Septage Holding Tank Facility

Gustavus Disposal and Recycling Center
Engineer's Report
January 31, 2023
Appendices Updated
March 1, 2023
July 14, 2023

Submitted to the
Alaska Department of Environmental Conservation
Engineering Support and Plan Review
for
Plan Review and Approval to Construct
as required by
18 AAC 72
Wastewater Disposal
As amended through November 7, 2017

Prepared for the City of Gustavus, Alaska
by John F. Barry, PE
Neval Engineering
Gustavus, Alaska

7/14/2023

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Project Overview

Background

There is no facility in Gustavus for the disposal of septage pumped from septic tanks and lift stations. Over the years there has been considerable discussion about possible solutions to the problem of septage disposal. In 2007 a committee, of which I was a member, was formed by the city council shortly after incorporation as a second class city that was tasked with identifying land parcels and evaluating disposal options for septage. At that time Gustavus was eligible to receive land from the state as part of becoming a municipality. The committee was unable for find a suitable land or lagoon disposal method due to the combination of high rainfall and a shallow ground water table that makes attaining the required vertical separation distance to seasonal high groundwater impractical. Required horizontal separation distances to residences and the airport were also problematic.

There was no septic tank pumping service available prior to the beginning of the Alaska Marine Highway System operations to Gustavus in 2010. Starting in 2011 two septic pumping service providers brought pump trucks from Juneau to Gustavus on the ferry, pumped the tanks, and returned to Juneau on the ferry with the septage for disposal in the Juneau wastewater treatment facilities. That system worked for several years, but one of the service providers went out of business and over the past few years the other slowly reduced and practically discontinued service due to higher priority obligations in Juneau. The septic tank pumping situation in Gustavus has now reached or exceeded the critical point for many wastewater system owners.

The primary reason for the drop off of septic tank service in Gustavus was the logistics of the ferry schedule. The 4000 gallon pump truck operated by one provider would have to travel on the ferry from Juneau to Gustavus on a Monday morning, pump a couple of tanks which could be done that day and the next morning, then wait for the ferry to return to Juneau on a Thursday afternoon. Once the tank was full the operator would either have to stay in Gustavus until the Thursday ferry or fly back to Juneau, then fly to Gustavus to put the truck on the ferry for the return trip to Juneau. Other variations of this were tried with a local contractor assisting with the truck, but those efforts were not sustainable. The other drawback was the hauler's primary pump truck was unavailable for service in Juneau for four days which is a problem during the busy summer season.

Recently, two surplus 10,000 gallon tanks were found in Juneau. These tanks provide an opportunity to hold a significant volume of septage that can be collected from individual septic tanks and later transported to be processed in the Juneau wastewater treatment facilities. The logistics, as proposed by Juneau Septic Services, would involve sending a small pump truck to Gustavus that would pump several septic tanks on a campaign basis, store the septage in the holding tanks, then later the septage would be pumped out of the holding tanks and hauled to Juneau in the larger tank truck. The larger truck would roll off the ferry, drive to the holding tanks located at the Gustavus Disposal and Recycling Center (DRC) that is just over a mile from the ferry dock, pump septage from the holding tank into the truck until it's full, then return to the ferry before it sets sail to return to Juneau. There is a 45 minute window to fill the truck while the ferry is moored at the dock.

Septage Holding Tank Site Description

The planned location for the holding tanks is within the boundary of Tract A, ASLS 2005-50 recorded as Juneau plat 2009-25 (see Appendix A for Tract A on Juneau Plat 2011-31). Tract A is the site of the DRC and the entire tract is permitted by DEC as a solid waste disposal facility Permit No. SW3AO17-25 effective September 1, 2020.

There is not a dedicated soil test hole for this project. The soils in the area of the DRC, as seen in the subsurface excavations for the landfill, are typical of the common Gustavus area soils profile. That profile is usually is a topsoil layer, mostly about 0.5 feet thick of clay/silt/fine grained sand, above loose medium grained sand grading deeper to coarse grained sand with some pebbles.

Ground water monitoring wells are located around the landfill area. These wells are described in the Landfill Development Plan issued by Vista Geoenvironmental Services in November, 2021. Monitoring data is submitted to DEC according to the 2015 Ground Water Sampling Plan. The holding tanks will be placed close to dead center between two monitoring wells, to the SW of MW-4 and NE of MW-6. Ground water flow is from NE to SW in the direction of the slope of the land surface toward the Salmon River. The groundwater depths in the spring dry season and autumn wet season are measured every third year. An analysis of spring and autumn data for four periods between 2012 and 2022 and one from 2009 showed that the MW-4 (farther from the river) autumn high water (wet season) was at a depth between 2.5 and 4.9 feet, and spring low water (dry season) between 3.7 and 5.2 feet. The same periods show the MW-6 (closer to the river) autumn high water was at a depth between 5.3 and 6.5 feet, and spring low water between 6.3 and 7.1 feet. The well head elevations are within about a foot according to the topo, with MW-6 probably slightly lower than MW-4. A table with details is in Appendix F.

The holding tank site is more than the required 100 feet from the mean higher high water level of the adjacent Salmon River estuary. On the Plat 2011-31, Tract A (Appendix G) is entirely above the surveyed mean high water meander line. According to NOAA data for nearby Excursion Inlet tides, mean higher high water is about 0.9 feet above mean high water.

Other Considerations

The DRC is managed to minimize:

- Human health hazards
- Noise
- Odors
- Interaction with wildlife
- Viewshed degradation

There is a water supply well adjacent to the DRC office that is shown on the map. It is more than the required separation distance of 75 feet from the holding tanks.

No streams will be crossed and no flooding will occur.

No other permits are required for this project.

The DRC site plan showing the tank location is in Appendix C.

More information about the DRC is available at https://cms.gustavus-ak.gov/drc

Holding Tank Description

The two tanks that are planned for this project are built by Xerxes Corporation. They are double wall fiberglass construction and labeled as 10,000 gallon capacity. The story about these tanks is they were installed at a fuel supply business in Juneau and then for some reason were removed from the ground after a few years and put in a storage yard. Photos of the tanks are in Appendix H.

The actual capacity for a new 8 foot diameter, 10,000 gallon tank listed on the Xerxes website is 9753 gallons. These tanks are several years old and may not match with the current published data. Measurements taken on the tanks as a check calculated an internal volume of 9852 gallons, a 1% variance.

The tanks have two, three foot diameter access hatches with steel lids bolted to a flange. The lids will be modified with quick connect fittings for the discharge hoses. Quick connect fittings and a stinger pipe may be installed for the suction hoses. A port to visually check the liquid level and a carbon filtered vent will be added to each tank.

The tanks were constructed with four sets of buoyancy restraint strap guides to accommodate a 2 inch wide strap.

One of the tanks has four separate holes in the ends of the outer tank wall that range from two to four inches across. To keep water and soil out of the interstitial area, a fiberglass patch of approximately the same thickness as the tank wall will be applied to repair the holes.

High Liquid Level Alarm

Since the liquid level must be visually monitored and managed by the pump truck operator, I request that DEC examine the necessity for a high liquid level alarm. This holding tank facility differs from a holding tank for a residential dwelling, which is what 18 AAC 72 refers to when addressing holding tanks, as this tank is filled by a pump truck operator who understands the truck unloading and holding tank filling procedure while visually monitoring the liquid level and can shut off the flow as the liquid level approaches capacity. An electric power cable would have to be extended nearly 200 feet from the office to power the alarm.

An audio/visual high liquid level alarm system can be installed on each tank. The alarm can be set to activate a visual and audible alarm when there is approximately 500 gallons of remaining capacity, or some other appropriate setting. Refer to the tank liquid volume by liquid depth table in Appendix I that will be used to set the alarm level. In addition to the alarm the pump truck operator would monitor the tank liquid level visually though a port in the lid and manage the remaining tank capacity to avoid overflowing the tank. When both tanks are full any septage left in the truck would stay on board until the truck returned to Juneau.

The alarm would use the same float switch, audio and visual alarm, disconnect and junction box currently installed by a licensed electrician for lift stations on local residential wastewater treatment systems. Refer to the lift station alarm photos and the float switch product information sheet in the Appendix.

Facility Construction

The holding tanks will be subject to a seasonally fluctuating water table as described previously in the Septage Holding Tank Site Description.

Tank installation must be done during the spring or early summer when the groundwater table is at its lowest. According to the data from MW-4 and MW-6 the water table should be about 6.5 feet deep when the tanks are placed. This will leave 1.6 feet of the tank above the natural land surface. An additional minimum one foot of fill is planned to cover the top of the tank, which will create a mound about 2.6 to 3.0 feet high above the natural ground surface.

The tanks will be placed end to end at least ten feet apart so they can be set in the excavation one at a time, with the first tank buried before the second excavation is started. This will minimize the size of the excavation opening and risk of wall failure, and also the equipment available to install the tanks isn't capable working over an excavation large enough for a parallel installation. The truck platform along the tanks will be at least ten feet away from the tanks to reduce ground pressures from a loaded truck against an empty tank. Protective berms will be placed along the driving surfaces to further protect the tank.

Bedding for the invert of the tank will be natural soil which is expected to be medium grained sand. Bedding for the bottom half of the tank will be coarse sand with some pebbles from the City owned gravel pit. The coarsest material available will be used. The bedding material around the lower half of the tank will be packed with a backhoe bucket instead of compacted because at that depth the excavation walls will be too wet and unstable to allow man entry. The fill around the upper half of the tank can be sand from the tank excavation, and also packed although it could be carefully compacted

with a manually operated compactor if it is safe to do so. Fill over the top of the tank will be loose soil from the tank excavation as compaction should not be done over the tank itself.

