



CITY OF WASILLA

290 E. HERNING AVE.
WASILLA, ALASKA 99687
PHONE: (907) 373-9050
FAX: (907) 373-0788

COUNCIL MEMORANDUM NO. 91-47 (Amended)

FROM: Deputy Administrator

DATE: August 12, 1991

RE: Final Design of Sewer Treatment Plant

The Department of Environmental Conservation has not received any protests or negative comments regarding our proposed construction of a Recirculating Granular Media Filter (RGMF) and subsequent discharge proposals. We expect the permit to be issued to us within the next few days. It is time to authorize funding for final design of the facility. The project description contained in the April 18, 1991 memorandum projects an estimated \$78,000 for design and construction administration (7.5%) of the estimated \$1,247,000 project.

We do not expect to advertise the project for construction until spring 1992 at the earliest. The timing will allow us to prepare final cost estimates and to evaluate the potential of obtaining additional legislative grant funding. Alternatively, we will have to borrow some portion of the funds for construction. I believe we can reasonably plan on construction late next summer. In the meantime, we will continue to request Council authority to expend sewer construction grant funds for some preliminary clearing, grubbing and excavation work that will reduce the overall construction costs.

Municipal Grant 87/475, for sewer construction, has a balance of \$372,135.84. Recommend that Council introduce Ordinance 91-29 for public hearing and adoption on August 12, 1991. The funds are the amount estimated by Gilfilian Engineering for design of the new sewage treatment facility.

Administration requests authority from Council to authorize final design and preparation of contract documents by Gilfilian Engineering, Inc. at a not to exceed \$39,000.

Robert E. Harris
Deputy Administrator



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COUNCIL MEMORANDUM NO. 91-47

FROM: Deputy Administrator


DATE: July 16, 1991

RE: Final Design of Sewer Treatment Plant

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Robert E. Harris
Deputy Administrator



Gilfillan Engineering, Inc.

Mat-Su Office: P.O. Box 871868 • Wasilla, Alaska 99687 • (907) 376-3005 FAX 373-5686
Anchorage Office: 3111 "C" St., Suite 200, • Anchorage, Alaska 99503 • (907) 562-2021 FAX 563-2605

July 15, 1991

City of Wasilla
290 E. Hering Ave.
Wasilla, AK 99654

Attn: Bob Harris
City Administrator

RE: Wasilla Sewage Treatment and Disposal System
Proposed Engineering Design Budget

Dear Mr. Harris:

Per your request, we have completed a review of our April 18, 1991 preliminary cost estimate to complete the design and contract administration of a Recirculating Granular Media Filter (RGMF). As a rule, the cost for design is approximately 50% of the total engineering budget. In this regard, a Work Order in the amount of \$39,000 should be prepared so that we can begin the design of the RGMF. This project will be conducted on a time and expense basis as typically used on our City Engineer projects.

The design effort will include the preparation of plans, specifications and the engineering construction estimate. Plans will be on reproducible mylars and the specifications will be in a form as to make up a complete bid package. This budget does not include the cost for reproduction of plans and construction bidding documents.

If you have any questions regarding this letter please feel free to call.

Sincerely,

GILFILLAN ENGINEERING, INC.

C. Peter Curtis
Senior Environmental Technician



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PROPOSED UPGRADE AND EXPANSION SEWAGE TREATMENT AND DISPOSAL SYSTEM

April 18, 1991

BACKGROUND

The City of Wasilla is the first community in Alaska to construct and operate a large municipal drainfield facility. The drainfield facility is used to treat and dispose of septic tank effluent collected in the City's pressure sewer system. The drainfield facility was constructed under the US Environmental Protection Agency's Innovative and Alternative Program and is one of the largest municipal drainfields in the nation.

Since the start-up of the drainfield facility in December 1986, the City has monitored the drainfield's operation and performance. The monitoring program has involved the monthly collection and analyses of samples from the wastewater influent, drainfield beds, groundwater wells and a nearby stream. The hydraulic capacity of the individual drainfield beds was also monitored.

Based on the results of the comprehensive monitoring program, the City identified several significant problems associated with the operation and performance of the drainfield facility. The two (2) most significant problems that need to be resolved are:

1. Limited Hydraulic Capacity- The drainfield facility was originally designed to treat and dispose of 440,000 gallons per day (gpd). Since the start-up of the facility, the quality of the wastewater applied to the drainfield beds caused a rapid formation of clogging in the soils beneath the beds. The drainfield beds have experienced premature hydraulic failure as a result of the excessive soil clogging condition.

