Alternatives Memo

Date:	September 6, 2024
Project:	Gustavus Septage Treatment
To:	Anita Erickson PE, Village Safe Water
From:	Anson Moxness PE, KC Kent, HDR
Subject:	Gustavus Septage PER Alternatives Memo

Introduction

HDR Alaska, Inc. (HDR), is developing the Gustavus Septage Management Preliminary Engineering Report (PER) under Village Safe Water (VSW) work order 24-GST-TO-016. The project's scope is to identify and study alternatives for treatment and disposal of septage. This memorandum identifies potential alternatives for further development in the 65% PER.

Gustavus residents and businesses are served by on-site septic tanks, which require periodic pumping for proper operation. The pumped septage requires proper disposal. Currently, septage pumped from on-site septic tanks is transported to two 10,000-gallon septage transfer tanks located at the Disposal and Recycling Center (DRC), followed by transport via the Alaska Marine Highway System (AMHS) in a large septage hauling tanker truck and septage pump truck to Juneau. In Juneau, the septage is disposed of at the wastewater treatment facility. The community desires a local treatment and disposal option to eliminate the reliance on other communities and the AMHS for disposal.

The goal of this PER is to recommend a method of local treatment and disposal of septage in a manner that meets Alaska Department of Environmental Conservation (ADEC) regulations and addresses Gustavus' needs. Given the relatively small volume of septage produced in Gustavus, a large, continually operating processing plant is likely not feasible. Large processing facilities or treatment plants are labor and resource-intensive, requiring large and continuous volumes of septage to operate efficiently. Although accepting septage from other Southeast Alaska communities could increase the total volume to be treated, it is unlikely that this would make a continually operating treatment facility economical. Since septic pumping is done in batches, treatment and disposal methods that can be operated intermittently will be best meet project needs.

The most effective plan for septage disposal involves either depositing septage in a treatment facility capable of receiving it (outside of Gustavus city limits) or dewatering the septage and disposing of the dewatered solids. To facilitate the analysis, two categories of alternatives were developed: stabilization and treatment of the septage, and disposal, if needed, of the solids.

Category 1: Septage Stabilization and Treatment Alternatives

A. Mechanical Dewatering
B. Passive Dewatering

C. Aerobic Digestion
D. Dewatering and Composting
E. Reed Bed Drying
F. No Action

Category 2: Sludge Disposal Alternatives

A. Incineration
B. Monofill
C. Ship to Juneau
D. Land Application
E. No Action

Proposed Alternatives

HDR considered a range of alternatives to address each of the categories of alternatives described above.

Category 1: Septage Stabilization and Treatment Alternatives

These alternatives describe several methods of stabilization and treatment of septage. Dewatering of septage creates a sludge or biosolid that is easier to dispose.

ALTERNATIVE 1A: MECHANICAL DEWATERING

Alternative 1A would install a mechanical dewatering facility, likely located at the DRC. The existing septage receiving tanks would serve as the receiving station and flow equalization. Septage would be lime stabilized in the receiving tank in batches prior to dewatering. Septage would then be pumped into a mechanical dewatering process such as a screw press or belt filter press. Polymer would be added to enhance the dewatering process. Leachate from the dewatering process would be disposed of in a subsurface drainfield on site. Due to the high solids percentage, the dewatered septage, now sludge, could be disposed of by any number of methods discussed in Category 2.

The indoor facility would contain the lime and polymer feed systems and mechanic dewatering process with an indoor vehicle bay for a City-owned pumper truck or trailer to service the septic tanks.

ALTERNATIVE 1B: PASSIVE DEWATERING

Alternative 1B would include the purchase of a septage pumper truck or trailer and a passive dewatering system, likely located at the DRC. Similar to Alternative 1A, septage would be pumped into one of the existing septage receiving tanks for equalization and lime stabilization. The stabilized septage would then be pumped to one of several passive dewatering options. Passive dewatering options could include geobags, a containerized dewatering unit, or other method. As with mechanical dewatering, passive dewatering will also include polymer addition to enhance dewatering.