Additional thermal protection or increasing the soil cover to more than minimum one foot is not planned. The 0.46 inch thick fiberglass walls (the outer end wall was measured) and 2.25 inch interstitial area between the tank walls (also measured) provide some insulation. Seventy eight percent of the liquid capacity in the tank will be three feet or more below the top of the soil cover and frostline. Heat does not have to be retained to encourage anaerobic digestion because that's not a function of the holding tank. The temperature of the groundwater coming from my residential well, which is not far from the DRC and has similar site characteristics, is consistently 46 degrees F during winter, so there is a significant heat source for the bottom of the tank during cold weather.

Siltation or contamination of the nearby surface waters is not expected due to the distance of the excavation from Mean High Water.

Buoyancy Restraints

Buoyancy Anchors

Buoyancy restraints will be installed. A review of historical groundwater depths in monitoring wells MW-4 and MW-6 shows that the groundwater table elevation can rise as much as three feet during the autumn wet season when the tank should be empty. Buoyancy resistance calculations were done based on an empty tank and a 3.5 foot increase in the groundwater elevation.

A no man entry method will be used to place the 4 inch x 12 inch (3.5 inch x 11.5 inch actual) x 16 foot long pressure treated timber deadman anchors in the excavation. Each tank will have four anchors and each anchor will have two 2 inch x 12 inch x 3 foot long pressure treated cross braces bolted to it near the anchor cables for stability to prevent the anchors from rotating when the cables are in tension. Each anchor will have two 1/2 inch diameter steel galvanized cables attached to it. The 1/2 inch diameter cables will be inserted through a 1/2 inch diameter hole drilled though the center of each anchor and attached by three galvanized wire rope clips, a 3 inch x 3 inch x 1/4 inch thick square galvanized dock washer with a 1/2 inch hole, and a 6 inch x 6 inch by 4 mm thick galvanized rock bolt plate.

Two inch wide steel straps will be placed over the top half of the tank within the strap guides installed by the manufacturer on the tank. Galvanized strap has so far not been found on the market. There may be suitable stainless strap available. The 1/2 inch cables will be drawn up on each side of the tank over the straps and fastened together at the top with six wire rope clips.

The anchors must be placed so the side facing the tank is no closer to the tank footprint than six inches. This is to keep the soil column above the anchors separated from the tank so all the weight of the soil bears on the anchors.

Details are shown in the tank section and plan drawings in Appendix C and D.

Buoyancy Restraint Calculations

Buoyancy resistance calculations were done for the planned anchoring system. Tank volume and footprint area were calculated using measurements by Dave Hanna, the tank owner at the time. The table showing these measurements and calculations is in Table 1 below.

Tank Volume, Product Capacity and Tank Area Calculator			
Item w/ Units	Outside	Inside	Notes
Tank Diameter Ft	**8.125**	7.596	Outside measured by D. Hanna, inside is calculated
Tank Total Length Ft	32.125	31.596	Outside measured by D. Hanna, inside is calculated
Outer Wall Thickness Ft	0.0385		measured by D. Hanna
Interstitial Area Thickness Ft	0.1875		measured by D. Hanna
Inner Wall Thickness Ft	0.0385		=outer wall thickness
Spherical Tank Volume Ft^3	281	229	$V=4/3\prod r^3$
Cylindrical Tank Volume Ft^3	1244	1088	$V=(L-D)\prod r^2$
Total Tank Volume Ft^3	1525	1317	Spherical + Cylindrical
Product Capacity (gal)		**9852**	Xerxes table 9753 gal 8' dia. DW 10,000 gal. tank
Spherical Tank Area Ft^2	52		$=\prod r^2$
Cylindrical Tank Area Ft^2	195		=(Total Length - Diameter)*Diameter
Total Tank Area Ft^2	**247**		Spherical + Cylindrical

Table 1

The figures in Table 1 were used for the buoyancy restraint calculations in Table 2 below. Refer to the tank section drawing in Appendix D for an illustration of the buoyancy restraint components and the V (vertical) ft. column. The 3.5 foot groundwater table rise is considered to be the upper end of the normal range for seasonal ground water depth fluctuation. The area of both the 16 foot long anchor and 1.5 feet of each cross braces is included in the buoyance resistance calculation. Soil densities are from common sources for soil properties.

Buoyancy Restraint Calculations - Groundwater Depth 3.0 feet from Surface									
Four Presssure Treated 4 inch x 12 inch x 16 foot Timber Anchors								Buoyancy Force lbs	
Source	Buoyancy Restraint Component	V Ft.	Sq. Ft.	Cu. Ft.	Density	Anchors	Weight	Upward	Downward
JFB Estimate	Depth of burial	6.5							
JFB Estimate	Depth of groundwater from surface	**3.0**							
JFB Calculation	Height of groundwater around tank	3.5							
Xerxes Tables	Weight of tank						4200		4,200
JFB Calculation	Weight of dry sand tank cover (fill)	1.0	247	247	90				22,216
JFB Calculation	Weight of dry sand over top half of tank			240	90				21,619
JFB Calculation	Weight of dry sand over anchors and X braces	1.6	21.08		90	4			12,144
JFB Calculation	Weight of moist sand over anchors and X braces	3.0	21.08		105	4			26,565
JFB Calculation	Weight of saturated coarse sand over anchors and X braces	3.2	21.08		125	4			33,821
PT Lumber Tables	Weight of 4" x 12" x 16' PT anchors	0.3			50.1	4	224		896
JFB Calculation	Buoyancy tank sphere volume submerged			111.4	-64.2			-7,155	
Online Calculator	Buoyancy tank cylinder volume submerged			511.8	-64.2			-32,858	
							Totals	-40,012	121,462
	V FT = Vertical Feet						Buoyancy Restraint Differential		81,450
							Tension on the Cables		-8,024
							Tension per Cable		-1,003
							Factor of Safety		**3.0**

Table 2

The Factor of Safety of 3.0 is more than adequate to keep the tank in place during the normal seasonal groundwater depth fluctuation range based on extrapolation of data between MW-4 and MW-6. The negative result for tension on the cables in Table 2 demonstrates that the combination of the weight of the tank and soil cover over the tank exceed the buoyant force in the normal groundwater depth range

without anchors. The Factor of Safety without anchors is 1.2 which would be reduced if the groundwater would rise higher than 3.5 feet or if the soil tank cover is eroded or diminished in any way, possibly resulting in eruption of the tank from the ground.

Buoyancy Restraint Calculations - Groundwater Depth 0 feet from Surface									
Four Presssure Treated 4 inch x 12 inch x 16 foot Timber Anchors								Buoyancy Force lbs	
Source	Buoyancy Restraint Component	V Ft.	Sq. Ft.	Cu. Ft.	Density	Anchors	Weight	Upward	Downward
JFB Estimate	Depth of burial	6.5							
JFB Estimate	Depth of groundwater from surface	**0.0**							
JFB Calculation	Height of groundwater around tank	6.5							
Xerxes Tables	Weight of tank						4200		4,200
JFB Calculation	Weight of dry sand tank cover (fill)	1.0	247	247	90				22,216
JFB Calculation	Weight of dry sand over top half of tank			240	90				21,619
JFB Calculation	Weight of dry sand over anchors and X braces	1.6	21.08		90	4			12,144
JFB Calculation	Weight of moist sand over anchors and X braces	0.0	21.08		105	4			0
JFB Calculation	Weight of saturated coarse sand over anchors and X braces	6.2	21.08		125	4			65,446
PT Lumber Tables	Weight of 4" x 12" x 16' PT anchors	0.3			50.1	4	224		896
JFB Calculation	Buoyancy tank sphere volume submerged			251.6	-64.2			-16,155	
Online Calculator	Buoyancy tank cylinder volume submerged			1244.4	-64.2			-79,890	
							Totals	-96,046	126,522
	V FT = Vertical Feet						Buoyancy Restraint Differential		30,476
							Tension on the Cables		48,010
							Tension per Cable		6,001
							Factor of Safety		**1.3**

Table 3

The results in Table 3 show that the buoyancy anchors will keep the empty tank in place even if an epic rainfall and high groundwater event were to occur that caused the ground to saturate to the surface. The 6000 pound tension on each cable is far below the break strength of at least 20,000 pounds for 1/2 inch diameter galvanized cable commonly found on the market, even when reduced to account for the 12 degree angle to vertical as shown in the tank cross section drawing.

Facility Operations

The septage holding tank facility will be city owned, contractor constructed and contractor operated. An RFQ to install the tanks will be issued as soon as DEC approval for the project is received. A Professional Services Agreement is in place with Juneau Septic Services (see Appendix B) to use and maintain the facility for the transfer of septage pumped from septic tanks on private property by way of the Alaska Marine Highway to Juneau for disposal in the Juneau wastewater treatment facilities. Over the past decade Juneau Septic Services has pumped septic tanks in Gustavus and transported the septage to the Juneau facilities, so this is not much of a departure from the current practice.

The PSA requires three septic tank pumping campaigns per year with the holding tanks pumped as needed during the campaigns. Three pumping campaigns would result in a maximum of 60,000 gallons of septage to haul to Juneau for disposal. The intent is for the holding tanks to be emptied by the end of the calendar year leaving them ready for a spring pumping campaign. The holding tanks must be pumped empty of all septage by the end of the agreement on December 31, 2024. The expectation is that a new agreement for 2025 and beyond would succeed the current agreement.

