72629-94-8
Perfluorotetradecanoic acid	PFTeDA	376-06-7
Perfluoroalkyl sulfonic acids (acid form)		
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluoropentansulfonic acid	PFPeS	2706-91-4
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluorononanesulfonic acid	PFNS	68259-12-1
Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Fluorotelomer sulfonic acids		
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid	4:2FTS	757124-72-4
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	6:2FTS	27619-97-2
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid	8:2FTS	39108-34-4
Perfluorooctane sulfonamides		
Perfluorooctanesulfonamide	PFOSA	754-91-6
N-methyl perfluorooctanesulfonamide	NMeFOSA	31506-32-8
N-ethyl perfluorooctanesulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids		
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols		
N-methyl perfluorooctanesulfonamidoethanol	NMeFOSE	24448-09-7
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1691-99-2
Per- and Polyfluoroether carboxylic acids		
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Ether sulfonic acids		
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	756426-58-1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
Fluorotelomer carboxylic acids		
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4

Table 3. Receiving Water Monitoring Requirements -- 2001 & 2023

			2001			2023			Additional Testing
Parameter	**Units**	**Sample Type**	**Depth**	**Monitoring Frequency**	**Station location**	**Sample Depth**	**Frequency**	**Location**	
Temperature	ºC	Grab	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4	ZID North ZID South Reference North Reference South	Surface, every 5m to bottom	Annually (July or August)	ZID Station, ZID Boundary, Reference Sites[1]	15 /year
Salinity	ppt	Grab	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4	ZID North ZID South Reference North Reference South	Surface, every 5m to bottom	Annually (July or August)	ZID Station, ZID Boundary, Reference Sites[1]	15 /year
Dissolved Oxygen	mg/L	Grab	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4	ZID North ZID South Reference North Reference South	Surface, every 5m to bottom	Annually (July or August)	ZID Station, ZID Boundary, Reference Sites[1]	15 /year
pH	Standard units	Grab	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4	ZID North ZID South Reference North Reference South	Surface, every 5m to bottom	Annually (July or August)	ZID Station, ZID Boundary, Reference Sites[1]	15 /year
Secchi Disk Depth	Feet	Visual	Surface	1/year; during January in years 1,3, and 5, and during August in years 2 and 4	ZID North ZID South Reference North Reference South	Surface, every 5m to bottom	Annually (July or August)	ZID Station, ZID Boundary, Reference Sites[1]	3 /year
Turbidity	NTU	Grab	Surface, every 5 meters to bottom	1/year; during January in years 1,3, and 5, and during August in years 2 and 4	ZID North ZID South Reference North Reference South	Surface, every 5m to bottom	Annually (July or August)	ZID Station, ZID Boundary, Reference Sites[1]	15 /year
Fecal Coliform	#/100 mL	Grab	Surface	4/year, January, May, August, and November (may be reduced to 1/year in year 3, see Section I.B.4.b)	North, East, and South edges of the fecal coliform bacteria mixing zone and one shoreline station within the mixing zone	Surface (or just below)	Monthly[3] (May to September)	ZID Station, ZID Boundary, Reference Sites, Near Shore Sites[2]	39 /year
Enterococcus	#/100mL	Grab				Surface (or just below)	Monthly[3] (May to September)	ZID Station, ZID Boundary, Reference Sites, Near Shore Sites[2]	55 /year
Biological Monitoring for Benthic Infauna and Sediment Analysis	Per method	Grab	Per method	August of fourth year of perm	Within ZID, one Reference Site, beyond ZID boundary (within 5 m of the boundary)	Per method	Once every 5 years[4]	ZID Station, ZID Boundary, Reference Sites[1]	4 /5 years

Notes from 2001 Permit:
1. Samples shall be collected on the same day that effluent is sampled for FC concentrations. The mixing zone for fecal coliform bacteria is defined as an arc of a circle of 1600 meter radius, centered on the outfall going from one shoreline to the other extending on either side of the outfall line and over the diffuser. Outside this mixing zone the fecal coliform concentrations shall not exceed a monthly average of 14 FC/100 mL, and a daily maximum of 43 FC/100 mL. Also, fecal coliform concentrations shall not exceed 200FC/100mL at the shoreline within the designated mixing zone.

Notes from 2023 Permit:
[1]Monitoring is required at the following: ZID Station, ZID Boundary Sites and Reference Sites as described in Permit Part I.D.2.a,b,c.
[2]Monitoring is required at the following: ZID Station, ZID Boundary Sites and Reference Sites as described in Permit Part I.D.2.a,b,c,d.
[3]Monitoring is required once a month in May, June, July, August, and September. Fecal Coliform and enterococcus sampling shall coincide with effluent sampling in Permit Part I.B.
[4]Biological monitoring shall be conducted in August of the fourth year of the permit and every five years thereafter.

10.0 APPENDICES

APPENDIX B: HAINES WASTEWATER SYSTEM

- **Sanitary Sewer Details**
  - **Collection System Pumps**
  - **WWTP Clarifier Schematic**
  - **Mixing Zone Schematic**
  - **2023 Sewer Fee Schedule**

Concertor DP N100-7800

Performance curve

FLYGT

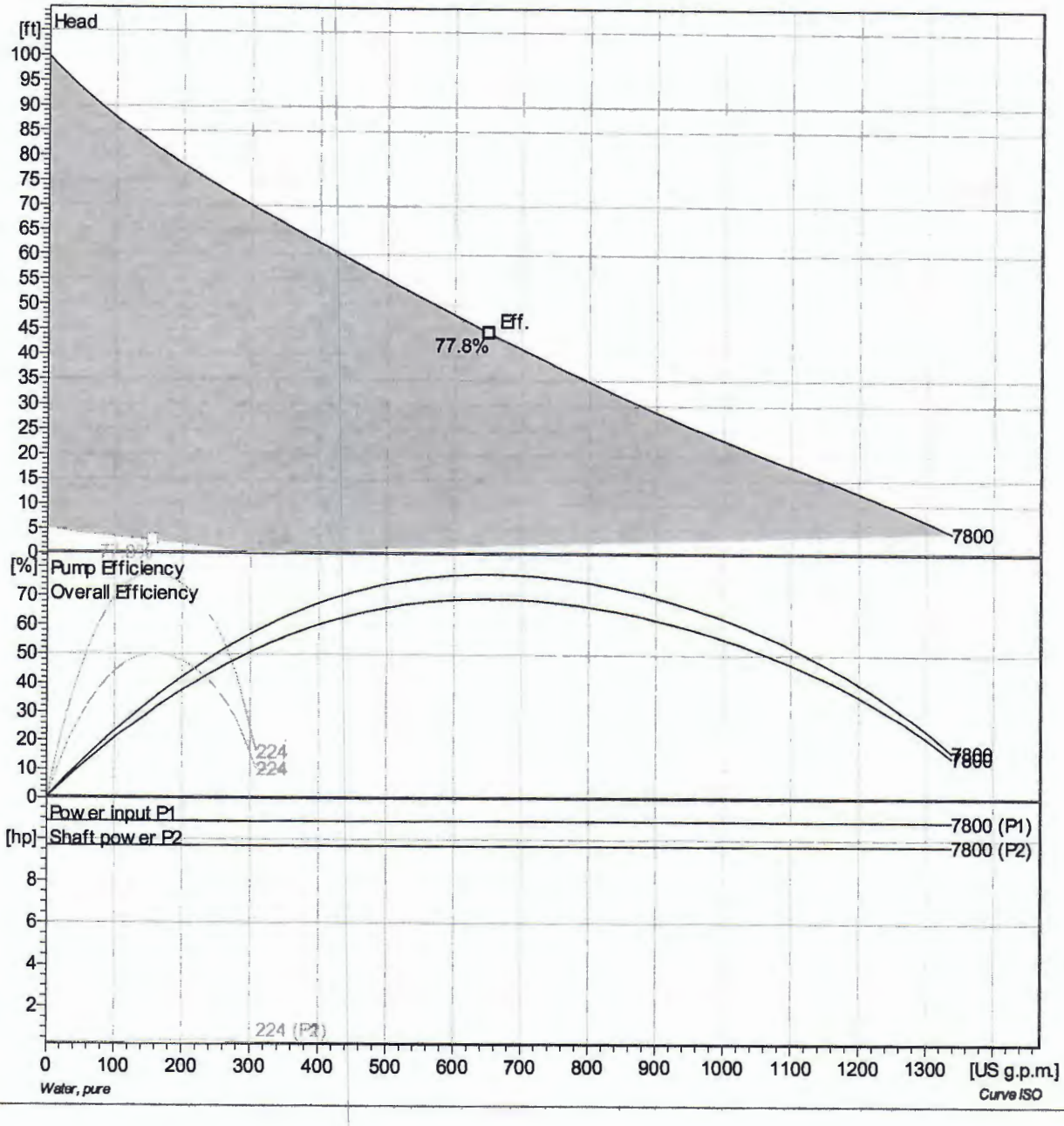
WWTP LIFT STATION

Pump

Discharge Flange Diameter	3 15/16 inch
Suction Flange Diameter	120 mm
Impeller diameter	7 7/8"
Number of blades	2

Motor

Motor #	N6020.091 18-08-1AZ-W 10hp
Frequency	50/60 Hz
Rated voltage	460 V
Phases	3~
Rated power	10 hp
Set power	7800 W
Rated current	10.9 A
Starting current	10.9 A
Rated speed	500-2175 rpm