The drainfield facility appears to have a limited long-term hydraulic capacity of approximately 100,000 gpd. Consequently, the use of the City's new sewer system is restrictive and will severely limit the growth and proper development of Wasilla.

2. Adverse Environmental Impact- The discharge of sewage effluent into the drainfield beds caused degradation of the quality of the groundwater aquifer and a groundwater spring located on the drainfield site. The treatment of the wastewater effluent in the soil zone beneath the drainfield beds had been documented to be inadequate. The untreated wastewater effluent has violated the permit discharge standards established by the Alaska Department of Environmental Conservation (ADEC).

PROPOSED UPGRADE AND EXPANSION IMPROVEMENTS

The City of Wasilla has evaluated several corrective action alternatives to provide an acceptable method for the treatment and disposal of the septic tank effluent. Because of the unique high strength characteristics of septic tank effluent, the City has selected an alternative treatment process that can affectively treat septic wastewater.

The selected treatment process, referred to as a Recirculating Granular Media Filter (RGMF), involves the use of a gravel media that filters recirculated effluent. The RGMF process was recently developed for the treatment of strong wastewater and found to consistently produce high quality effluent at relatively low operating and maintenance costs.

The RGMF treatment process offers several advantages for the conversion (upgrade and expansion) of the existing Wasilla drainfield facility. The existing treatment plant facilities are usable with minor modifications to retrofit the components for use in the RGMF treatment process. The RGMF system is capable of being developed in phases that will accommodate future increases in wastewater flow; thereby, decreasing initial capital improvement costs. Also, minimal operator skill is needed for the operation of the RGMF treatment process.

Operation of the RGMF Treatment System: Influent from the City's septic tank effluent pump (STEP) sewer system flows to a recirculating tank. In controlled doses, the mixture of fresh influent and recirculated, partially treated, filtrate is applied to a gravel media filter bed through a pressure distribution system. The wastewater drains through the gravel media and undergoes biological treatment on the surface of the media particles. The treated wastewater (filtrate) is collected at the bottom of the filter, and returned to the recirculating tank. The filtrate is mixed with fresh influent and cycles to the gravel filter bed. A portion of the filtrate flow is discharged through a float controlled valve to a chlorination unit. The chlorinated treated effluent flows through the chlorine contact chamber and discharges by gravity to a nearby stream.

A schematic flow diagram of the proposed upgrade and expansion improvements is shown on the attached drawing. The proposed improvements are designed to provide adequate treatment for 200,000 gpd. The RGMF process is designed for a recirculation ratio of 5:1 at a dosing rate of 2,000 gpm for 5 minutes every 30 minutes.

The RGMF treatment process has the potential to handle greater hydraulic flows, but the ultimate capacity will be dependent on the cold climate affect on the performance of the gravel filter media. Because of the limited information on the performance of RGMF treatment systems in cold climate areas, the initial use of the RGMF system will be seasonally restricted to the above freezing temperature times of the year.