Appendix A

State of Alaska
Department of Environmental Conservation

WASTEWATER SYSTEM OWNER'S STATEMENT

ADEC Date Received Stamp:

ADEC Plan Review No. _____

Please type or print in ink:

1. **Project Name:** Septage Holding Tank Project

2. Legal Description, Physical Address, and Nearest Community Name:

Disposal & Recycling Center

Harbor Road

Gustavus, AK 99826

3. I submit the enclosed items concerning the above referenced proposed project for review. By my signature, I certify that I have authority to sign this application as required under 18 AAC 15.030, and that the project is (check one):

- ☐ privately owned and that I am the owner.
- ☐ owned by a sole proprietorship and that I am the proprietor.
- ☐ owned by a partnership of which I am a general partner.
- ☐ owned by a corporation of which I am a principal executive officer of at least the level of vice-president, or a duly authorized representative responsible for the overall management of this project.
- ■ owned by a municipal, state, federal, or other public agency of which I am a principal executive officer, ranking elected official, or other duly authorized employee.

Kathy Leary — 01/26/2023

Signature (please sign in ink) — Date

Kathy Leary, City Administrator

Name and Official Title

City of Gustavus

Company or Agency (if applicable)

PO Box 1, Gustavus, AK 99826

Mailing Address

kathy.leary@gustavus-ak.gov — 907-697-2451

Email Address — Phone Number

18. AAC 15.030. SIGNING OF APPLICATIONS: All permit or approval applications must be signed as follows:

(1) in the case of corporations, by the principal executive officer of a t least the level of vice-president or his duly authorized representative, if the representative is responsible for the overall management of the project or operation;

(2) in the case of a partnership, by a general partner;

(3) in the case of a sole proprietorship, by the proprietor; and

(4) in the case of municipal, state, federal, or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee. (Eff. 11/25/77, Register 64)Authority: AS 46.03.020(10), AS 46.03.090, AS 46.03.100, AS 46.03.110, AS 46.03.160. AS 46.03.330, AS 46.03.720

Professional Services Agreement

The City of Gustavus ("City") and Juneau Septic Services ("Contractor")
Contractor Address: 1720 Crest Street, Juneau, Alaska 99801

Contractor Services: The City engages the Contractor to provide septage pumping and hauling services within the City.

Description of Contractor Work (the "Work"): Provide septic tank pumping services for private residences and businesses within the City of Gustavus. Operate and maintain the City of Gustavus owned septage transfer facility. Haul septage that is temporarily stored at the transfer facility out of Gustavus to a sewage processing facility in a nearby municipality. The Contractor shall make its best efforts to accomplish the goals set out in the Contractor's Proposal attached to this Agreement.

Use of City Facility: As part of the septage pumping and hauling services agreement with the Contractor, the City shall grant the use of the City owned septage transfer facility located at the Disposal and Recycling Center to the Contractor without charge. In the case of a need for a septic tank to be pumped and the Contractor is unavailable, another operator may, with the approval of the City Administrator or Designee, deposit septage at the facility. That operator must make arrangements with the Contractor to haul the septage to a sewage processing facility and the Contractor shall cooperate with the operator to affect that transfer.

Term of Agreement: The term of this Agreement shall begin on January 1, 2023 (the "Effective Date") and continue until December 31, 2024 (the "Completion Date"), unless sooner terminated. The City may terminate this Contract at any time upon thirty days written notice to the Contractor. In recognition of the importance of the service to the City residents and businesses, and the difficulty with obtaining the services, the Contractor agrees to provide a minimum of ninety days (90) written notice before terminating this Contract. In the event of a termination of the contract, Contractor shall within 60 days remove any stored material in the tanks and haul it to a disposal or processing facility out of Gustavus. The failure of the Contractor to comply with this provision shall constitute a material breach of the contract. The City may terminate this Agreement upon any breach of the Agreement by the Contractor upon ten days (10) written notice to the contractor.

Materials and Equipment to be Supplied by the Contractor: Vacuum pump trucks capable of pumping septic tanks and vaults from properties with varying accessibility, and also capable of hauling all of the septage collected during the contract period to a sewage processing facility shall be supplied by the Contractor.

Documentation: The Contractor agrees to provide the City with a monthly accounting of 1) the number and volume of septic tanks, vaults, and lift stations pumped and the quantity of septage hauled to the City septage transfer facility, and 2) the number of trips, dates, destination, and quantity of septage hauled to a sewage processing facility.

Contractor Responsibilities: The Contractor must prominently post notices of when a septic tank pumping campaign is scheduled in order to allow property owners sufficient notice to sign up for the service. The agreement and billing for services will be between the Contractor and the property owner(s). The Contractor will plan for at least three pumping campaigns per year. The contractor must make a reasonable effort to pump the tanks on all of the properties that request the service. The Contractor must make satisfactory arrangements in compliance with all federal, state and local laws and regulations with a marine operator to carry the truck(s) hauling the septage to a sewage processing facility, whether that operator is the Alaska Marine Highway System or a private vessel operator. The Contractor will ensure that all septage stored at the City septage transfer facility is hauled to a sewage processing facility by the end of the contract period.

City of Gustavus Responsibilities: The City will provide access to the City owned septage transfer facility 24 hours per day, seven days per week.

Contractor Fee: The purpose of this Agreement is to allow the opportunity for City residents to arrange for the pumping and hauling of septage at a reasonable cost while at the same time providing the storage tanks for Juneau Septic Services to reduce their costs per trip to the City. For all services rendered by the Contractor, the individual property owners will be responsible to pay the fee agreed to by them with the Contractor for the service. Contractor agrees the fee will include septage actually pumped from septic tanks and lift stations. This fee will also include haulage of septage to a sewage processing facility. The Contractor shall submit an invoice specifying the work performed to each property owner. The City is not responsible for payment to the Contractor under any circumstances, regardless of whether the property owners pay the City is the owner of a tank or vault being pumped.

Expenses: The City ____ will ✓ will not reimburse the Contractor for expenses incurred in providing the Work, as detailed above or in an attachment to this Agreement.

Insurance and Indemnification: The Contractor shall at all times maintain all certificates of insurance required by law, including without limitation, workers' compensation, automobile liability, and general liability insurance. The Contractor shall maintain general liability insurance in amount not less than $1,000,000. The City shall be named as an Additional Insured on that liability policy and the Contractor shall provide the City with a Certificate of Insurance not later than thirty days after signing this Contract. The Contractor will maintain a $10,000 License Bond to compensate the City in the event of a default of the Contractor's obligations. Contractor shall submit proof of bonding and shall notify the City immediately in the event the bond is terminated for any reason. The Contractor shall indemnify, save, hold harmless and defend the City, its directors, officers, council members, employees, volunteers and representatives from and against any claims, including attorneys' fees or costs, of any kind or nature, including death, and including any administrative claims or proceedings resulting from an environmental spill event or other environmental contamination event, arising from any act or omission of the Contractor, or the Contractor's employees, subcontractors and agents related to or arising out of

Contractor's performance of this Agreement. The failure of the Contractor to comply with this provision in any aspect constitutes a material breach of the Agreement.

Independent Contractor Relationship: The parties acknowledge that the Contractor is an independent contractor, and this Professional Services Agreement does not create a joint venture or any other such status. Contractor agrees and acknowledges that the Contractor is not an employee of the City and none of the Contractor's employees and subcontractors are employees of the City.

No Authority to Bind the City: The Contractor is not authorized to bind the City, make representations on behalf of the City, or to enter into any agreement or contract with any seller, vendor or third party on behalf of the City unless expressly detailed in the Work or if general services, detailed in the specific work request. During the term of this Agreement, the performance of the Contractor's duties shall be under the technical direction of Kathy Leary, City Administrator or designee.

No Assignment: The Contractor may not assign this Agreement without the City's prior written consent. The City may withhold agreement for assignment to an LLC unless the members of the LLC guarantee performance of the Contract or Contractor guarantees performance of the LLC, in the City's sole discretion.

Entirety of Agreement: This agreement sets forth the entire agreement between the parties with respect to its subject matter and may not be modified except by mutual written agreement of the parties.

Representation: The Contractor acknowledges and agrees that the Contractor has not received any legal advice from the City or the City's attorneys. The Contractor acknowledges and agrees that they have had a full opportunity to consult with independent counsel of their choice before entering this Agreement.

Notifications: All written communications and notifications related to this Agreement shall be provided to the Contractor and City to the following addresses, phone numbers and emails. Emails shall constitute written notice where written notice is required.

City of Gustavus
P.O. Box 1
Gustavus, Alaska 99826
(907) 697-2451
Attn: City Administrator
administrator@gustavus-ak.gov
mayor@gustavus-ak.gov

Juneau Septic Services
PO Box 210714
Auke Bay, Alaska 99821
(907) 523-3272
jasontarverjma@gmail.com
juneauseptic@gmail.com
fftrevor@yahoo.com

For Internal Use Only

City Administrator	1/13/22 Date	Capital Budget CP22-04 Funding Source/Project #
Mayor	1/13/22 Date	Funding Source/Project #
Supervisor (if applicable)	Date	
Treasurer/Controller	01/13/22 Date	

Contractor

Juneau Septic Services	1/13/23 Date
Juneau Septic Services	1/13/23 Date

Attached: Juneau Septic Services Proposal, Certificate of Insurance, Certificate of License Bond, Business License

Septage Holding Tank Facility

Disposal & Recycling Center

City of Gustavus Public Works

Neval Engineering John F. Barry PE
PO Box 25, Gustavus, AK 99826
(907) 697-3025 nevalmining@gmail.com