Like Alternative 1A, leachate water would be disposed of in a drainfield at the DRC and dewatered sludge disposed of by an alternative selected in Category 2. This alternative would

likely require an indoor facility to contain the lime feed and polymer feed systems with a vehicle bay for a City-owned pumper truck or trailer.

ALTERNATIVE 1C: AEROBIC DIGESTION AND DEWATERING

Alternative 1C would construct an aerobic digestion treatment plant to treat septage. The septage would be batch processed in a digester with bubble aerators to promote the activity of microbes which breaks down the septage and makes it dewater more efficiently and effectively. This process would use electric-powered blowers to provide oxygen into the digester. Digested sludge would then be dewatered using one of the processes from Alternatives 1A, 1B, or 1D. Decant from the digester and leachate from dewatering would be disposed of in a subsurface drainfield near the facility.

ALTERNATIVE 1D: DEWATERING AND COMPOSTING

Sludge composting is an aerobic digestive process that produces a stabilized biosolid that can be used for soil amendment or mulch. Alternative 1D would construct a sludge composting facility to receive and process septage and facilitate composting. This alternative would require a dewatering process prior to the composting process. Dewatered sludge would be mixed with a bulking agent such as wood chips or saw dust and aerated mechanically or turned to create a compost pile. The composting process creates a stable biosolid suitable as a soil amendment, land application, or for disposal.

ALTERNATIVE 1E: REED BED DRYING

Planted reed bed filters have been used extensively in Europe for sludge dewatering and treatment. The reed bed operates similar to a conventional sand filter drying bed with additional septage treatment from the reeds. A large, lined lagoon is constructed with a geomembrane to contain the filtrate. Layers of gravel and coarse sand are added over perforated filtrate collection pipes. Once the reeds are established, a layer of sludge can be added directly from a septic pumper truck and distributed through the reed bed. New layers of sludge can be added to the bed once or twice a month without a negative impact.

Filtrate would be disposed of in a subsurface drainfield, and dewatered sludge can be periodically (once every several years) collected and disposed of using a method described in Category 2.

ALTERNATIVE 1F: NO ACTION

Per the U.S. Department of Agriculture (USDA) Rural Development PER requirements, Alternative 1F would involve no action. This alternative would continue with the existing system with no capital or operational improvements. This alternative would result in no local treatment of septage and would continue the reliance on outside entities for transport and disposal.

Category 2: Sludge Disposal

Once the septage has been processes through an alternative in Category 1, the resultant sludge must be disposed of. These alternatives cover possible methods for disposal of sludge.

ALTERNATIVE 2A: INCINERATION

Alternative 2A would involve either the installation of an incinerator at the dewatering site or utilizing the incinerator at the Bartlett Cove Wastewater Treatment Facility if an agreement

between the City and Bartlett Cove is reached. A diesel fired incinerator would burn dewatered sludge, and the ash would be landfilled.

ALTERNATIVE 2B: MONOFILL

Alternative 2B would include the permitting and construction of a monofill at the existing landfill to accept dewatered sludge. The dewatered sludge would be transferred from one of the Category 1 dewatering processes to the new monofill. Once the sludge is placed in the monofill, soil would be spread over the sludge per ADEC regulations.

ALTERNATIVE 2C: SHIP TO JUNEAU FOR DRYING

Alternative 2C would involve shipment of dewatered sludge to Juneau for drying and final disposal. This alternative would be different from current septage disposal because the water content would be greatly reduced and the total volume needed to ship would be less, resulting in lower costs and a smaller operation. Dewatered sludge would only require a dumpster rather than the tanker that is currently being used. Dewatered sludge could be delivered directly to the sludge drying facility in Juneau and bypass the wastewater treatment facility. Juneau disposes of the dried sludge in a facility in the Lower 48.

ALTERNATIVE 2D: LAND APPLICATION

Alternative 2D would involve disposing of dewatered, treated sludge by land application at a vacant site in the Gustavus area.

ALTERNATIVE 2E: NO ACTION

Per the USDA Rural Development PER requirements, Alternative 2E would involve no action. This alternative would retain the existing process of transport and disposal of raw septage in Juneau’s wastewater treatment facility with no capital or operational improvements.