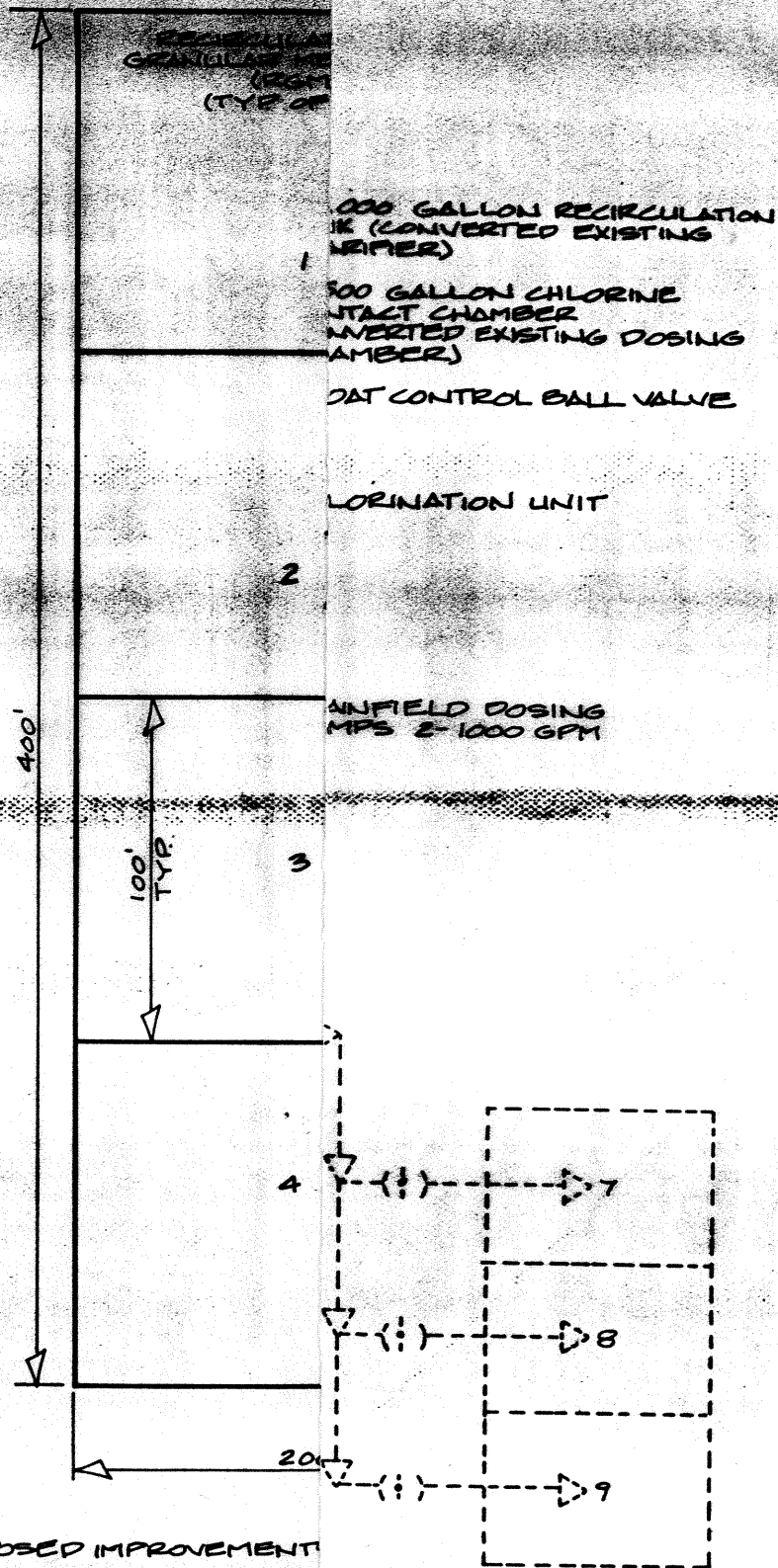
The normal operation (current use) of the drainfield system will be activated during the winter months. This arrangement will allow the drainfield beds to rest for nearly 6 months of the year. The operation of the RGMF system will be tested and evaluated during the colder times of the year and may prove to be usable for the entire year.

As shown on the attached flow diagram, the proposed upgrade and expansion improvements will consist of the following changes and additions:

- The existing 100,000 gallon clarifier will be converted into a recirculation tank.
- Effluent from the recirculating tank will be alternately dosed via 2 - 2,000 gpm pumps to 4 - 20,000 s.f. surface area recirculating gravel media filters (RGMF).
- Filtrate from the RGMFs will flow by gravity to a 10,000 gallon return vault and pumped via 2 - 500 gpm pumps to the inlet of the recirculation tank.
- An overflow volume equivalent to the influent flow will be discharged from the recirculating tank through a float controlled valve to a chlorination unit.
- The chlorinated effluent will flow into the existing 17,500 gallon dosing chamber that will be converted into a chlorine contact chamber.
- The finished treated effluent will flow by gravity from the chlorine contact tank through an existing overflow main to the headworks of Drainfield Bed No. 1.
- A new gravity outfall main will discharge the treated effluent to the nearby stream on the City's property.

PRELIMINARY COST ESTIMATE

SITWORK: clearing, grubbing, and excavation	\$165,000
RECIRCULATING TANK: clarifier conversion and chlorine contact chamber	100,000
YARD PIPING & PUMPING SYSTEM	100,000
RECIRCULATING GRANULAR MEDIA FILTERS	650,000
OUTFALL DISCHARGE SYSTEM	<u>20,000</u>
Total Construction Cost Estimate	\$1,035,000
Design and Construction Admin. (7.5%)	78,000
Administration Costs (2%)	21,000
Subtotal Cost	\$1,134,000
Contingency (10%)	<u>113,000</u>
ESTIMATED TOTAL PROJECT COST	\$1,247,000



W.O. # 91-01

DATE: APRIL 1971

DESIGNED BY: J.H.H.