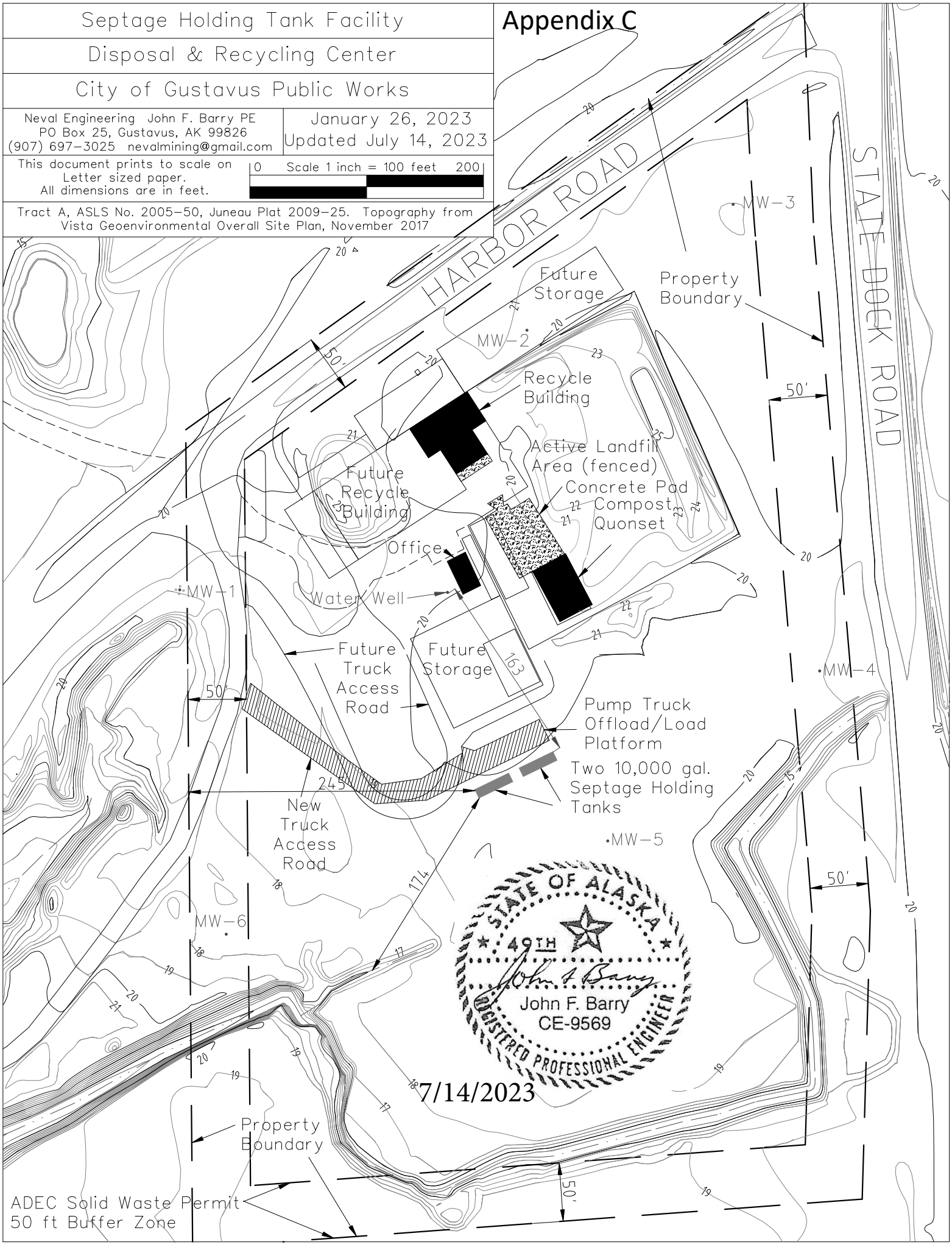
January 26, 2023
Updated July 14, 2023

This document prints to scale on Letter sized paper.
All dimensions are in feet.

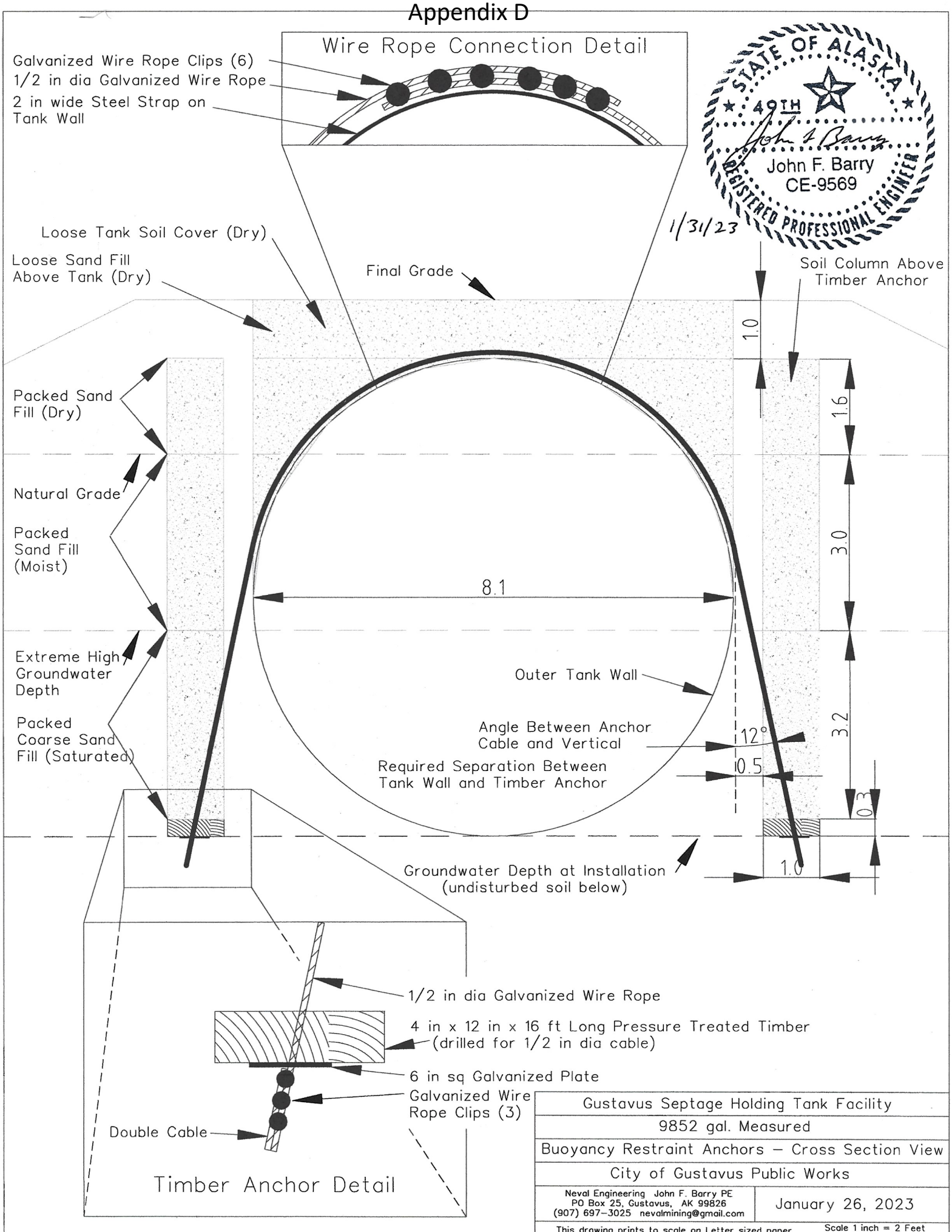
0 Scale 1 inch = 100 feet 200

Tract A, ASLS No. 2005-50, Juneau Plat 2009-25. Topography from Vista Geoenvironmental Overall Site Plan, November 2017