Project	Project ID	Created by	Created on	Last update
			3/27/2019	

BEACH ROAD LIFT STATION

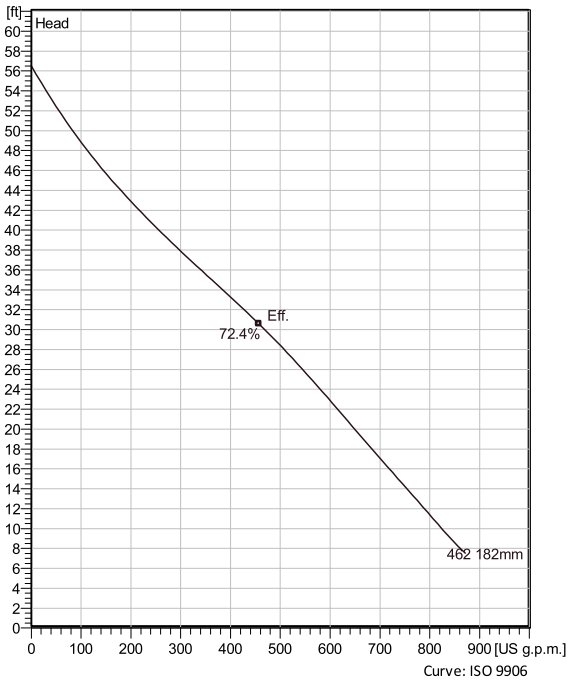
NP 3102 MT 3~ Adaptive 462

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

FLYGT
a xylem brand

Technical specification

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

Configuration

Motor number
N3102.070 18-11-4AL-W 5hp

Installation type
P - Semi permanent, Wet

Impeller diameter
182 mm

Discharge diameter
4 inch

Pump information

Impeller diameter
182 mm

Discharge diameter
4 inch

Inlet diameter
100 mm

Maximum operating speed
1760 rpm

Number of blades
2

Max. fluid temperature
40 °C

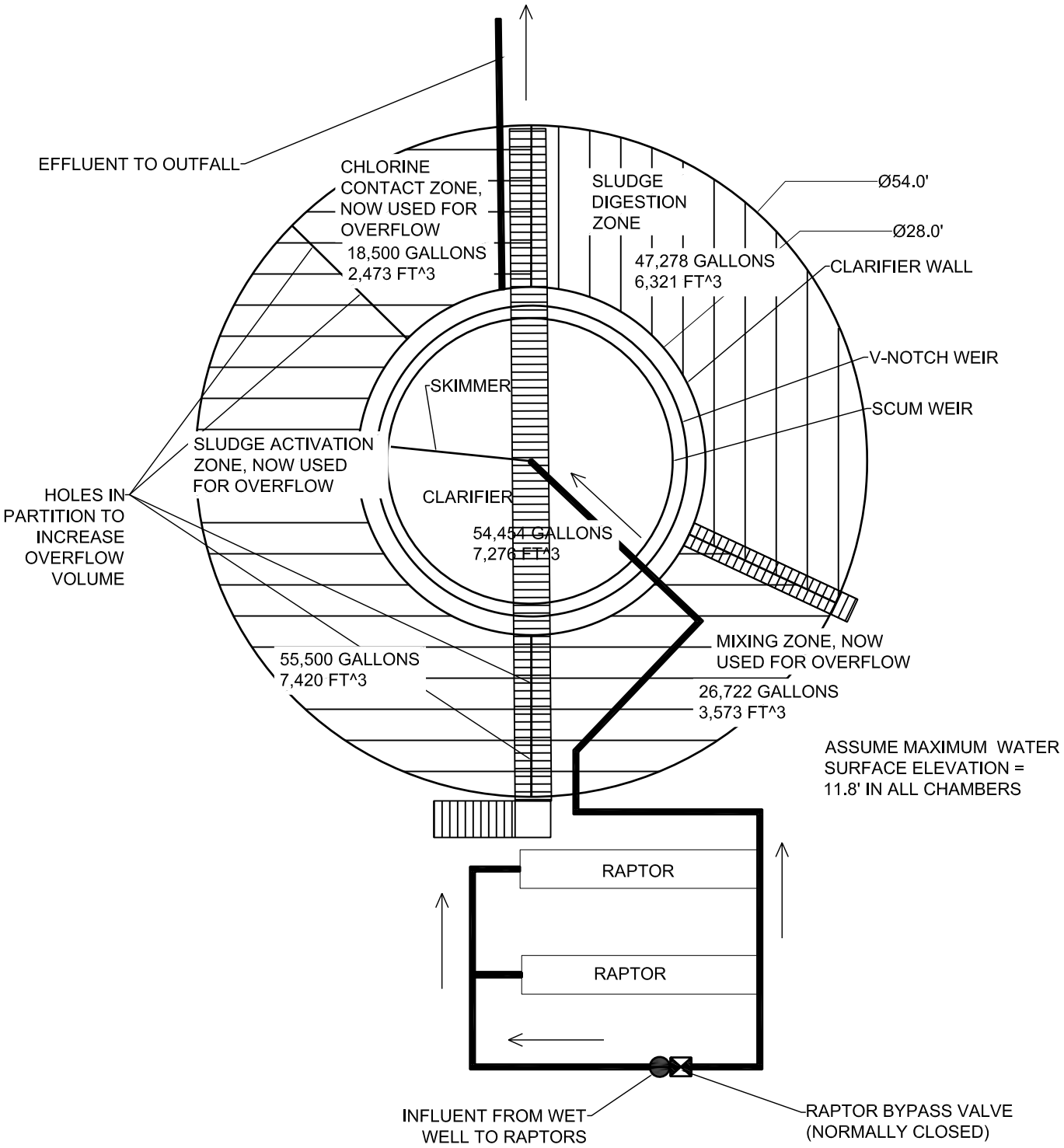
Configuration

Material

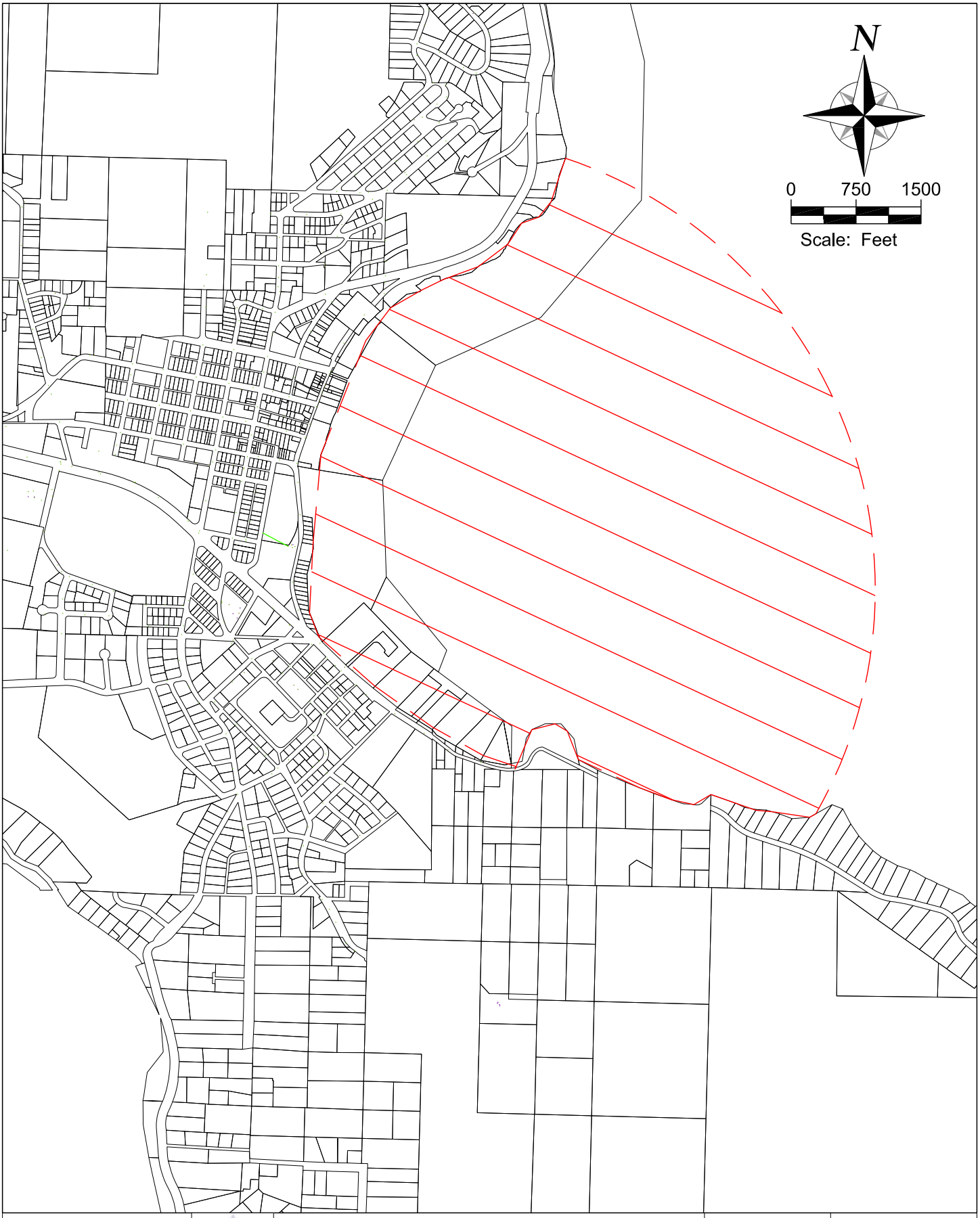
Impeller
Hard-Iron

mat_STATOR_HOUSING_MTRL
Grey cast iron

Project	Xylect-20470562	**Created by**	Mark Ornellas
Block		**Created on**	4/21/2023 **Last update** 4/21/2023



	JOINER ENGINEERING LLC BECAUSE WE ALL LIVE DOWNSTREAM	PROCESS CHAMBERS SCHEMATIC WASTEWATER TREATMENT BUILDING 2023 SEWER MASTER PLAN	Drawn by: WAJ	SHEET B-1
Date: 4/2/2023			Checked by: WAJ	Project No: 21-003



		1600-METER RADIUS MIXING ZONE PERMIT AK-002138-5 2023 SEWER MASTER PLAN	Drawn by: WAJ	SHEET B-2
Date: 3/25/2023	JOINER ENGINEERING LLC BECAUSE WE ALL LIVE DOWNSTREAM		Checked by: WAJ	Project No: 21-003

Haines Borough – Water-Sewer Rate Schedule

(See HBC Title 13 for regulations and more information)