NOT TO SCALE

SCHEMATIC FLOW DIAGRAM

CITY OF WASILLA

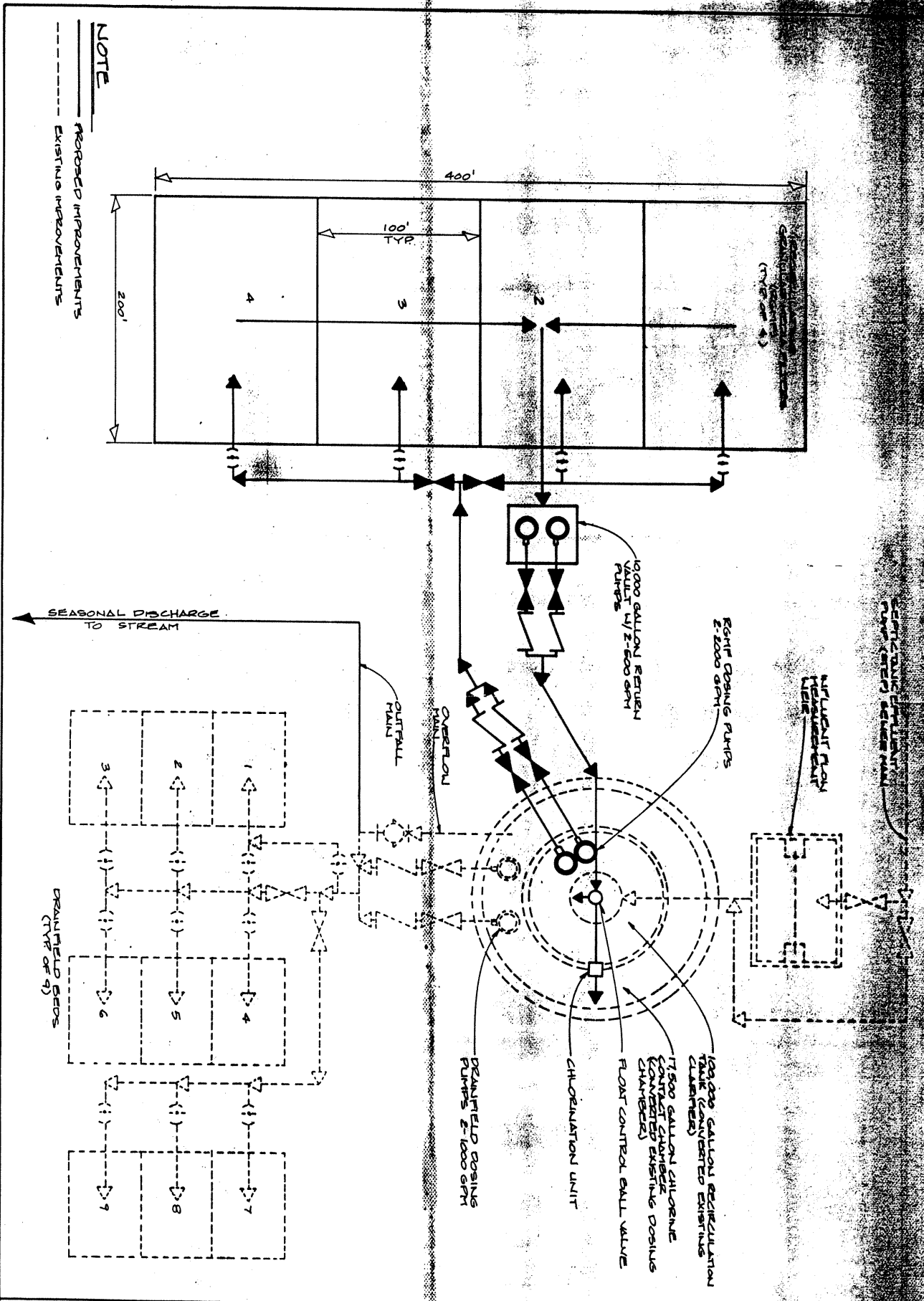
PROPOSED UPGRADE AND EXPANSION
SEWAGE TREATMENT AND DISPOSAL SYSTEM

Gilfilian Engineering, Inc.
P.O. Box 871868
Wasilla, Alaska 99687



NOTE

- PROPOSED IMPROVEMENTS
- - - - - EXISTING IMPROVEMENTS



NOTE

PROPOSED IMPROVEMENTS
EXISTING IMPROVEMENTS

SCHMATIC FLOW DIAGRAM

CITY OF WASILLA
PROPOSED UPGRADE AND EXPANSION
SEWAGE TREATMENT AND DISPOSAL SYSTEM

W.O. 91-01
DATE: APRIL 1991
DRAWN BY: J.M.
NOT TO SCALE



Gilfilian Engineering, Inc.
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