Appendix C

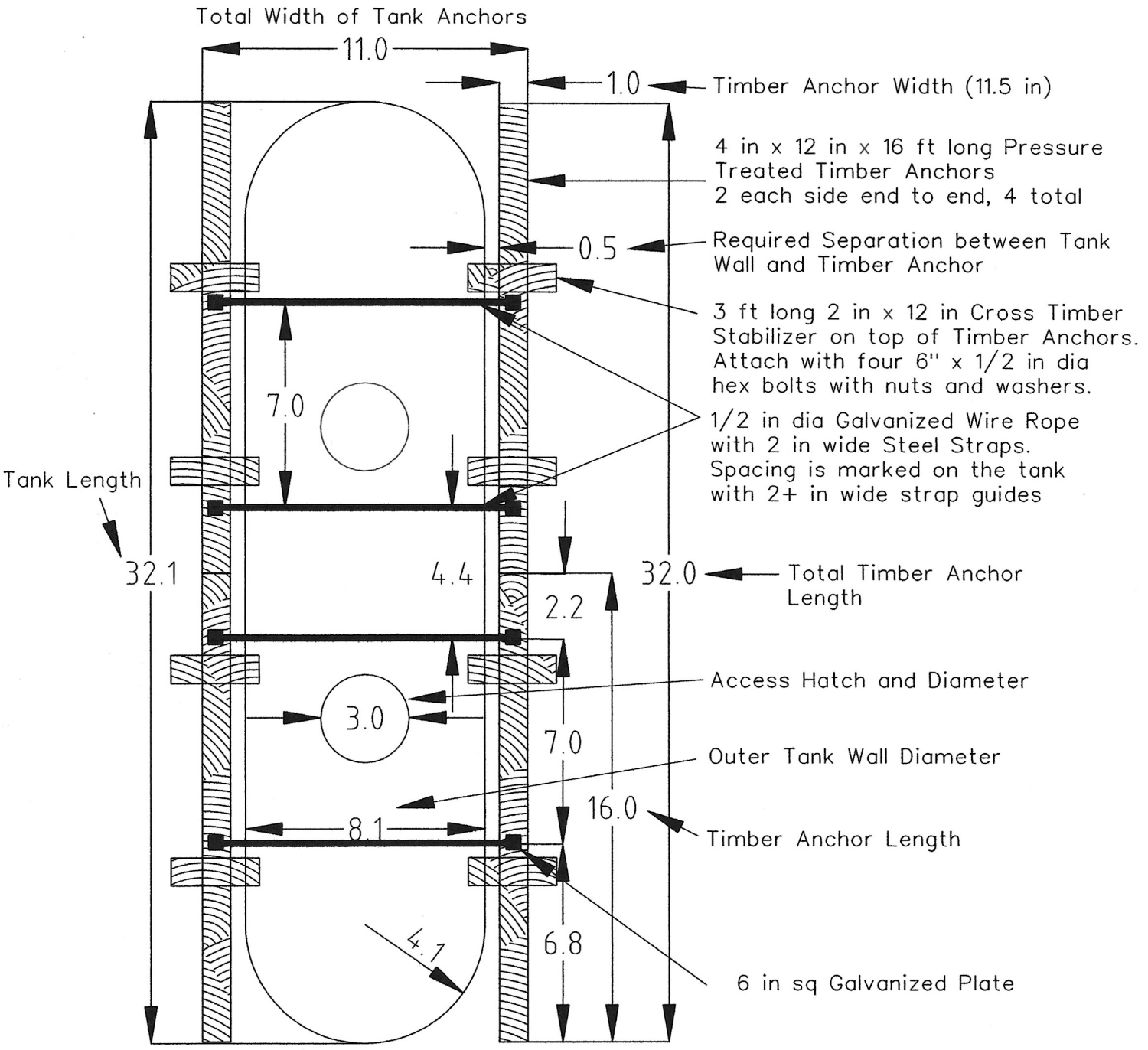


Appendix D



Gustavus Septage Holding Tank Facility	
9852 gal. Measured	
Buoyancy Restraint Anchors – Cross Section View	
City of Gustavus Public Works	
Neval Engineering John F. Barry PE PO Box 25, Gustavus, AK 99826 (907) 697-3025 nevalmining@gmail.com	January 26, 2023
This drawing prints to scale on Letter sized paper All dimensions are in feet	Scale 1 inch = 2 Feet

Appendix E



STATE OF ALASKA
40TH
John F. Barry
John F. Barry
CE-9569
REGISTERED PROFESSIONAL ENGINEER

1/31/23

Gustavus Septage Holding Tank Facility	
9852 gal. Measured	
Buoyancy Restraint Anchors – Plan View	
City of Gustavus Public Works	
Neval Engineering John F. Barry PE PO Box 25, Gustavus, AK 99826 (907) 697-3025 nevalmining@gmail.com	January 26, 2023
This drawing prints to scale on Letter size paper All dimensions are in feet	Scale 1 inch = 5 feet

Appendix F

DRC Monitoring Well Depth from Surface to Groundwater					
Wet Season					
Flow Direction from MW 4 to MW 6					
	11/5/2021	10/28/2019	10/28/2015	10/17/2012	10/18/2009
Depth in inches measured from top of casing					
MW 4	73.5	89.5	64.875	71.25	93.75
MW 6	93.875	95	85.25	80.625	83.625
Height of casing from ground in inches					
MW 4	35.25	35.25	35.25	35.25	35.25
MW 6	17.5	17.5	17.5	17.5	17.5
Groundwater depth from natural surface in feet					
MW 4	3.19	4.52	2.47	3.00	4.88
MW 6	6.36	6.46	5.65	5.26	5.51

For a dry hole or missing data, highest recorded reading in the well is substituted.

_= Highest recorded depth

_= Lowest Recorded depth

DRC Monitoring Well Depth from Surface to Groundwater					
Dry Season					
Flow Direction from MW 4 to MW 6					
	4/18/2022	4/18/2018	4/8/2016	5/27/2013	
Depth in inches measured from top of casing					
MW 4	98	94	86	79.625	
MW 6	102.25	101.875	96.125	92.5	
Height of casing from ground in inches					
MW 4	35.25	35.25	35.25	35.25	
MW 6	17.5	17.5	17.5	17.5	
Groundwater depth from natural surface in feet					
MW 4	5.23	4.90	4.23	3.70	
MW 6	7.06	7.03	6.55	6.25	

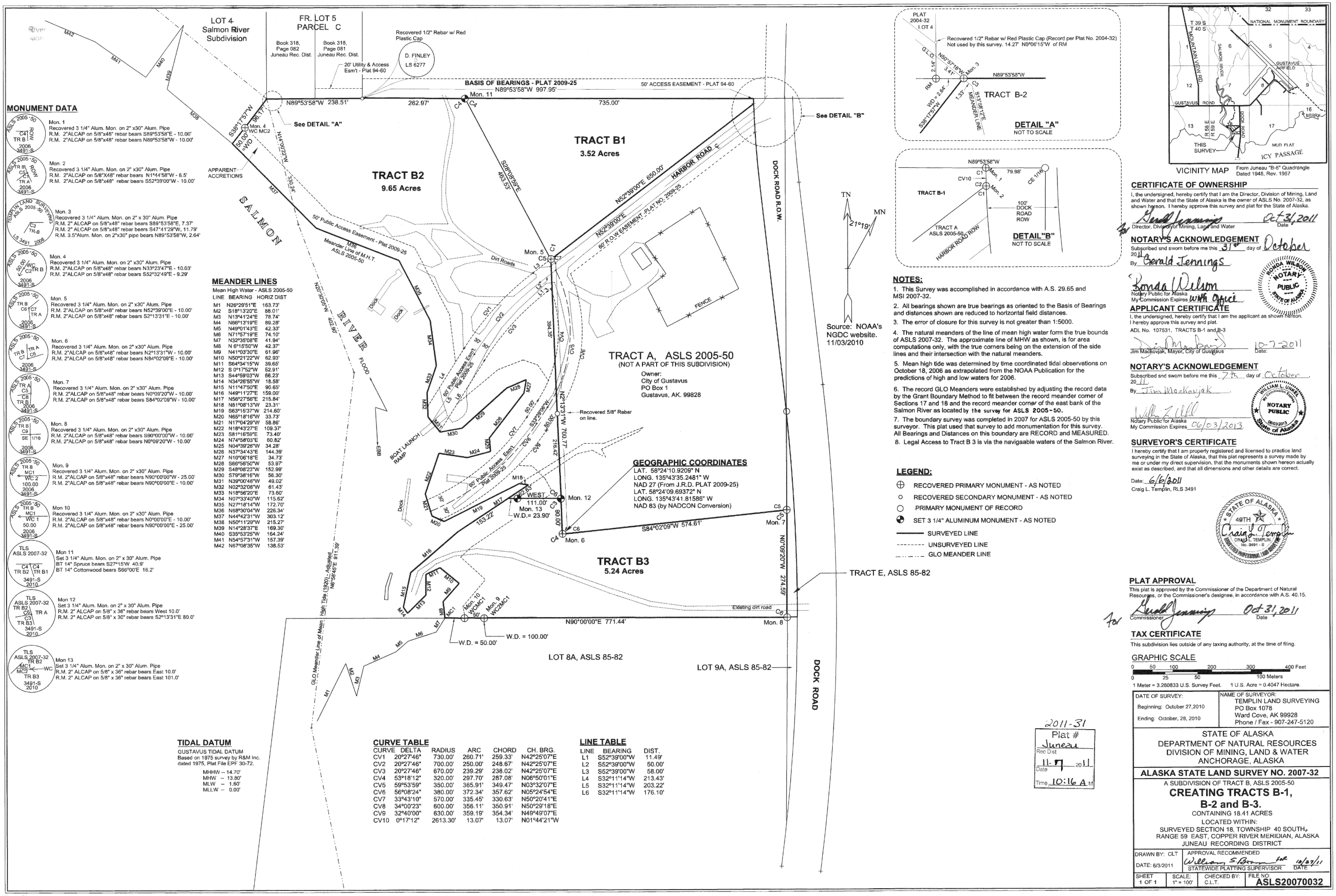
_= Highest recorded depth

_= Lowest Recorded depth

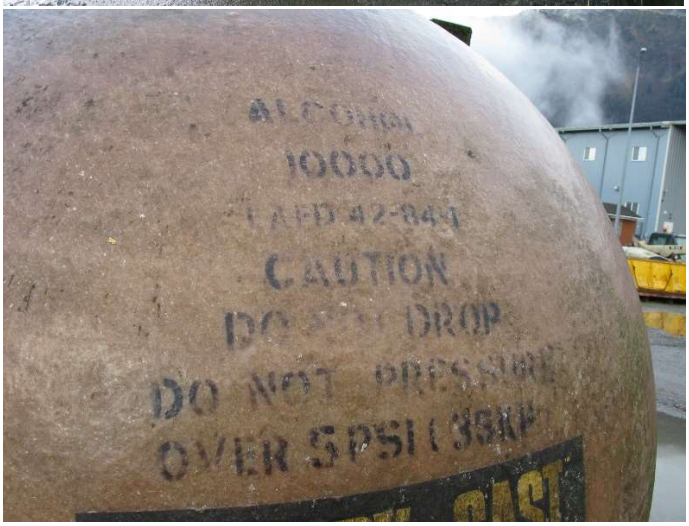
DRC Monitoring Well Depth from Surface to Groundwater					
Seasonal Depth Variance in Inches					
	2021-2022	2018-2019	2015-2016	2012-2013	**Extreme Var.**
MW 4	24.5	4.5	21.1	8.4	**33.1**
MW 6	8.4	6.9	10.9	11.9	**21.6**

_= Greatest seasonal variations.