Effective Date	07/01/2022	07/01/2023	07/01/2024	07/01/2025
Flat Rate Residential Service				
Water	$41.00	$43.05	$45.20	$47.45
Sewer	$54.75	$56.45	$58.25	$60.20
Total Monthly Residential Flat Rate	**$95.75**	**$99.50**	**$103.45**	**$107.65**
Unmetered Commercial Service ¾" (existing non-conforming)				
Water	$41.00	$43.05	$45.20	$47.45
Sewer	$54.75	$56.45	$58.25	$60.20
Total Monthly Rate ¾" Unmetered Commercial:	**$95.75**	**$99.50**	**$103.45**	**$107.65**
¾" Metered Commercial Service*				
Water	$38.60	$40.50	$42.55	$44.70
Sewer	$52.70	$54.30	$56.00	$57.85
Total Monthly Rate ¾" Commercial Service:	**$91.30**	**$94.80**	**$98.55**	**$102.55**

*Includes the first 5,000 gallons of water used per month

Multi-dwelling Residential Flat Rate (apartments)

Multi-dwelling flat rate Per unit -**3 to 4 units**				
Water	$40.20	$42.20	$44.30	$46.50
Sewer	$53.65	$55.30	$57.05	$58.95
Total Monthly Rate Per Unit (3-4)	**$93.85**	**$97.50**	**$101.35**	**$105.45**
Multi-dwelling flat rate Per unit -**5 or more units**				
Water	$39.35	$41.35	$43.40	$45.55
Sewer	$52.55	$54.15	$55.85	$57.65
Total Monthly Rate Per Unit (5+)	**$91.90**	**$95.50**	**$99.25**	**$103.20**

Water Demand Charge (additional monthly charge for commercial service larger than ¾")

1" Service	$12.16	$12.77	$13.41	$14.08
1½" Service	$24.31	$25.52	$26.80	$28.14
2" Service	$36.47	$38.29	$40.20	$42.21
3" Service	$72.92	$76.57	$80.40	$84.42

Monthly Surcharge for Crystal Cathedrals Special Assessment District

	WATER	SEWER
Commercial / Residential Surcharge as of 07/01/2022	$7.75	$3.35
Total Combined Surcharge for Water-Sewer Service:	**$11.10**	

Extra Gallonage Charge Each 1,000 gals or fraction thereof used after the minimum usage charge

Water	$2.68	$2.81	$2.95	$3.10
Sewer	$7.00	$7.35	$7.72	$8.10

Note: If a commercial service includes residential dwellings, an additional 5,000 gals is allowed for each dwelling, covered by the residential flat rate charge as defined in HBC 13.04.240.

Hook-Up Fees

	WATER	SEWER
Minimum Hook-Up Fee (upon completion applicant will be billed for costs in excess of the minimum)	$750.00	$650.00
Water Hook-up Inspection Deposit	200.00	n/a
Inspection Fee per Hook-Up	$100.00	$100.00
Water Main Extension Inspection Fee - First 100 Feet ~Each Additional Foot	$100.00 $1.00	$100.00 $1.00

Expansion Charges

Size of Water Service Line	Capacity (GPM)	WATER	SEWER
¾" – 1" commercial	8 – 15	$450.00	$500.00
1-1/2" commercial	45	$1,030.00	$1,040.00
2" commercial	80	$1,830.00	$2,030.00
4" commercial	500	$7,300.00	$8,120.00

Other Water & Sewer Fees and Charges

Water and/or Sewer Service Application fee	$75.00
Subdivision application for five or more services	$150.00
Other Agency Permit Fee	Cost of the Permit plus $50
Meter Installation Fee	Actual cost of installation
Meter Inspection Fee	$40.00
Meter Testing Fee	Actual cost +15%
Frost Bottom Replacement	$50.00
Control Valve Shut-off or Turn-on ~Minimum service fee (if water is off for less than 3 months) ~Seasonal Turn-on/off (if water is off for 3 months or more) ~Excess fees, if necessary	 $40.00 $100.00 $50/hour
Bulk Water (PC Dock, Boat Harbor, Fill Station, & Hydrants,) ~Per 1,000 gallons ~Service Charge (does not apply to water fill station)	 $6.00 $75.00
After Hours Employee Call-Out	$150.00
Deposits and Credit Establishment	$100 for water and $100 for sewer
Unauthorized Water Turn On ~Charge to Shut Off Water at the Main or Remove Meter	Actual cost to the water department plus $250
Termination or Restoration of Sewer Service ~Minimum Service Charge (nonrefundable)	Actual cost +15%
Septic Waste Disposal (at sewage plant only) per load	$20.00 for each 100 gals or fraction thereof $100 minimum
RV Dump Stations	$60.00
RV Parks	Same as Metered Commercial

10.0 APPENDICES

APPENDIX B: HAINES WASTEWATER SYSTEM

- **Sanitary Sewer Reports**
  - **I/I Studies Summary**
  - **Site Visit Photo Log – November 9 – 11, 2022**
  - **Annual Wastewater Utility Report: 2022**

I/I Studies Summary

1976: Major SSS Overflows

- **Manholes & WWTP Leakage**

1976 EMPS Infiltration & Inflow Investigation

- **Investigation included:**
  - ✓ Visual inspection
  - ✓ Smoke testing
  - ✓ Flow checks by depth measurement
- **Recommendations**
  - ✓ Replace perforated manhole covers with standard manhole covers
  - ✓ Replace all manholes on View and 1st Street line with standard manhole covers
  - ✓ Rebuild systems on 3rd and 4th Street north of Union
  - ✓ Rebuild the entire Port Chilkoot system
  - ✓ Establish program to remove roof drains and other connections to the sewerage system or assess a higher serviced charge when unwanted connections exist
  - ✓ Verify effects of correction on the system
- **Outcomes:**
  - ✓ Replaced sewer lines on Lynnvue Drive, Fourth Avenue north of View Street, and entire Port Chilkoot area
  - ✓ Manhole replacement on First Avenue, from View Street north of Lutak Road
  - ✓ Various manhole lid improvements

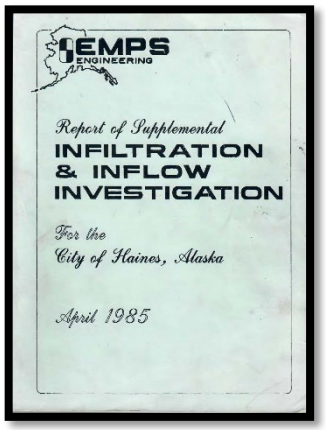
1982 URS Wastewater System Analysis

- **URS Engineers investigated modifying the current sewer system (collection and treatment components) versus placing a new screening facility near Beach Road**
- **Recommended City of Haines pursue a 301(h) secondary treatment waiver from EPA and postpone decision until after waiver determination**

1984 & 1985: Major SSS Overflows / City of Haines Response

- **Manholes & WWTP Leakage**
- **Two Bypasses Constructed**
  - ✓ Beach Road sewage passed directly to Portage Bay without treatment
  - ✓ WWTP influent bypassed to WWTP effluent line without treatment
- **EMPS Engineering contracted for I&I study**

1985: EMPS Engineering: Report of Supplemental Infiltration & Inflow Investigation for the City of Haines Sewerage System

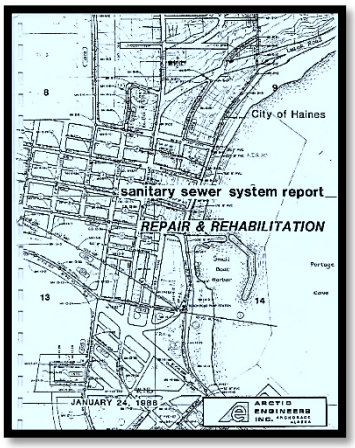


- **Report supplements EMPS 1976 I/I investigation**
- **Major recommendation: Clean the sewerage system**
- **Investigation**
  - ✓ Visual inspection
  - ✓ Smoke testing
  - ✓ Dye testing
  - ✓ Flow checks by depth
- **Conclusions**
  - ✓ Serious flow capacity problems due to lack of maintenance and unwanted inflows
  - ✓ Sewerage system needs to be cleaned; parts of the system fixed, replaced and/or expanded; and a data program initiated
- **Recommendations**
  - ✓ Removing blockages and cleaning system lines
  - ✓ Initiate a maintenance program: all collectors cleaned every 5 years and all mains every 2 years
  - ✓ Initiate a separate monitoring program
  - ✓ Initiate inspection program for storm water and sanitary sewer connections for new construction
- **Future Alternatives**
  - ✓ If the 301(h) waiver is denied and secondary treatment is required, routing to the WWTP by a new route could reduce energy costs, pump maintenance and replacement costs
  - ✓ The WWTP capacity may need to be expanded as its hydraulic capacity is the primary flow restriction
  - ✓ Create peak flow storage as an alternative to WWTP expansion

1985: ADEC Investigation

- **Emergency appropriation from the AK Legislature - $1.6 million**
- **Compliance order to City of Haines with scheduled activities**
  - ✓ Achieve secondary treatment until 301(h) waiver issued
  - ✓ Address the feasibility of supplying coarse screening capability at upper end of 10-inch effluent line at Haines Highway
  - ✓ Present plans and specification for 1,300-foot outfall extension, and construct the extension
  - ✓ Install overflow bypass to 10-inch effluent line; Install gate valve on bypass
  - ✓ Install bypass at Teach Road Pump Station to outfall line, and discontinue use of this bypass
  - ✓ Submit report identifying location and schedule for disconnection of City road and building storm drains; disconnect all City road and building storm drains from sanitary sewer system
  - ✓ Require storm drains be disconnected from sewer system, and disconnect drains when they cannot be done using reasonable means
  - ✓ Complete all repairs and modification by December 31, 1985

