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COUNCIL MEMORANDUM NO. 90-78

TO: Wasilla City Council

FROM: Bob Gilfilian, P.E Robert Gilfilian
City Engineer

DATE: October 17, 1990

SUBJECT: Wasilla STEP Drainfield Facility
Replacement of Sewage Treatment and Disposal System

This memo describes a work plan for the development of conceptual engineering plans for the replacement of the Wasilla drainfield facility. On October 11, 1990 I had the opportunity to meet with representatives from the Alaska Department of Environmental Conservation (ADEC) to discuss the merits of a work plan to replace the drainfield facility. ADEC representatives present at the meeting included Mr. Paul Pinard and Mr. Keven Kleweno of the Mat-Su District Office and Mr. George Wilson, a permit coordinator from the Southcentral Regional Office.

BACKGROUND

The City of Wasilla is one of the first Alaskan communities to construct and operate a large municipal drainfield facility, considered to be one of the nation's largest. The drainfield facility is used as the final treatment and disposal process on the Septic Tank Effluent Pumping (STEP) sewer system serving the City of Wasilla.

The construction of the STEP sewer and drainfield facility received 85% grant funding under the U.S. EPA Innovative and Alternative (I&A) Technology Program as provided in the 1977 Amendments to the Clean Water Act (P.L. 95-217). These amendments created a program that encouraged municipalities to use innovative and/or alternative technologies for the treatment of wastewater. Provisions under Section 202(a)(3) of P.L. 95-217 allows EPA to pay 100% of the cost of modifications or replacement of any of the innovative or alternative processes which fail to meet their design performance standards.

Approved 11/14/90

The City of Wasilla monitored the performance of the drainfield facility during the first two years of operation. The monitoring program involved the monthly collection of samples from the wastewater influent, ground water and surface water bodies and analyzed these samples for several physical and chemical parameters.

On December 7, 1988, the City of Wasilla completed a Performance Evaluation Report that was based on the results of the 2 year monitor study and concluded the drainfield facility failed to meet project performance standards for hydraulic and treatment capabilities. The hydraulic loading rates resulted in premature hydraulic failure of the drainfield beds. In addition, wastewater effluent discharged from the drainfield facility caused an adverse environmental impact on the receiving ground water and surface water bodies.

As a result of the negative findings of the Performance Evaluation Report, the City of Wasilla petitioned U.S. EPA on December 22, 1988 for a 100 % modification or replacement grant for correcting the operating deficiencies of the drainfield facility. On May 23, 1989 the City of Wasilla was informed by Mr. Dick Marcum, Chief Municipal Grants & Loans for ADEC, that the U.S. EPA had denied the City's request for a 100% modification/replacement (M/R) grant. In response to EPA's negative decision, the City filed an appeal on June 23, 1989 to EPA's Grants Dispute Coordinator of Region X. On April 19, 1990 Mr. Ron Kreizenbeck, Acting Director of Water Division of Region X EPA, responded to the appeal and informed the City that EPA's previous negative determination on the M/R grant request was appropriate.

On May 15, 1990 the City requested the EPA Regional Administrator to review the negative determination reached by Mr. Kreizenbeck. The City submitted additional documentation on the progressive hydraulic failure of the drainfield beds and findings of adverse environmental impact on the ground water system at the drainfield site. On July 10, 1990 the EPA Dispute Coordinator granted the City the right to an informal conference with their technical review committee. The conference was held on September 13, 1990 at the EPA Region X Seattle office. The City presented operational data that substantiated the claim that the drainfield had failed severely in achieving its performance goals. The City is currently awaiting a determination from the EPA technical review committee.

ASSESSMENT OF EXISTING DRAINFIELD FACILITY

The Council should be aware that the existing drainfield facility has several major shortcomings that include the following:

* Limited Hydraulic Capacity - Although the 10-acre drainfield facility was originally designed to handle 440,000 gallons per day (gpd), it appears the existing system is currently at capacity of less than 150,000 gpd. Based on current operational data, the City should not allow additional users on the sewer system.

* Negative Environmental Impact - The discharge of sewage effluent into the drainfield beds has caused degradation of the quality of the ground water aquifer and surface water spring on the drainfield site. Treatment of the effluent in the soil zone beneath the beds has been documented to be minimal.

* Costly Monitoring Program - Because the discharge of effluent enters the ground water system, the ADEC disposal permit requires extensive sampling and testing of the receiving ground waters. Unlike a surface water discharge which typically requires monitoring at one (1) location for a limited number of test parameters, a discharge to the ground water requires monitoring at many locations and testing for a large number of chemical parameters. As a result, the cost for permit monitoring is many times higher for ground water discharges.