Appendix G


LOT 4
Salmon River
Subdivision
FR. LOT 5
PARCEL C
Book 318, Page 082 Juneau Rec. Dist.
Book 318, Page 081 Juneau Rec. Dist.
20' Utility & Access Esm't - Plat 94-60
Recovered 1/2" Rebar w/ Red Plastic Cap
D. FINLEY
LS 6277
BASIS OF BEARINGS - PLAT 2009-25
N89°53'58"W 997.95'
50' ACCESS EASEMENT - PLAT 94-60
N89°53'58"W 238.51'
262.97'
735.00'
Mon. 11
See DETAIL "A"
See DETAIL "B"
APPARENT ACCRETIONS
TRACT B2
9.65 Acres
TRACT B1
3.52 Acres
HARBOR ROAD
N52°39'00"E 650.00'
60' R.O.W. EASEMENT - PLAT NO. 2009-25
S26°08'59"E 463.53'
SALMON
RIVER
FLOOD
50' Public Access Easement - Plat 2009-25
Meander Line of M.H.T. ASLS 2005-50
Dirt Roads
Mon. 5
FENCE
DOCK ROAD R.O.W.
TRACT A, ASLS 2005-50
(NOT A PART OF THIS SUBDIVISION)
Owner:
City of Gustavus
PO Box 1
Gustavus, AK. 99828
Recovered 5/8" Rebar on line.
N2°13'31"W 700.77'
BOAT LAUNCH RAMP
Dock
GEOGRAPHIC COORDINATES
LAT. 58°24'10.9209" N
LONG. 135°43'35.2481" W
NAD 27 (From J.R.D. PLAT 2009-25)
LAT. 58°24'09.69372" N
LONG. 135°43'41.81586" W
NAD 83 (by NADCON Conversion)
WEST 111.00'
Mon. 13
W.D.= 23.90'
Mon. 12
Mon. 6
Mon. 7
S84°02'09"W 574.61'
TRACT B3
5.24 Acres
N0°09'20"W 274.59'
TRACT E, ASLS 85-82
Existing dirt road
N90°00'00"E 771.44'
Mon. 8
Mon. 9
Mon. 10
W.D. = 100.00'
W.D. = 50.00'
LOT 8A, ASLS 85-82
LOT 9A, ASLS 85-82
DOCK ROAD
GLO Meander Line of Mean High Tide (1920) - Adjusted
TN
MN
21°19'
Source: NOAA's NGDC website. 11/03/2010
PLAT 2004-32
LOT 4
Recovered 1/2" Rebar w/ Red Plastic Cap (Record per Plat No. 2004-32) Not used by this survey. 14.27' N0°06'15"W of RM
N89°53'58"W
TRACT B-2
DETAIL "A"
NOT TO SCALE
TRACT B-1
CV10
79.98'
100' DOCK ROAD ROW
TRACT A ASLS 2005-50
HARBOR ROAD ROW
DETAIL "B"
NOT TO SCALE
VICINITY MAP From Juneau "B-6" Quadrangle Dated 1948, Rev. 1967
GUSTAVUS ROAD
THIS SURVEY
MUD FLAT
ICY PASSAGE
MONUMENT DATA
Mon. 1
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears S89°53'58"E - 10.00'
R.M. 2"ALCAP on 5/8"x48" rebar bears N89°53'58"W - 10.00'
Mon. 2
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"X48" rebar bears N1°44'58"W - 6.5'
R.M. 2"ALCAP on 5/8"x48" rebar bears S52°39'00"W - 10.00'
Mon. 3
Recovered 3 1/4" Alum. Mon. on 2" x 30" Alum. Pipe
R.M. 2" ALCAP on 5/8"x48" rebar bears S89°53'58"E, 7.37'
R.M. 2" ALCAP on 5/8"x48" rebar bears S47°41'29"W, 11.79'
R.M. 3.5"Alum. Mon. on 2"x30" pipe bears N89°53'58"W, 2.64'
Mon. 4
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears N33°23'47"E - 10.03'
R.M. 2"ALCAP on 5/8"x48" rebar bears S52°32'49"E - 9.29'
Mon. 5
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears N52°39'00"E - 10.00'
R.M. 2"ALCAP on 5/8"x48" rebar bears S2°13'31"E - 10.00'
Mon. 6
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears N2°13'31"W - 10.00'
R.M. 2"ALCAP on 5/8"x48" rebar bears N84°02'09"E - 10.00'
Mon. 7
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears N0°09'20"W - 10.00'
R.M. 2"ALCAP on 5/8"x48" rebar bears S84°02'09"W - 10.00'
Mon. 8
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears S90°00'00"W - 10.00'
R.M. 2"ALCAP on 5/8"x48" rebar bears N0°09'20"W - 10.00'
Mon. 9
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears N90°00'00"W - 25.00'
R.M. 2"ALCAP on 5/8"x48" rebar bears N90°00'00"E - 10.00'
Mon 10
Recovered 3 1/4" Alum. Mon. on 2" x30" Alum. Pipe
R.M. 2"ALCAP on 5/8"x48" rebar bears N0°00'00"E - 10.00'
R.M. 2"ALCAP on 5/8"x48" rebar bears N90°00'00"E - 25.00'
Mon 11
Set 3 1/4" Alum. Mon. on 2" x 30" Alum. Pipe
BT 14" Spruce bears S27°15'W 40.9'
BT 14" Cottonwood bears S66°00'E 16.2'
Mon 12
Set 3 1/4" Alum. Mon. on 2" x 30" Alum. Pipe
R.M. 2" ALCAP on 5/8" x 36" rebar bears West 10.0'
R.M. 2" ALCAP on 5/8" x 30" rebar bears S2°13'31"E 80.0'
Mon 13
Set 3 1/4" Alum. Mon. on 2" x 30" Alum. Pipe
R.M. 2" ALCAP on 5/8" x 36" rebar bears East 10.0'
R.M. 2" ALCAP on 5/8" x 36" rebar bears East 101.0'
MEANDER LINES
Mean High Water - ASLS 2005-50
LINE BEARING HORIZ DIST
M1 N26°29'51"E 163.73'
M2 S18°13'20"E 88.01'
M3 N13°41'24"E 78.74'
M4 N66°13'19"E 89.28'
M5 N49°01'43"E 42.33'
M6 N71°57'19"E 74.10'
M7 N32°35'08"E 41.94'
M8 N 6°15'50"W 42.37'
M9 N41°03'30"E 61.96'
M10 N50°21'22"W 62.93'
M11 S64°34'15"W 39.65'
M12 S 0°17'52"W 52.91'
M13 S44°59'03"W 66.23'
M14 N34°26'55"W 18.58'
M15 N11°47'50"E 90.65'
M16 N49°11'27"E 159.00'
M17 N56°27'56"E 215.84'
M18 N81°08'13"W 23.31'
M19 S63°15'37"W 214.60'
M20 N65°18'16"W 33.73'
M21 N17°04'29"W 58.86'
M22 N18°43'27"E 109.37'
M23 S81°16'59"E 73.40'
M24 N74°58'03"E 60.82'
M25 N04°39'26"W 34.28'
M26 N37°34'43"E 144.39'
M27 N10°06'18"E 34.73'
M28 S66°56'50"W 53.97'
M29 S48°08'23"W 152.99'
M30 S79°38'16"W 56.30'
M31 N39°00'46"W 49.02'
M32 N02°32'08"W 61.43'
M33 N18°56'20"E 73.60'
M34 N07°33'40"W 115.62'
M35 N27°18'14"W 172.70'
M36 N68°30'04"W 226.34'
M37 N44°42'31"W 303.12'
M38 N50°11'29"W 215.27'
M39 N14°28'37"E 169.30'
M40 S35°53'25"W 164.24'
M41 N54°57'31"W 157.39'
M42 N67°08'35"W 138.53'
TIDAL DATUM
GUSTAVUS TIDAL DATUM
Based on 1975 survey by R&M Inc. dated 1975, Plat File EPF 30-72.
MHHW – 14.70'
MHW – 13.80'
MLW – 1.60'
MLLW – 0.00'
CURVE TABLE
CURVE DELTA RADIUS ARC CHORD CH. BRG.
CV1 20°27'46" 730.00' 260.71' 259.33' N42°25'07"E
CV2 20°27'46" 700.00' 250.00' 248.67' N42°25'07"E
CV3 20°27'46" 670.00' 239.29' 238.02' N42°25'07"E
CV4 53°18'12" 320.00' 297.70' 287.08' N06°50'01"E
CV5 59°53'59" 350.00' 365.91' 349.47' N03°32'07"E
CV6 56°08'24" 380.00' 372.34' 357.62' N05°24'54"E
CV7 33°43'10" 570.00' 335.45' 330.63' N50°20'41"E
CV8 34°00'23" 600.00' 356.11' 350.91' N50°29'18"E
CV9 32°40'00" 630.00' 359.19' 354.34' N49°49'07"E
CV10 0°17'12" 2613.30' 13.07' 13.07' N01°44'21"W
LINE TABLE
LINE BEARING DIST.
L1 S52°39'00"W 11.49'
L2 S52°39'00"W 50.00'
L3 S52°39'00"W 58.00'
L4 S32°11'14"W 213.43'
L5 S32°11'14"W 203.22'
L6 S32°11'14"W 176.10'
2011-31
Plat #
Juneau
Rec Dist
11-7-2011
Date
Time 10:16 A.M.
NOTES:
1. This Survey was accomplished in accordance with A.S. 29.65 and MSI 2007-32.
2. All bearings shown are true bearings as oriented to the Basis of Bearings and distances shown are reduced to horizontal field distances.
3. The error of closure for this survey is not greater than 1:5000.
4. The natural meanders of the line of mean high water form the true bounds of ASLS 2007-32. The approximate line of MHW as shown, is for area computations only, with the true corners being on the extension of the side lines and their intersection with the natural meanders.
5. Mean high tide was determined by time coordinated tidal observations on October 18, 2006 as extrapolated from the NOAA Publication for the predictions of high and low waters for 2006.
6. The record GLO Meanders were established by adjusting the record data by the Grant Boundary Method to fit between the record meander corner of Sections 17 and 18 and the record meander corner of the east bank of the Salmon River as located by the survey for ASLS 2005-50.
7. The boundary survey was completed in 2007 for ASLS 2005-50 by this surveyor. This plat used that survey to add monumentation for this survey. All Bearings and Distances on this boundary are RECORD and MEASURED.
8. Legal Access to Tract B 3 is via the navigaable waters of the Salmon River.
LEGEND:
RECOVERED PRIMARY MONUMENT - AS NOTED
RECOVERED SECONDARY MONUMENT - AS NOTED
PRIMARY MONUMENT OF RECORD
SET 3 1/4" ALUMINUM MONUMENT - AS NOTED
SURVEYED LINE
UNSURVEYED LINE
GLO MEANDER LINE
CERTIFICATE OF OWNERSHIP
I, the undersigned, hereby certify that I am the Director, Division of Mining, Land and Water and that the State of Alaska is the owner of ASLS No. 2007-32, as shown hereon. I hereby approve this survey and plat for the State of Alaska.
For Gerald Jennings Oct 31, 2011
Director, Division of Mining, Land and Water Date
NOTARY'S ACKNOWLEDGEMENT
Subscribed snd sworn before me this 31st day of October 2011.
By Gerald Jennings.
Ronda Wilson
Notary Public for Alaska
My Commission Expires with office
RONDA WILSON NOTARY PUBLIC STATE OF ALASKA
APPLICANT CERTIFICATE
I, the undersigned, hereby certify that I am the applicant as shown hereon. I hereby approve this survey and plat.
ADL No. 107531, TRACTS B-1 and B-3
Jim Mackovjak, Mayor, City of Gustavus 10-7-2011 Date:
NOTARY'S ACKNOWLEDGEMENT
Subscribed snd sworn before me this 7th day of October, 2011.
By Jim Mackovjak.
Notary Public for Alaska
My Commission Expires 06/03/2013.
WILLIAM L. UNKEL NOTARY PUBLIC State of Alaska
SURVEYOR'S CERTIFICATE
I hereby certify that I am properly registered and licensed to practice land surveying in the State of Alaska, that this plat represents a survey made by me or under my direct supervision, that the monuments shown hereon actually exist as described, and that all dimensions and other details are correct.
Date: 6/6/2011
Craig L. Templin, RLS 3491
STATE OF ALASKA 49TH CRAIG L. TEMPLIN No. 3491-S
PLAT APPROVAL
This plat is approved by the Commissioner of the Department of Natural Resources, or the Commissioner's designee, in accordance with A.S. 40.15.
For Gerald Jennings Oct 31, 2011
Commissioner Date
TAX CERTIFICATE
This subdivision lies outside of any taxing authority, at the time of filing.
GRAPHIC SCALE
0 50 100 200 300 400 Feet
0 25 50 100 Meters
1 Meter = 3.280833 U.S. Survey Feet. 1 U.S. Acre = 0.4047 Hectare.
DATE OF SURVEY:
Beginning: October 27,2010
Ending: October, 28, 2010
NAME OF SURVEYOR:
TEMPLIN LAND SURVEYING
PO Box 1078
Ward Cove, AK 99928
Phone / Fax - 907-247-5120
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER
ANCHORAGE, ALASKA
ALASKA STATE LAND SURVEY NO. 2007-32
A SUBDIVISION OF TRACT B, ASLS 2005-50
CREATING TRACTS B-1, B-2 and B-3.
CONTAINING 18.41 ACRES
LOCATED WITHIN:
SURVEYED SECTION 18, TOWNSHIP 40 SOUTH, RANGE 59 EAST, COPPER RIVER MERIDIAN, ALASKA
JUNEAU RECORDING DISTRICT
DRAWN BY: CLT
DATE: 6/3/2011
APPROVAL RECOMMENDED
William S. Brown for 10/27/11
STATEWIDE PLATTING SUPERVISOR DATE
SHEET 1 OF 1
SCALE: 1" = 100'
CHECKED BY: C.L.T.
FILE NO: ASLS20070032
Traverse PC