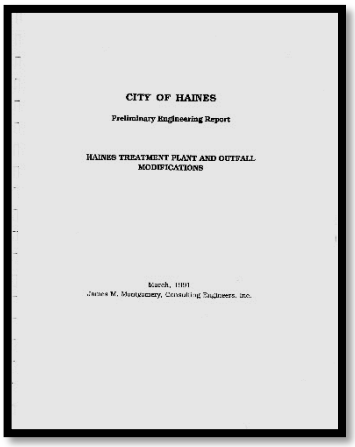
1986: AEI Sanitary Sewer System Report Repair & Rehabilitation



- **PURPOSE**
  - ✓ Arctic Engineers, Inc. contracted to design necessary sanitary sewer system repairs and rehabilitation based on previous studies including verifying previous recommendations
  - ✓ AEI recommended justification of system repairs be verified by implementing a flow measurement program
  - ✓ AEI determined a full system analysis was necessary and contract was expanded
- **INVESTIGATION**
  - ✓ Oral interviews
  - ✓ Inspecting all lines with sewer camera (July to October)
  - ✓ Inspecting all manholes
  - ✓ Smoke testing to locate leaks, storm drain cross-connections, improper services (tested all lines as previous smoke tests done during in the winter when the ground was potentially frozen or saturated)
  - ✓ Dry weather flow data collected (July) as well as wet weather data collected (December)
- **PROJECT ADMINISTRATION**
  - ✓ Oversaw work done by Advanced Equipment contractor for:
    - Line cleaning
    - Line inspections with sewer camera
    - Line grouting
    - Manhole grouting
  - ✓ Developed, implemented and administrated manhole rehabilitation contract
- **FINDINGS, REPAIRS & OTHER OUTCOMES**
  - ✓ **Line Cleaning & Camera Inspections**:
    - AC pipe installed in the 1950s characterized by numerous holes, cracks with bad joints requiring grouting
    - Cleaning yielded large amounts of black gravel (no regular maintenance program)
    - Lines were grouted and hydraulic flow improved
    - Some AC lines appear to be exfiltrating, losing wet weather flows into surrounding soils and causing flow disruptions as groundwater pollution of an unknown magnitude / impact
  - ✓ **Construction Issues**
    - Lines built with flat grade in marginal soils and construction conditions causing solids to settle out
    - Lines in wet or deep areas sagging
  - ✓ **Manholes**
    - Numbered all manholes
    - 66 of 160 repaired
    - 12 scheduled for replacement

- ✓ **Flow Testing**
  - I/I dry-weather baseflow of 23.5 GPCD determined (established between 1 AM to 5 AM)
  - I/I contribution during wet flows (rainfall): 1 to 3 GPM per manhole or 1,500 to 4,500 GPD per manhole
- ✓ **Smoking Testing**
  - Showed commercial sources with most illegal / defective connections (storm water entering SSS)
  - After line and manhole repairs, I/I appears to source from private service lines
- ✓ **Storm Water**
  - City hired Force Account Crew to remove storm water sources from the SSS
  - Crew disconnected / repaired private service lines not in compliance with DEC regulations including items located by 1985 EMPS studies, smoke testing, visual inspection, advertising
  - Repairs paid with EMS Emergency Funding
- ✓ **Other Outcomes**
  - Developed master specifications for future sanitary sewer work
  - Identified need for comprehensive sewer system map
  - Identified 6 drainage basins: Beach Road, Port Chilkoot, Mud Bay Road, Downtown, Allen Road, One Mile

1991: Preliminary Engineers Report: Haines Treatment Plant and Outfall Modifications


CITY OF HAINES

Preliminary Engineering Report

HAINES TREATMENT PLANT AND OUTFALL MODIFICATIONS

March, 1991
James M. Montgomery, Consulting Engineers, Inc.

- **PURPOSE**
  - ✓ Funding proposal to convert existing WWTP from secondary to primary treatment and to increase capacity of treated effluent outfall line from the WWTP to the beginning of the submarine outfall line.
  - ✓ EPA 301(h) waiver granted allowing primary treatment only with permit stipulations
  - ✓ To retain the 301(h) waiver, primary treatment to be operating successfully by April 1993.
  - ✓ Treated effluent line (gravity flow, 10-inch) incapable of handling peak flows and flooding occurs in WWTP. Three alternatives considered:
    - Pressurize existing line
    - Slip lining existing line then pressurizing
    - Laying a parallel outfall line
- **EXISTING FACILITIES**
  - ✓ WWTP centered around a *Biosorption* biological secondary package plant with two operational configurations:
    - Extended aeration with 24-hour detention when hydraulic load was low
    - With increased demand, switch to contact stabilization configuration suited to high organic loading (operating mode at time of study).
    - First 150,000 gallons of influent required to receive secondary treatment. Beyond 150,000 gallons can be bypassed to rotary screen.

  - Sludge from secondary plant dewatered with *Permutit Gravity Filtration Dual Cell Gravity Solids Concentration Unit*. Polymer added to precondition sludge. Dewatered sludge hauled by truck to landfill for disposal.

- **CURRENT SYSTEM INADEQUATE**
  - ✓ Significant extensions of the original collection system since 1974.
  - ✓ Extensive 1980 efforts to reduce I/I a temporary fix as current peak sewage flows estimated to exceed 1 million gallons per day.
  - ✓ Flows beyond 400,000 GPD raw sewage bypassed to ocean outfall and not metered. High flows make achieving BOD and SS stipulated in the NPDES permit difficult.
  - ✓ Sludge treatment unable to consistently produce sludge dewatered to 10 percent solids, meeting State of Alaska requirements.
- **PROPOSED FACILITIES**
  - ✓ Converting existing WWTP to primary treatment only. NPDES permit will be issued when plant modification completed.
  - ✓ Effluent outfall line able to handle a maximum flow of 500,000 gallons and contingent upon City reducing I/I with replacement of old sewage collection in downtown area with State of Alaska funding.
  - ✓ Replacement of existing sludge treatment facilities to meet 10 percent solids requirement.
- **CLARIFIER CHANGES**
  - ✓ *Biosorption* plant modified by removing dividing walls and equipment within the circular outer wall of package plant.
  - ✓ Rotating sludge collection and surface skimming equipment added tank bottom reshaped with provisions for removing settled sludge.
  - ✓ Estimated surface area after modifications: 594 square feet.
  - ✓ Clarifier overflow rate to be 842 gallons per day per square foot during 500,000 GPD sewage flow, only slightly higher than the maximum desire overflow rate of 800 GPD per square foot.
  - ✓ Final design for modifications could increase clarifier capacity.
- **CHEMICAL ADDITION**
  - ✓ Contractors conducted treatability testing with grab samples at a variety of flow rates and chemical concentrations and mixing rates to select and size chemical feed equipment.
  - ✓ Chemicals to be added between grit chamber and primary clarifier to ensure 30 percent BOD and SS removals obtained with dilute, raw sewage.
- **SLUDGE DEWATERING FACILITIES**
  - ✓ An inclined screw surrounded by a filter fabric set-up will dewater sludge from the primary clarifier.
  - ✓ Polymer added to precondition sludge.
- **ALTERNATIVE SOLUTION**
  - ✓ None as the cost of a new WWTP prohibitively more than the proposed modifications even though the City owns adjacent land for such a facility.

Photo 1: Well Field Lift Station for Valley of the Eagles Golf Links & Well Field Road Area

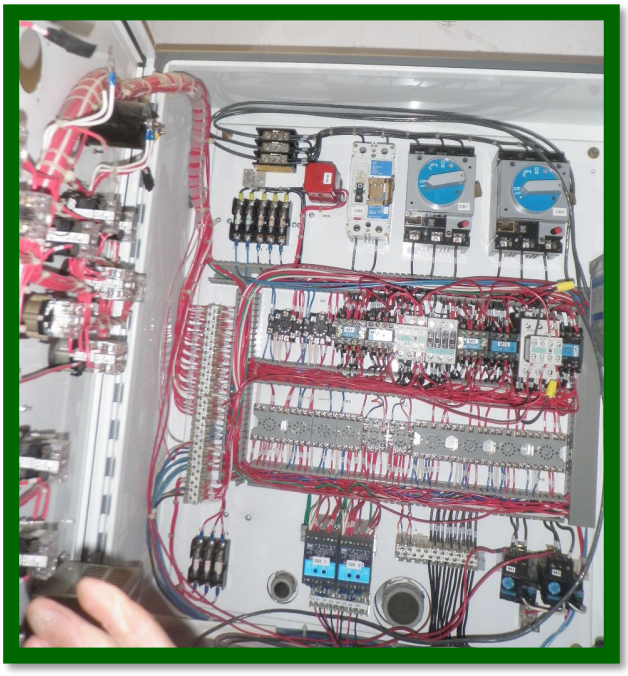
Located in Right-of-Way Adjacent to the non-profit, Uglys of Haines

Photos 2 & 3: Well Field Lift Station Detail

Lift Station To Be Upgraded

Photos 4 — 6: 1 Mile Haines Highway Lift Station

Lift Station To Be Upgraded



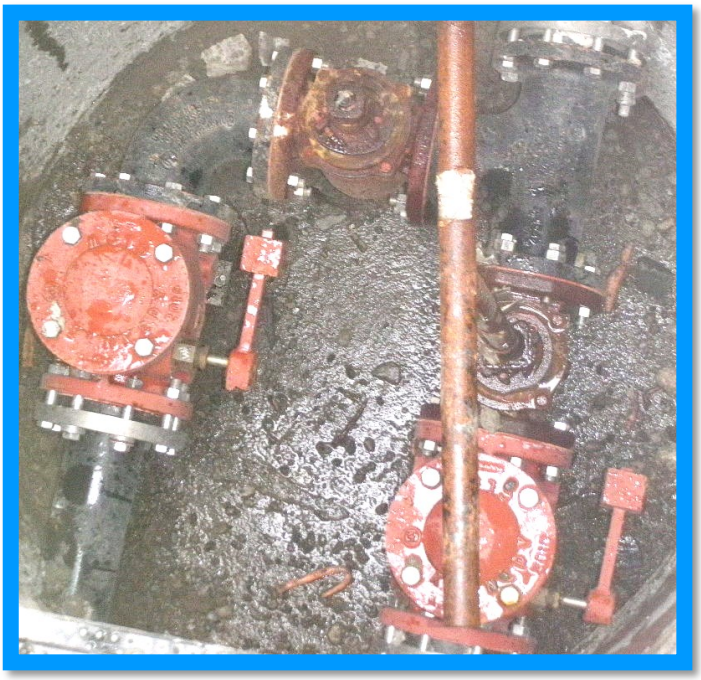
Photos 7 — 9: 1 Mile Haines Highway Lift Station