* Limited Expansion Capability - The drainfield facility is located on a 40-acre parcel. Based on hydrogeological information on the remaining available acreage at this site, the subsurface soil and ground water conditions are not suitable for drainfield expansion unless expensive pre-treatment of the effluent applied to the beds is provided.

PROPOSED REPLACEMENT SEWAGE TREATMENT/DISPOSAL SYSTEM

In consideration of the above shortcomings, it is strongly recommended alternatives be evaluated for the replacement of the drainfield facility in the very near future. The drainfield beds are currently undergoing a progressive failure process whereby the hydraulic capacity of the usable beds are being reduced by biological clogging in the rock filter media. Under such conditions the beds will eventually clog and cause raw sewage to backup and possible daylight on the ground surface.

The I&A drainfield system should be replaced with a conventional sewage treatment and disposal system that will discharge treated effluent to the surface water located on the City's 40-acre site. The replacement treatment system could utilize the existing improvements located at the 40-acre site that include the flow measurements weir, clarifier, dosing chamber, aerobic digester, sludge drying beds and control building. A secondary treatment plant would be needed with a disinfection processing unit. The existing drainfield beds could be used as a backup system for emergency situations, if needed.

Several alternatives for a secondary treatment process need to be evaluated to determine the most cost effective and reliable system to treat the City's STEP wastewater effluent. The disposal system would consist of a single point discharge into the headwaters of the wetland stream located along the southern boundary of the City's 40-acre parcel.

PROPOSED WORK PLAN FOR DEVELOPMENT OF CONCEPTUAL PLANS

The development of conceptual engineering plans for the replacement sewage treatment/disposal system should be done on a phased approach. Each phase will involve a series of specific tasks. A description of individual tasks and related budget are given as follows:

TASK I Discharge Permitting Process

It is essential that a wastewater discharge permit be obtained from ADEC to determine if the proposed concept of surface water discharge is feasible at the City's 40-acre site. Under this task, a discharge permit application will be prepared and submitted to ADEC for processing purposes. The permit application will include information obtained from the other tasks described below. Presentation of the permit application may be required for public hearing purposes.

TASK II Evaluation of Receiving Stream

The hydrological characteristics of the surface water stream will be determined under this task. A reconnaissance study will be undertaken to determine physical location of the stream with respect to adjacent properly ownership. Stream flow measurements will be obtained and used to determine the assimilation capacity of the water body and evaluate the environmental impact from the proposed treated effluent discharge.

TASK III BENCH TESTING OF SEWAGE EFFLUENT

The quality of the sewage effluent received at the drainfield facility has unique characteristics compared to conventional sewer system's effluent. The main difference is that the clarifier receives primary treated sewage that was pre-treated in septic tanks. Treatment of septic tank effluent may involve unique processes to achieve secondary treatment standards that will be required under the discharge permit issued by ADEC. Under this task, effluent samples from the clarifier will be collected and tested to determine its characteristics. The effluent samples will be used in a series of bench tests that will evaluate various treatment processes.
processeas.

TASK IV Preparation of Conceptual Engineering Plans

Based on information obtained from Task II & III, a conceptual design for the replacement treatment and disposal processes will be prepared. The engineering plans will be sufficient in detail for ADEC review purposes and submitted with the discharge permit application prepared under Task I. The replacement sewage treatment and disposal system will be conceptually designed to handle a projected initial flow of 250,000 gpd, and designed for expansion to allow future flow up to 1 million gallons per day. The design will use technology that is reliable, cost effective, flexible to allow for expansion, and capable to adequately treat the sewage to minimize environmental impact.

BUDGET SUMMARY

TASK I:	Discharge Permitting Process	$ 3,640.00
TASK II:	Evaluation of Receiving Stream	$ 5,400.00
TASK III:	Bench Testing of Sewage Effluent	$ 4,900.00
TASK IV:	Preparation of Conceptual Engineering Plans	$ 6,020.00
	BUDGET TOTAL	**$19,960.00**

As directed by Council, we are prepared to initiate the above work plan under the City engineering work order process. Services are rendered on a time and expense bases for a cost not to exceed the above budget without prior Council approval. During the October 22, 1990 I will make a verbal presentation to the Council on this work plan. Additional technical information including slides will be presented. Questions you may have on this memo will be addressed at that time.

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FAX COVER SHEET

FAX NUMBER: (907) 373-5686

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DATE: 10/17/90

NUMBER OF PAGES (INCLUDING COVER SHEET): 3

FIRM/COMPANY: City of Wasilla FAX# 373-0788

ATTENTION: Margie

REGARDING: Bob's Council Memo

MESSAGE:

Please insert these revised pages.

Thanks

Bob

IF THERE ARE ANY PROBLEMS WITH THE FAX COPY YOU HAVE RECEIVED PLEASE CALL US AS SOON AS POSSIBLE AT (907) 376-3005.