Appendix H
Holding Tank Photos



Xerxes 10,000 Gallon Tank Photos
October, 2022

Buoyancy restraint strap guides are visible along the top half of the tank.

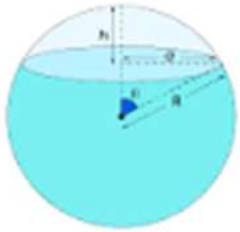
Interstitial space thickness measurement.

Outer tank wall thickness measurement.

Appendix I

Tank Inside Volume Calculator		Tank Liquid Level Height in Feet/Volume Table Calculator															
Inside Tank Diameter Ft	7.596	Height of Liquid Ft	7.596	7	6.5	6	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1	0.5
Inside Tank Total Length Ft	31.596	Cylinder Inside Length Ft	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Spherical Tank Volume Ft^3	229	Calculated	229	225	217	203	187	167	146	124	101	79	58	39	23	11	3
Cylindrical Tank Volume Ft^3	1088	Online Calculator	1088	1048	991	921	843	759	671	581	490	399	312	229	152	85	31
Total Tank Volume Ft^3	1317	Calculated	1317	1273	1207	1125	1030	927	817	704	591	479	370	268	175	95	33
Calculated Product Capacity gal	**9852**		**9852**	**9526**	**9032**	**8413**	**7705**	**6931**	**6113**	**5270**	**4419**	**3579**	**2765**	**2005**	**1312**	**714**	**250**
Xerxes Table gal	**9753**	% Capacity	97%	92%	85%	**78%**	70%	62%	53%	45%	36%	28%	20%	13%	7%	3%	
Variance	1.0%																

Volume of a Spherical Cap



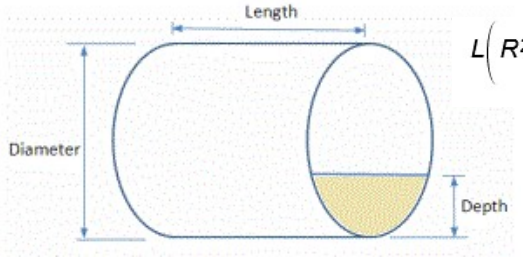
Spherical Cap

Volume in terms of h and R $= \frac{1}{3}\pi h^2(3R - h)$

Volume in terms of a and h $= \frac{1}{6}\pi h(3a^2 + h^2)$

$V = (1/3)\pi h^2(3R - h)$

Formula used in the table



$$L\left(R^2\cos^{-1}\left(\frac{R-D}{R}\right)-(R-D)\sqrt{2RD-D^2}\right)$$

Online calculator used in the table

Appendix J
High Liquid Level Alarm Photos

Typical high liquid level alarm, power disconnect and junction box installed for a lift station on a private residential wastewater disposal system in Gustavus.

Appendix K
High Liquid Level Alarm Float Switch

92000: Tethered Float Switch

Non-Mercury Switch

Click on image for high resolution picture

Specifications

Features

- Non-mercury tethered float switch
- 10' cord with piggy back plug
- Flexible wire construction

Technical Specifications

Model	92000
Run Current	10 Amps
Start Current	90 Amps
Liquid Temperature	140ºF
Cord Length	10 ft

SUPERSEDED

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Product Information/Specification Sheet

Studor Maxi-Filtra (Active Carbon Filter designed to eliminate bad odours produced by the drainage system)

Description

The Studor Maxi-Filtra is an active carbon filter designed to eliminate bad odours produced by the drainage system. For use externally, it operates as a 2-way vent, filtering air in both directions. Particularly for use with septic tanks, the Maxi-Filtra may also be installed on open vents already existing or for new buildings where regulations insist on their inclusion within the building's drainage system.

For best results, the Studor Maxi-Filtra should be installed with Studor Air Admittance Valves (AAVs).

Features

- Replaceable carbon filter cartridge.
- Prevents the release of foul air from the drainage system.
- Requires no specialist installation.
- Available in black ABS.

Installation

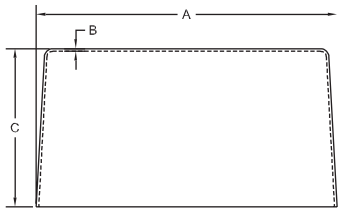
- The Maxi-Filtra should be connected to the piping in accordance with Studor's installation instructions.

Applications

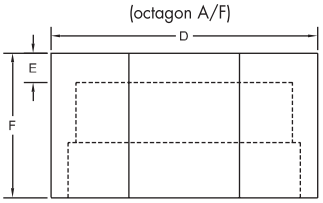
The Maxi-Filtra may be installed externally anywhere when the odour from existing vents present a problem, or when pipe vents are to be included in the drainage system of a new build:

- Septic tanks
- Grease separators
- Rain water tanks
- Sewage treatment plants
- Lifting equipment*
- Building drainage open vents*

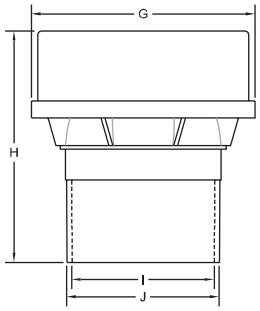
* in conjunction with Studor AAVs of an appropriate airflow



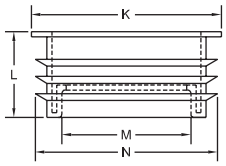
Aluminium Cover



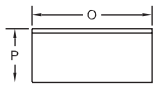
Insulating Cap



Maxi-Filtra



Connector



Cartridge

Dimensions

Dimension	Metric (mm)	Imperial (inches)
A	Ø 175	6 7/8
B	1.5	1/16
C	92	3 5/8
D	155	6 1/8
E	17	11/16
F	84	3 5/16
G	Ø 130	Ø 5 2/16
H	131	5 5/16
I	Ø 83	3 1/4
J	Ø 89	3 1/2
K	Ø 111	Ø 4 3/8
L	50	2
M	Ø 75	Ø 2 15/16
N	Ø 106	4 3/16
O	Ø 70	Ø 2 3/4
P	31	1 1/4

Note: Dimensions for reference only

Performance parameter

Temperature range	-20°C to +60°C (CE) -40°F to +150°F (ASSE)

Airflow Capacity

Pressure (Pa)	Flow Rate (l/s)
100	2
250	5
500	8

Materials

Component	Material
Aluminium cover	Aluminium
Insulating cover cap	Polystyrene
Maxi-Filtra body	ABS
Connector	Rubber
Cartridge	Activated carbon

Aluminium Cover (optional)

The Aluminium Cover provides increased protection to the Maxi-Filtra when it is installed outside. The cover is placed over the upper half of the polystyrene cap provided and secured in place with adhesive tape. This provides increased protection from animals/ birds and the environment, i.e. inclement weather and the sun's ultra-violet rays.