Wet Vault

Photo 10 & 11:
Chilkoot Estates
Lift Station

Photos 12 — 14 Chilkoot Estates Lift Station

Control Panel



Photos 15 — 17: Chilkoot Estates Lift Station

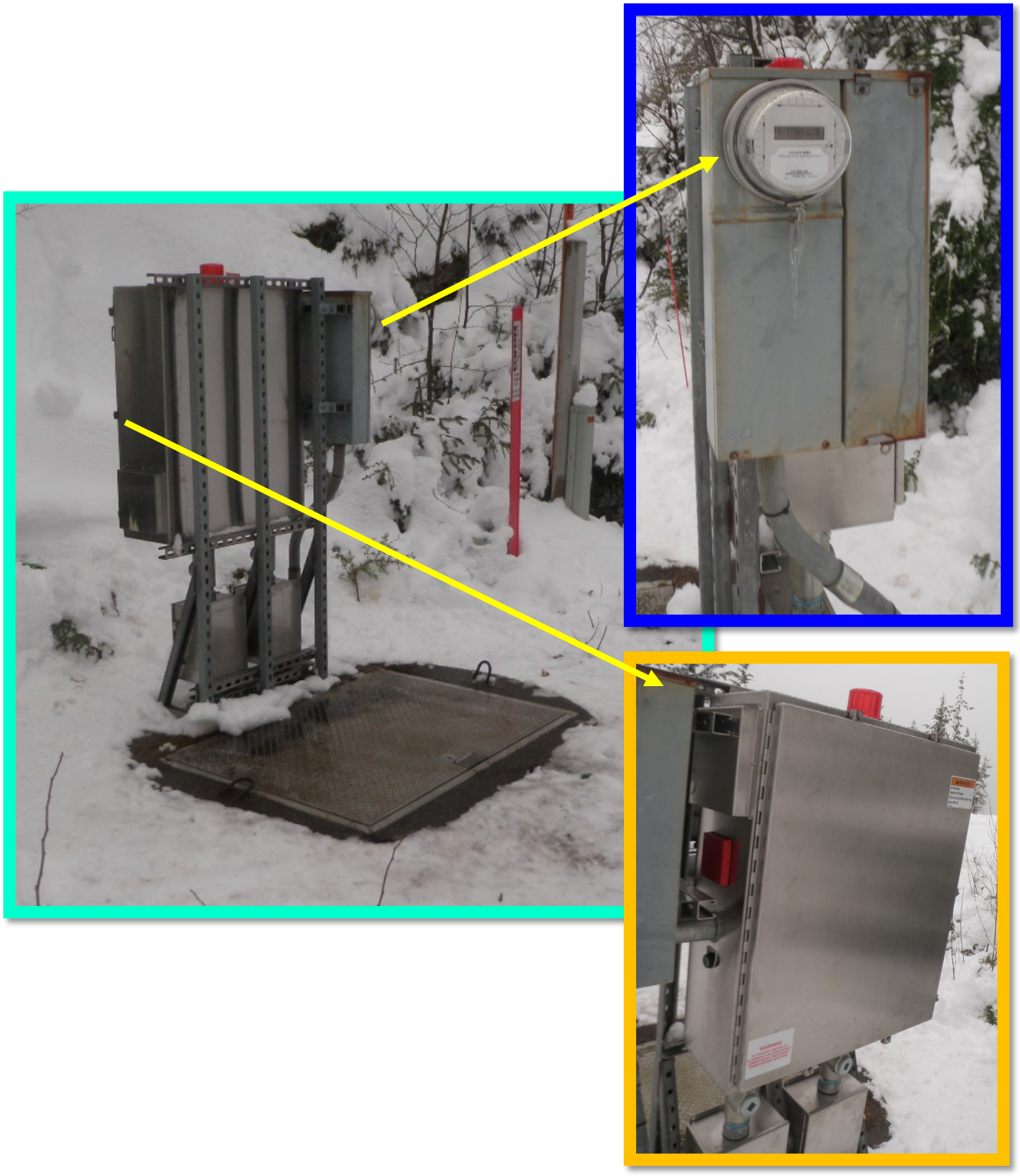
Wet Vault

Photos 18 — 20: Chilkoot Estates Lift Station

Dry Vault

Photos 21 — 23 Skyline Lift Station

Control Panel



Photos 24 — 26: Skyline Lift Station

Vault

Photos 27 & 28: Beach Road Lift Station

Control Panel Inside Utility Building Across from Harbor

Photos 29 — 32: Beach Road Lift Station

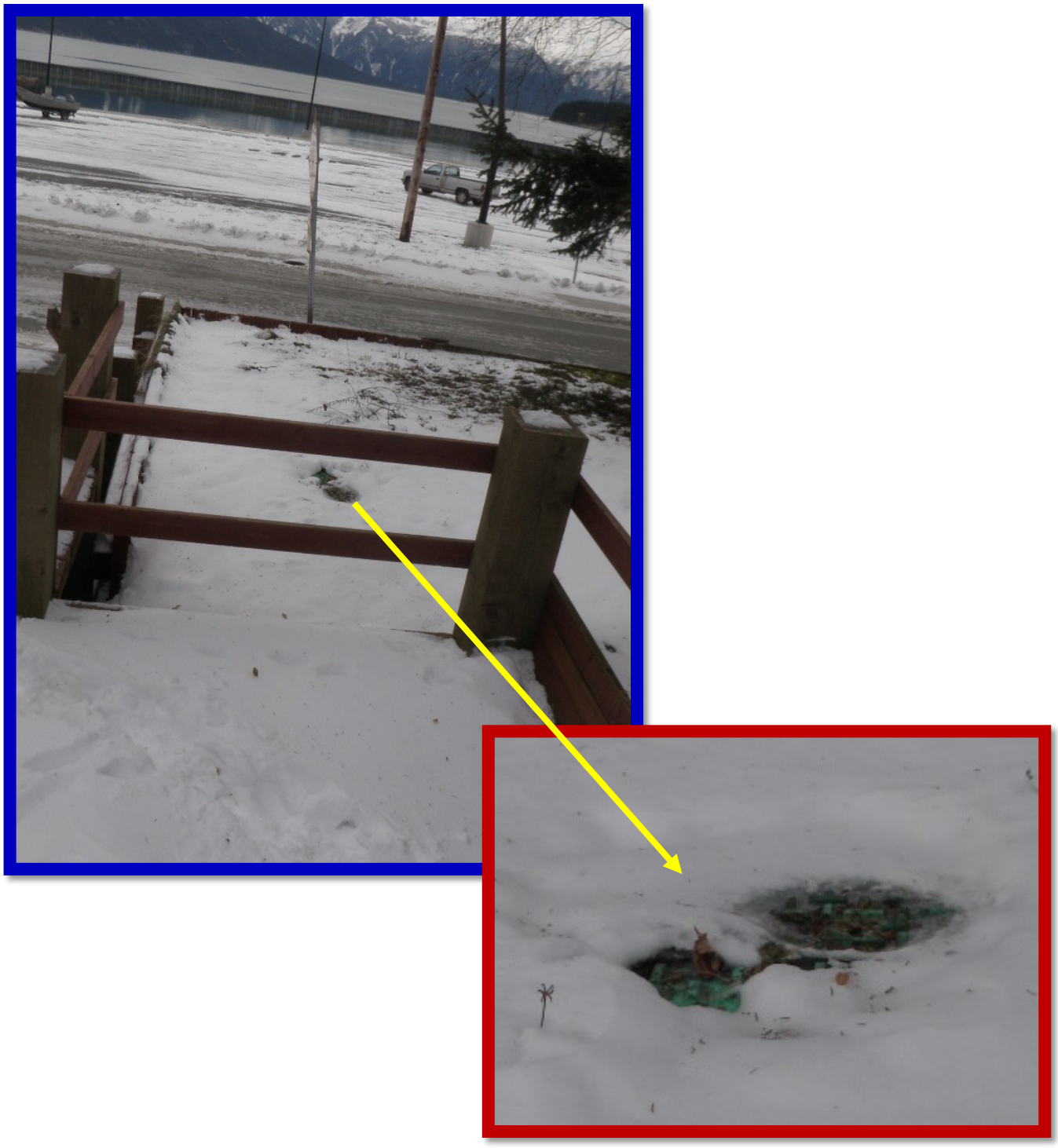
Wet Vault (upper left photo) and Future Dry Vault (right photos)

Force Main Extension Area — 500 feet

Photos 33 & 34: Sewage Outfall Line

Wet Vault (upper left photo) and Future Dry Vault (right photos)

Force Main Extension Area — 500 feet



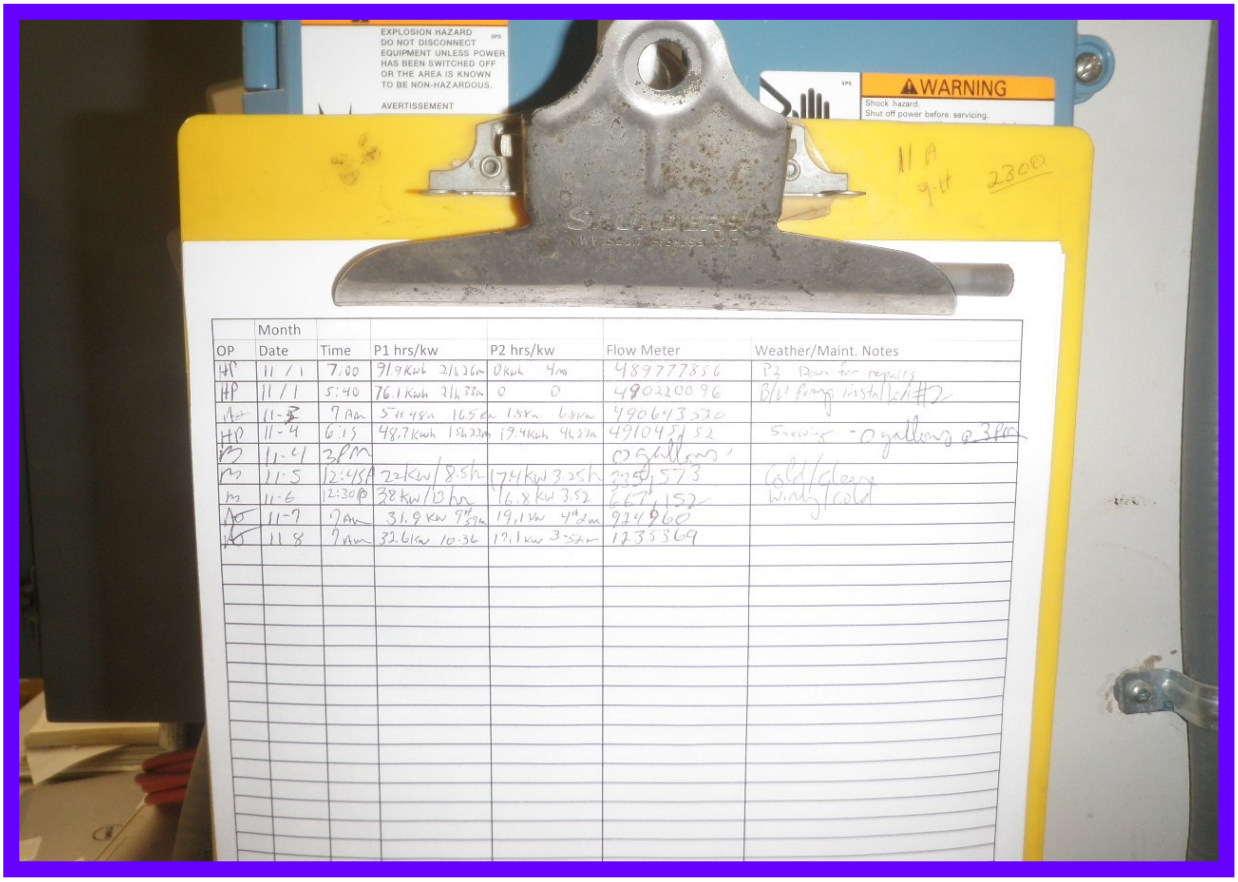
Photos 35 — 37: WWTP Lift Station

Photos 38 — 40: WWTP Lift Station Access

Doors to Inside Wet Vault (left photos) and Wet Vault Access

Photos 41 & 42: WWTP Lift Station

Wet Vault



Photos 43 — 45: WWTP Lift Station Controls

Photos 46 & 47: WWTP Inflow

Photos 48 — 51: Influent Screens: Two Raptors

Photos 52 — 55: Pressed Sludge & Influent Screens: Two Raptors

Screenings Removed by Raptors

Photos 56 & 57: Clarifier

Influent Wells Up through Center

Photos 58 — 60: Clarifier Arm, Baffles & Sludge

Photos 61 & 62: Sludge Digester

Photos 63 & 64: Sludge Pressing

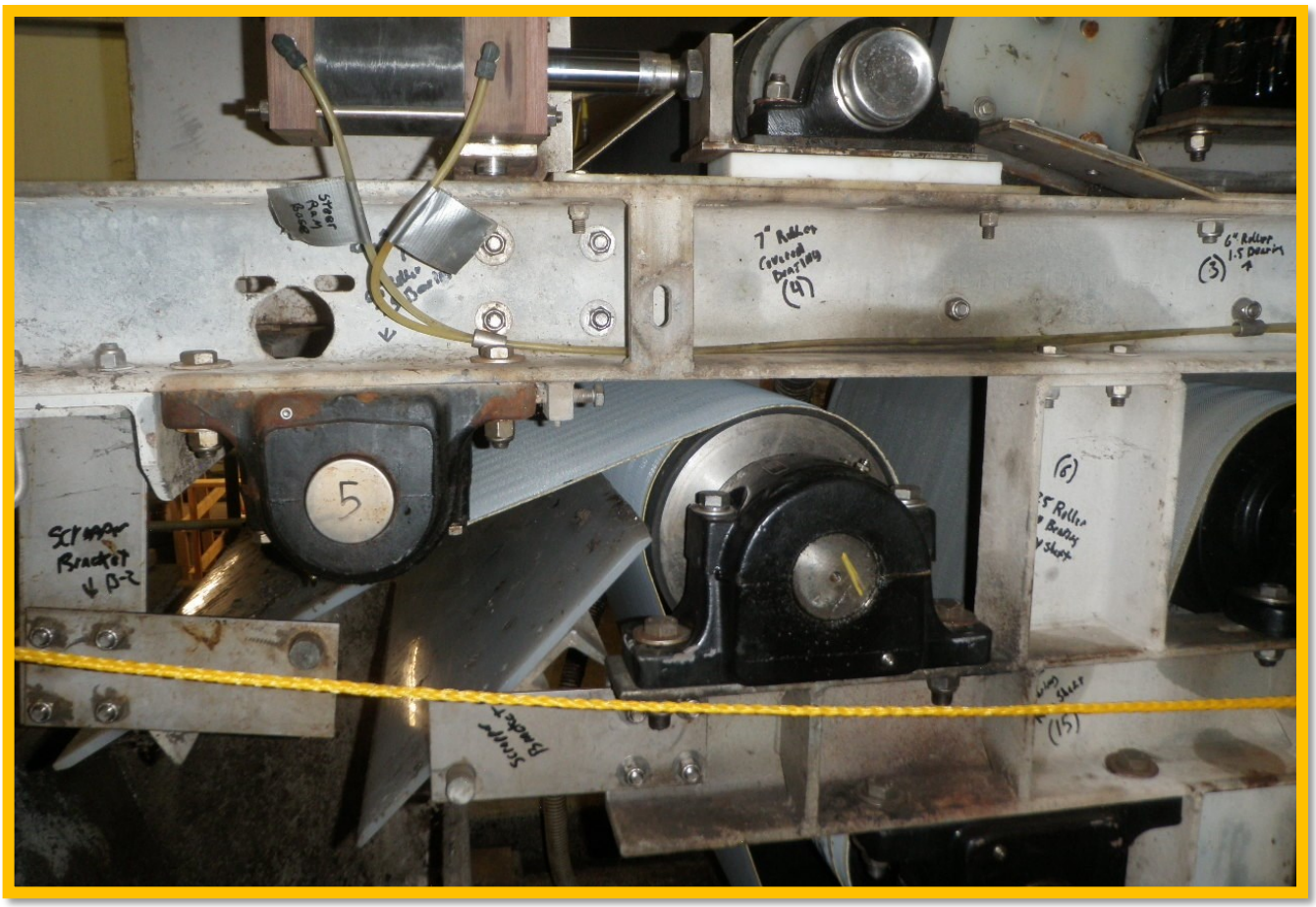
Mixing and Dosing Tanks for Sludge Polymer

Photo 65: Sludge Pressing

Mixing and Dosing Tanks for Sludge Polymer

Photos 66 & 67: Sludge Pressing

Sludge Press Located Upstairs

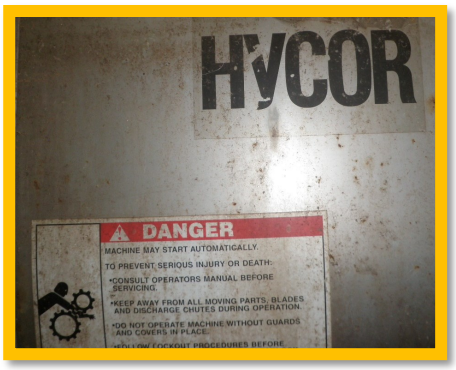


Photos 68 — 70: Sludge Pressing

Controls, Side View of Press, Finished Sludge Exit

Photos 71 — 73: Screens Replaced by Raptors

In Storage Adjacent to Belt Sludge Press (Upstairs)

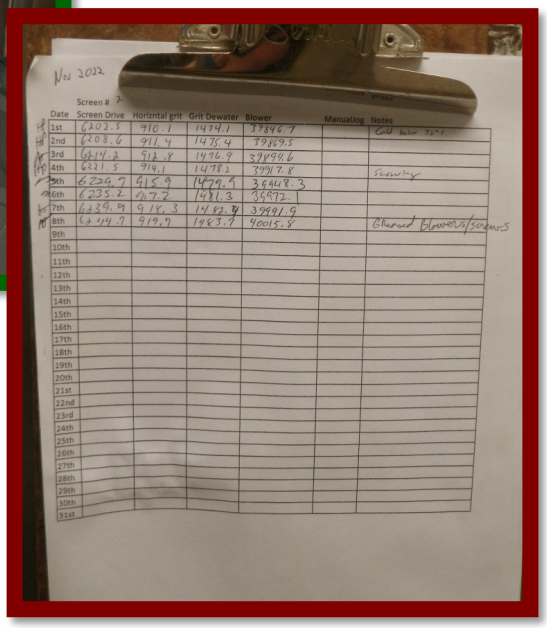


Photos 74 — 76: Air Compressor Room

Located on Main Level; Provides Aeration for Sludge Digester

Photos 77 — 79: Controls for Raptor Influent Screens

Two Sets in Compressor Room



Photos 80: Sewage Jeter

Pipe Cleaning Equipment

Appendix B

Haines Sanitary Sewer System — Photo Log: November 2022

Treatment System

The WWTP uses two steps to physically remove contaminants from the wastewater. These include:

- **Screening & Grit Removal**

Two combined plants screen and removes large debris, such as food waste, paper towels and any other material larger than 0.0082 inches. A cylindrical chamber in each unit uses centrifugal force to remove sand, silt and other inorganic material.