Warranty

The Studor products have a 10 year warranty period. Visit www.studor.net for full details.

Pipe sizes

Europe	AU/NZ	USA
DN 75-110	DN 80-100	3" - 4"

03/18/013

studor

Aliaxis Nederland B.V. t/a Aliaxis Technical Services Tel +44 1273 525 500 studor.info@aliaxis.com www.studor.net

Appendix M
Gustavus Septage Holding Tank Facility
Assessment of Annual Septage Generation
Additional Information Requested by DEC
March 1, 2023

Please provide your calculations on wastewater sludge generation.

The plan to manage wastewater sludge (septage) as described in the Engineer's Report is flexible in terms of its capacity, as the quantity of septage that passes through the holding tanks depends on the capability of the contractor to haul the septage out of Gustavus to a sewage processing facility. The holding tank facility itself doesn't need to be designed based on a minimum throughput capacity such as a conventional municipal sewage treatment plant would.

The actual annual septage quantity generated in Gustavus that would transit the septage holding tanks is dependent on the number of households that decide to pump their septic tanks in a particular year. The demand for septic tank pumping is unpredictable so the annual septage quantity generated can't be reliably calculated.

Currently it's known that there is a backlog of tanks that require pumping, but how many tanks is unknown. It's expected that once the backlog is cleared the short term demand will drop to a steady but slowly increasing number of tanks over the years.

A reasonable estimate of the capability of this septage management plan to adequately service Gustavus septic tanks can be derived from the Professional Services Agreement (PSA) between the City of Gustavus (the City) and Juneau Septic Services (JSS); information from the 2020 census; and an informal annual locally organized people count.

The JSS proposal to the City (Appendix N) offers to pump a minimum of twenty tanks per year with the goal of fifty tanks per year. The City countered that proposal in the PSA with the requirement that JSS "will plan for at least three pumping campaigns per year". Considering the average septic tank size (1100 gals.) and allowances for pumping out lift stations and leaving some head space in the holding tanks, and that the 1000 gallon truck will return to Juneau full, the number of tanks that should be pumped per campaign is 17 so the total for the year of 50 is achievable. The capacity of the big pump truck operated by JSS was given to me yesterday as 4500 gallons instead of the 4000 gallons stated in the engineer's report, so it should have to make four trips of one day each between Juneau and Gustavus per campaign, or approximately twelve trips per year.

Gustavus 2020 Census Data:

Population:	655
Total Households:	188

There is no data available to determine how many of the 188 households actually have septic tanks. There are properties that have composting toilets or outhouses with graywater disposal systems.

The DEC SEPTS database can't be queried directly to determine the number of documented systems in Gustavus. A time consuming manual search of all the records listed under the Juneau area office could

be done, but that's not going to yield a usable number of septic tanks because there are many undocumented, substandard, bootleg wastewater systems in Gustavus.

The National Park Service has seasonal and permanent housing at Bartlett Cove and near the school that was included in the 2020 census and is serviced by the NPS sewage treatment system.

The census data shows that if 50 tanks are pumped per year, and assuming all 188 of the active households have or will have septic tanks, the average time between pumping active tanks is less than four years per household. This is below the mid point for pumping frequency stated in the 2002 EPA Onsite Wastewater Treatment Systems Manual of 3-5 years (4.6.5) and 1-7 years (SIFS-1). Many property owners in Gustavus do not put grease, toilet paper, food waste, powdered soaps, etc., into their wastewater systems and don't need their tanks to be pumped that frequently. They are motivated to do this because of the lack of septic tank pumping service and its significant cost.

Traditional New Year's Day People Count:

2023:	417
2022:	429
2021:	469
2020:	No count
2019:	390
2018:	404
Average:	422

The Traditional New Year's Day People Count shows consistently that 35% of the census population is not in Gustavus in the winter. The same analysis for the period of 2008 to 2013 around the 2010 census yields a similar result. In the summer months there is a temporary increase in population that offsets the winter population decrease, so it is reasonable to assume that the population averages out over the course of a year. The spike in population on New Year's Day 2021 is explained by seasonal residents staying home for the winter due to the Covid pandemic. This was just before the first vaccines were available in Gustavus.

How many homes does it service?

The total number of housing units in Gustavus is not a good measure of annual wastewater generation. According to the 2020 census half of the housing units are vacant. Gustavus has a high proportion of seasonal, part time seasonal (weekend and vacation only) and absentee property owners, and some older dwellings are dilapidated and not livable but are still standing.

Gustavus 2020 Census Data:

Total Housing Units:	600
Occupied Housing Units:	302
Vacant Housing Units:	298

How does having a larger tank solve the ferry schedule issue? How does increasing the number of pump trucks solve that problem?

The current situation involving the combined constraints of the ferry schedule and availability of the big pump truck to haul septage from Gustavus to Juneau is explained in paragraph 3 on page 1 of the

Engineer's Report. The plan to resolve those constraints using the septage holding tank facility is explained in paragraph 4 on page 1.

Is there any historical data you can provide that justifies a pump schedule of 3-4 times a year?

JSS does not have any specific record of how many tanks have been pumped or trips made to Gustavus with the pump trucks. To obtain this information JSS would have to review their entire annual billing and expense records and they have stated that they don't have the ability to do this because they don't have the manpower, and also the billing software was changed and only the last couple years (they didn't say exactly how many years) would be accessible. From memory the JSS operator told me he probably made four trips with the big truck in 2022 and five in 2021. Each of these trips required the big pump truck to be away from Juneau for at least four days at a time. With a capacity of four septic tanks per trip that would equal 16 tanks in 2022 and 20 in 2021. Last year I saw the big pump truck once at the ferry terminal and once parked at the airport. The actual number of tanks pumped annually can't be reliably determined, but that doesn't matter because more tanks need to be pumped than have been pumped in the past.

The City has not previously been involved with septic tank pumping. The JSS PSA with the City requires JSS to submit monthly pumping records to the City. With the commissioning of the new septage holding tank facility the City will collect that data and use it to forecast the future requirements for septic tank pumping and septage disposal. This data will be needed to evaluate long term solutions for local septage treatment that would involve water reduction and dewatering to reduce its volume, which will increase options for disposal of the sludge.

From the JSS PSA:

Documentation: The Contractor agrees to provide the City with a monthly accounting of 1) the number and volume of septic tanks, vaults, and lift stations pumped and the quantity of septage hauled to the City septage transfer facility, and 2) the number of trips, dates, destination, and quantity of septage hauled to a sewage processing facility.

Gustavus Septic Storage Proposal

11.21.2022

Juneau Septic Services
PO Box 210714
Auke Bay, AK 99821

Overview

The proposed project is to purchase and install 2 x 10,000 Gallon Storage Tanks. This is the first step toward a future septage treatment system to meet the needs of the Gustavus residents. The use of these tanks for storage will aid JSS in the bulk removal of sewage.

Goals

1. Gustavus (GST) will purchase, Install and maintain the storage tanks.
2. Juneau Septic Services (JSS) Will provide services to a minimum of 20 residential Septic systems per year with a goal of 50 per year.
3. JSS will have 24/7 access to the site for operations.
4. JSS will provide GST indemnification during commercial operations.

Productivity Is based on standard septic Installations and may vary due to unknown issues due to underground Buried Tanks.

Appendix O

Subject: RE: Gustavus Septage Holding Tanks
From: "Zimmer, Raymond T (DEC)" <raymond.zimmer@alaska.gov>
Date: 3/14/2023, 1:25 PM
To: John Barry <jbarrycak@gmail.com>

Hi John,

I think that's a reasonable request seeing the tanks are going to be physically pumped into via vac truck. Was I mistaken that the design had a high level alarm system?

Regardless, please consider this email as justification for that requirement waiver.

Regards,

Raymond Zimmer
Engineering Associate I

Alaska Dept. of Environmental Conservation
Division of Water, Wastewater Discharge
Engineering Support & Plan Review Section
410 Willoughby Ave, Juneau, AK 99801
Office: (907) 465-5167

-----Original Message-----
From: John Barry <jbarrycak@gmail.com>
Sent: Tuesday, March 14, 2023 11:37 AM
To: Zimmer, Raymond T (DEC) <raymond.zimmer@alaska.gov>
Subject: Gustavus Septage Holding Tanks

Hi Ray,

I have a follow up question about the high level liquid alarm requirement for the septage holding tanks that you issued a permit for last week. In the engineer's report I asked if the requirement for the alarm could be waived and instead have a visual method of monitoring the tank liquid level. The tank would be filled by an attending operator who would still have to visually monitor the tank during offloading the septage from the pump truck. The regulation requirement for the alarm seems to be based on a holding tank that receives an intermittent flow of sewage from a source such as a residential dwelling where the liquid level requires constant monitoring to prevent overflow. This is a different situation, and if the alarms don't need to be installed then the cost of approximately 250 feet of buried power cable as well as the installation of the alarms would be saved. Would it be possible to reconsider this requirement?

Thanks,

John Barry