- **Primary Clarification**

A large, cylindrical tank slows the flow of the wastewater, allowing smaller suspended material time to settle and to be pumped out. Floatable material, such as grease and foam, are skimmed from the top of the water column.

SLUDGE

- **Sludge Digester**

Sludge from the clarifier is moved to a digester. Then a biological process reduces the amount of organic material.

- **Sludge Dewatering**

A belt-filter press removes water, leaving the processed biosolids with about 17 percent solids-content.

- **Solids Disposal**

Each year the WWTP removes over 60 tons of solid contaminants from the wastewater. In 2022, the volume weighed 61 tons. The dewatered sludge biosolids are transported to the local landfill for depositing.

Treated Water Disposal

Once the water leaves the last stage of the treatment process, it flows to the outfall in Portage Cove. The area surrounding the outfall is referred to as the mixing zone. It is a circular area, 1,600 meters in radius that centers on the end of the outfall and extends from off the shoreline of the Small Boat Harbor. While the Alaska Department of Environmental Conservation recommends that citizens do not bath or consume shellfish with the mixing zone, the Borough's water quality tests show an extremely low impact on this area from the WWTP effluent.

Infiltration & Inflow

The Townsite's Sanitary Sewer System contains pipes installed multiple decades ago. Older pipes, especially those made with asbestos cement, have a tendency to crack and leak. During heavy precipitation events, water infiltrating the ground leaks into the cracks in the sewer lines as well as through manholes lacking sealed covers and vaults. This inflow creates a huge surge for the WWTP to handle. Household roof drain, sump pumps, foundation and driveway drains should be hooked up to the Storm Water Sewer—not the Sanitary Sewer. If you believe your home has any of these unauthorized connections, contact the Department of Public Works.

2022 Wastewater Report

Wastewater Utility

In 2001, the City of Haines was granted a National Pollution Discharge Elimination (NPDES) Permit, AK-002138-5, by the US Environmental Protection Agency. The permit authorizes the Borough's Wastewater Utility to operate and maintain a 1.9 million gallon per day primary treatment facility and seven lift stations that comprise the community's collection system. The Wastewater Treatment Plant (WWTP) processes about 200 million gallon of wastewater per year while meeting the discharge limitations and preserving quality of Lynn Canal waters. The facility is staffed by three-full time operators, who also run the Water Utility in the Department of Public Works. In addition to the operation and maintenance of Sanitary Sewer System, these operators perform required laboratory analyses to ensure compliance with state and federal regulations.

Collection System

The Borough's Townsite wastewater collection system transports sewage from 554 customer connections to the WWTP. The collection system consists of 19 miles of underground piping, 267 manholes and 7 lift stations.

Haines Borough

PO Box 1209, Haines, Alaska 99827
907-766-2231

Parameter	Effluent Permit Limits Monthly Average	Haines Townsite Effluent Monthly Average
TSS	140 mg per L or ppm	40.0 ppm
TSS	30% minimum removal	55.0 % removal
BOD	140 ppm winter 260 in summer	52 ppm Oct-April 177 ppm May Sept
BOD	30% minimum removal	41.0% removal
FC	1,000,000 FC per 100 ml	189,542 FC per 100 ml
DO	2 to 17 ppm	6.1 ppm
pH	6.5 to 8.5	7.1
Flow	1. 9 MGD	0.289 MGD

Water Quality

Wastewater Operators are responsible for performing approximately 300 laboratory tests each year to ensure compliance with the Borough's NPDES permit. These tests include:

- **Biochemical Oxygen Demand (BOD):** A water quality measurement that indicates what demand a stream of wastewater will incur on the dissolved oxygen content in the receiving waters.
- **Total Suspended Solids (TSS):** A measure of the concentration of suspended matter present in wastewater.
- **Fecal Coliform:** An indicator bacteria indicative of warm-blooded animals and humans. The measurement shows the strength of the wastewater.
- **Dissolved Oxygen (DO)** A measure of the amount of oxygen dissolved in the wastewater. Dissolved oxygen is essential in sustaining aquatic life.
- **pH:** The measurement of the acidity or basicity of the wastewater.

2022 HAINES SEWER SYSTEM FACTS

- Annual Effluent Volume: 109.2 Million Gallons
- Average Daily Wastewater Treatment Volume: 0.288 Million Gallons
- Number of Connections: 554 Customers
- Gallons per Capita per Day: 185 Gallons per Person
- Cost to Treat 1,000 Gallons of Wastewater: $4.86
- Gravity Sewer Main: 17.5 Miles
- Force Sewer Main: 1.4 Miles
- Number of Lift Stations: 7
- Number of Manholes: 267

Household Hazardous Waste

Borough staff are doing their part to treat the wastewater generated in your homes. Haines citizens can help by paying attention to what they put down the drain.

- Grease and oil can build up in sewer lines and cause blockages.
- Rags, disposable wipes and paper towels can get caught in pumps causing interruptions in service and potential pump damage.
- Household hazardous waste can create serious problems when introduced into the sewer. Corrosive, toxic and flammable substances are harmful to the collection and treatment systems, Borough personnel and Portage Cove. If hazardous wastes are detected during routine sampling, additional testing is immediately required placing a tremendous financial burden while tracking down this pollution source. Fines can be levied on the Borough and the responsible individuals for violation of discharge requirements. Customers are urged to dispose of hazardous wase in a proper manner.

We thank you for your help in keeping our wastewater free of these pollutants and protecting the environment.

Please take part in the collection event to ensure proper disposal of hazardous waste.

HOW TO PROPERLY DISPOSE OF HAZARDOUS WASTE

The Borough sponsored a Household Hazardous Waste collection event on July 19—20, 2022. With your assistance, the Borough collected 995 gallons as well as 4 cubic yards of waste. The next collection even will be held summer 2023.

Eligible Items

Items that can be brought to the event free of charge include:
poisons, disinfectants, solvents, herbicides, used oil, flammable liquids (gasoline, diesel fuel, Blazo, etc.), paint products, paint thinner, furniture stripper, antifreeze, acids, cleaners, pesticides, transmission fluid, wood preservatives, floor wax, printing and photographic chemicals, Ni-Cad and lithium batteries, auto batteries, and mercury.

Items not in the original container will NOT be accepted under any circumstances.

Ineligible Items

Explosives, blasting caps and gun powder, reactive such as sodium metal, infectious wastes, radioactive wastes, light bulbs of any kind, household batteries (AAA, AA, C, D, 9-volt, etc.) and any item not mentioned in the **Eligible Item** list.

FREE HOUSEHOLD HAZARDOUS WASTE COLLECTION

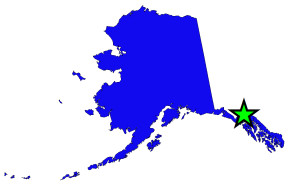
10.0 APPENDICES

APPENDIX C: MAPS

- **Flood Risk**
- **Tsunami Inundation Risk**

Haines

City Office: 907-766-2231
Revised: 29-Jun-2017



Alaska District

Status	First Class City	**Last Flood Event**	N/A
Population	2508	**Elevation**	N/A
River System	Multiple	**Flood of Record**	N/A
Coastal Area	Lynn Channel	**Baseline Erosion Report Year (Updated)**	2007 ()
NFIP Status	Community-Only	**Flood Insurance Rate Map**	N/A
Flood Gage		**Flood Insurance Study**	Yes

Gage Info: N/A

Profile Map: http://dcra.commerce.alaska.gov/profile Pdfs/Haines_1983.pdf

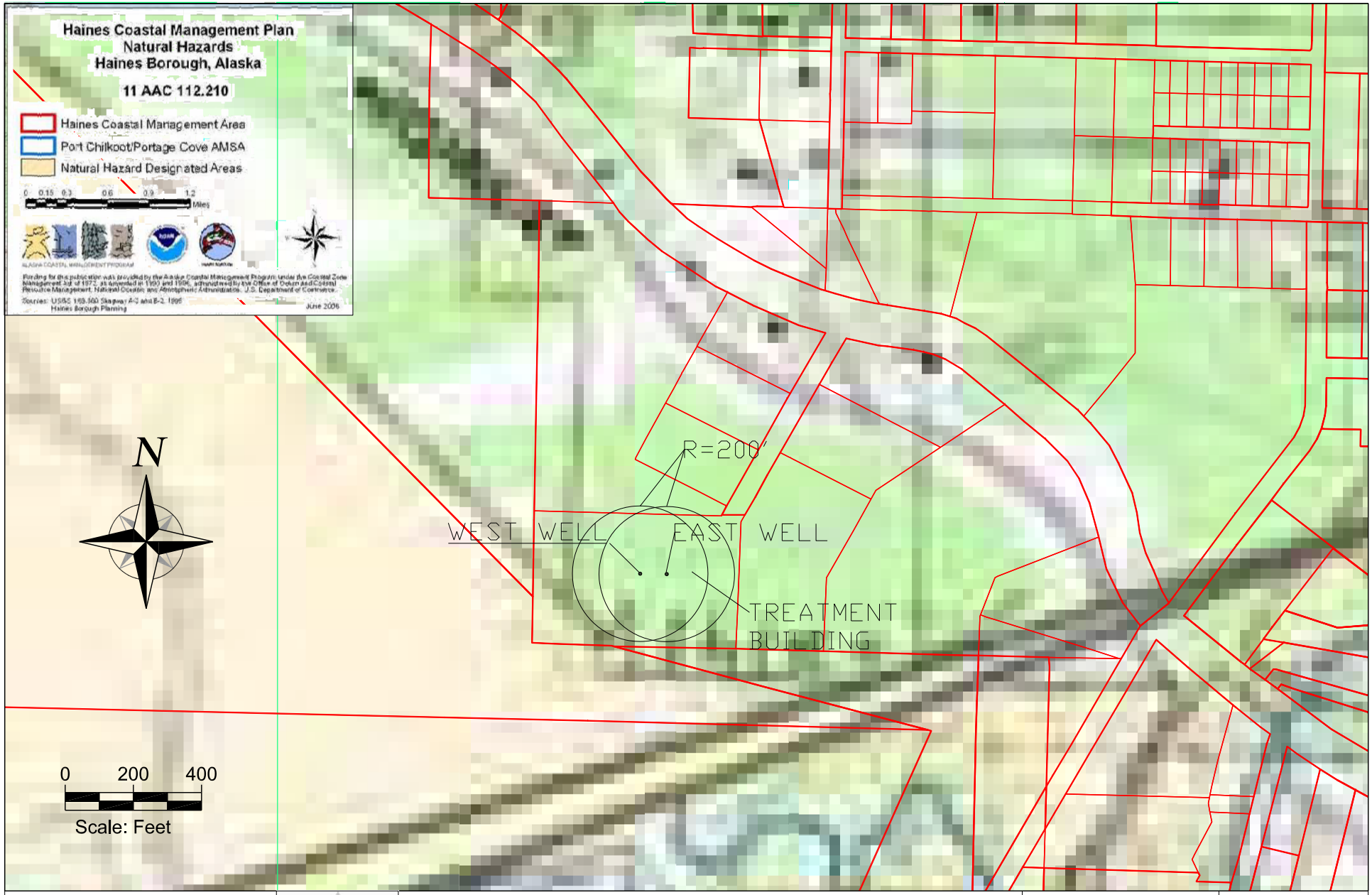
FEMA Map: N/A

High Water Mark: N/A

Floodplain Notes: No known flooding. The highway into Haines was severely damaged by flooding from the rivers and streams of the Chilkat River Valley. The airstrip came within inches of flooding in September, 1967. The design elevation of the airstrip is 22 ft Mean Lower Low Water. All of the low areas between the sawmill and the airstrip were inundated. This area is normally flooded by 20' spring tides once or twice a year.

Figure 2. HCMP Natural Hazards

Source: *HCMP, 2007*



JOINER ENGINEERING
Civil & Environmental Engineering

CRYSTAL CATHEDRALS WATER SYSTEM
HCMP NATURAL HAZARDS
HAINES, ALASKA

Date: 4/2/2014	Sheet 1 of 1
Drawn By: WAJ	Project No: 14-002
Checked By: WAJ	

ALASKA DIVISION OF GEOLOGICAL &
GEOPHYSICAL SURVEYS

REPORT OF INVESTIGATION 2018-2
Nicolsky and others, 2018
SHEET 2 OF 3
Explanatory text accompanies map

135°35'W 135°30'W 135°25'W

59°16'N 59°14'N 59°12'N 59°10'N

Chilkoot Inlet

McClellan Flats

Sheet 3

Chilkat Inlet

Letnikof Cove

Flow Depth

15 m (50 ft)
10 m (33 ft)
5 m (17 ft)
2.5 m (8 ft)
1.5 m (5 ft)
1.0 m (3 ft)
0.5 m (1.6 ft)
0.25 m (0.8 ft)

Maximum estimated inundation extent from all scenarios

Inundation from tectonic scenarios

Scenario 4
Scenario 1M

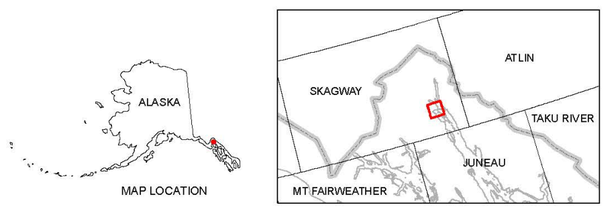
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
3354 College Road ♦ Fairbanks, Alaska 99709-3707
Phone 907-451-5010 ♦ Fax 907-451-5050
email: dggspubs@alaska.gov ♦ website: dggs.alaska.gov

MAXIMUM ESTIMATED TSUNAMI INUNDATION FROM TECTONIC AND LANDSLIDE SOURCES, HAINES, ALASKA

by

D.J. Nicolsky[1], E.N. Suleimani[1], and J.B. Salisbury[2]

2018



Location of Map Area

SCALE 1:29000

0 0.25 0.5 1 1.5 2 2.5 3 3.5 MILES

0 0.5 1 2 3 4 5 KILOMETERS

0 700 1400 2800 4200 5600 7000 8400 9800 11200 12600 14000 FEET

N

Affiliations:

[1] Alaska Earthquake Center, Geophysical Institute.
University of Alaska Fairbanks, PO Box 757320, Fairbanks, AK 99775-7320
[2] Alaska Division of Geological & Geophysical Surveys, 3354 College Road,
Fairbanks, AK 99709-3707

Base map from:
UAF-GINA Best Data Layer
Projection:
Alaska State Plane Zone 1 (Feet)
Datum:
North American Datum of 1983
Cartography by:
L. Gardine[1] (2018)
Cartographic review by:
P.E. Gallagher[2] (2018)
Peer review by:
De Anne S.P. Stevens[2] (2018)

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

REPORT OF INVESTIGATION 2018-2
Nicolsky and others, 2018
SHEET 3 OF 3
Explanatory text accompanies map

STATE OF ALASKA
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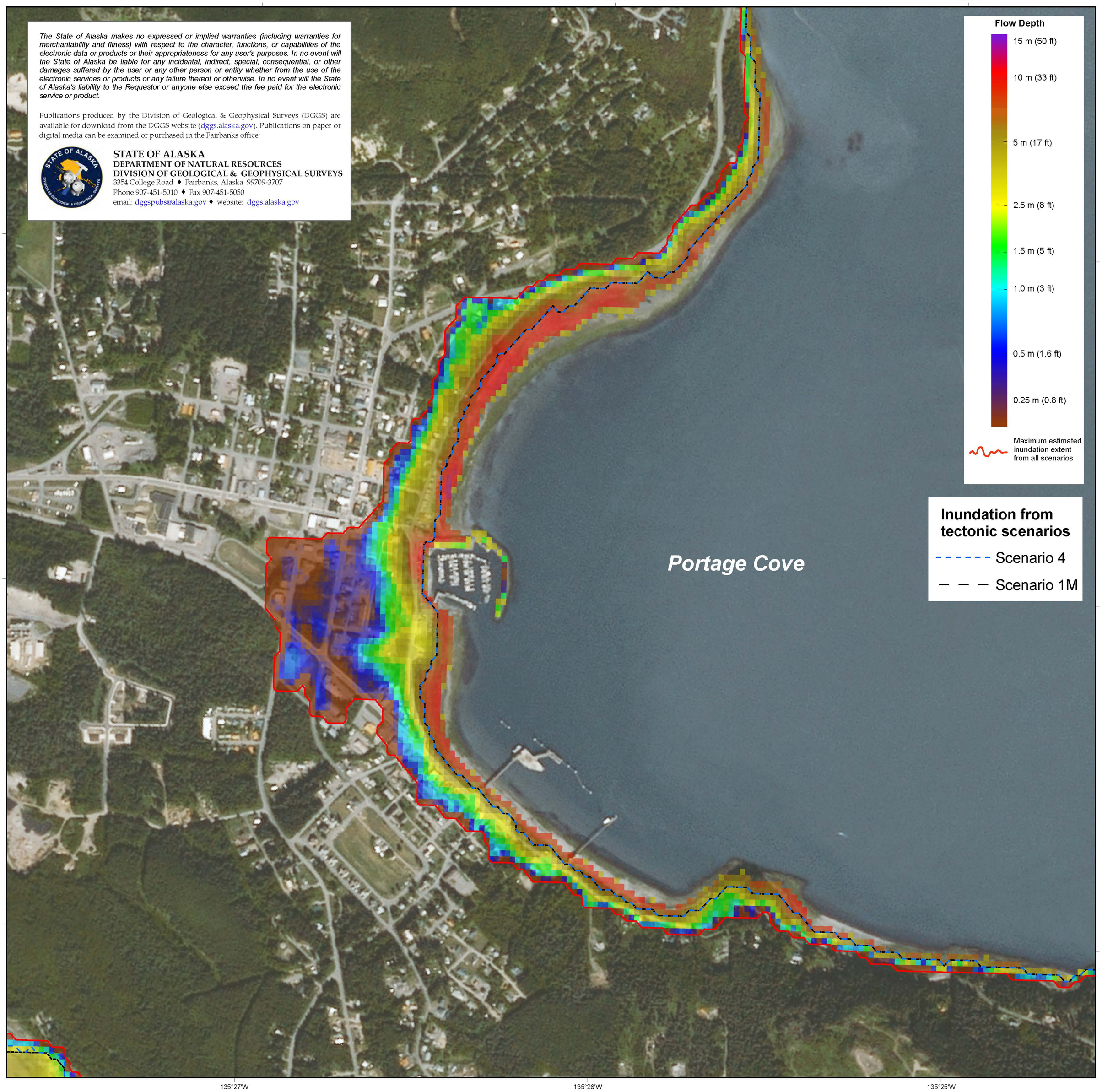
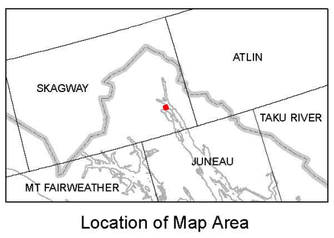


MAXIMUM ESTIMATED TSUNAMI INUNDATION FROM TECTONIC AND LANDSLIDE SOURCES, PORTAGE COVE, HAINES, ALASKA



Location of Map Area

by

D.J. Nicolsky[1], E.N. Suleimani[1], and J.B. Salisbury[2]

Affiliation:

[1] Alaska Earthquake Center, Geophysical Institute. University of Alaska Fairbanks, PO Box 757320, Fairbanks, AK 99775-7320
[2] Alaska Division of Geological & Geophysical Surveys, 3354 College Road, Fairbanks, AK 99709-3707

2018

SCALE 1:6250

0 0.125 0.25 0.5 0.75 MILE

0 0.05 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 KILOMETER

0 150 300 600 900 1200 1500 1800 2100 2400 2700 3000 FEET

N

Base map from:
UAF-GINA Best Data Layer
Projection:
Alaska State Plane Zone 1 (Feet)
Datum:
North American Datum of 1983
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