IN PLANNING
ATMENT FACILITY

, 1989, at The University of Georgia. Kathryn J.
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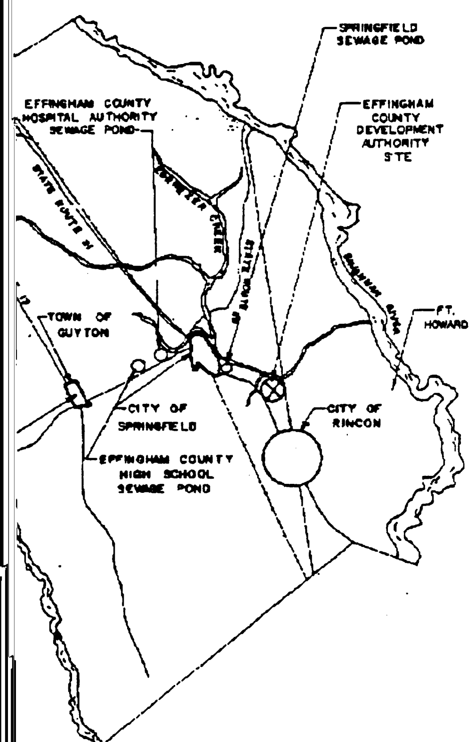

astewater Treatment Facilities.

illy to serve a major portion of Effingham
owest possible cost wastewater treatment
est available technology for protecting the
benezer Creek. The balance of this paper
chnical details for beginning construction
a 0.5 mgd modern extended aeration treat-
an hydrographic control release pond.

SPRINGFIELD

a small town with a population of ap-
people. It has 500 current water and sewer
late 1960's, the City constructed a 6.5 acre
th 0.12 mgd capacity to serve the residents
increased population in Effingham Coun-

reased demands on the City of atment facilities. In 1986, the state ansion to 170,000 gallons per day to d to implement a hydrographic con- he Springfield interim expansion d into three cells in series with the baffles. A large primary cell is er secondary cells which treat the phased isolation concept. It is meet effluent limitations of 40 mg/l d solids. The pond is 7.5 feet deep w monitoring device at the effluent

anning and Development Commis- of Springfield and surrounding area ulation between now and the year gfield has been under an upgrade tate Water Quality Standards for o low stream flow in the creek. h the following three alternatives for ewater discharge requirements be- ow flows in Ebenezer Creek: 1) existing facility to another receiving flow and less stringent waste load the existing pond and release the when stream flows are above 20 cfs; e existing effluent by land applica-

as rejected because the only receiv- ssimilation capacity than Ebenezer h River which was too far from ternatives considered were as fol- nent plant with a hydrographic con- g site; 2) secondary treatment plant trol release at the Development nd treatment system. The above ted considering economic and en- the alternatives met Georgia En- Division (GA EPD) water quality

n economic evaluation of the alter- The total annual cost, which is used of the original cost amortized over e of 7% and the annual operation

: Evaluation Of Alternatives

	NO. 2	NO. 3
	2,305,000	2,455,500
	145,600	179,200
	1,542,482	1,898,440
	3,847,482	4,353,940

Table 2. Rank Of Alternatives

Categories	NO. 1	NO. 2	NO. 3
Environmental	2	1	2
Monetary Costs	1	2	4
Contribution to Objective	2	2	2
Energy and Resources Use	1	1	3
Reliability	1	1	1
Acceptability	3	1	1
Totals	10	8	16

The environmental effects presented in Table 2 that pertain to each of the alternatives are as follows: (1) each of the alternatives would lead to an improvement in the water quality of Ebenezer Creek; (2) each alternative may have temporary adverse environmental effects during construction; (3) none of the alternatives would have significant impacts on ecological systems, air quality or aesthetics; (4) none of the alternatives would have significant secondary environmental effects;(5) the land treatment alternative may have a temporary effect on some terrestrial wildlife; (6) the land treatment alternative would require the commitment of approximately 85 acres of land, pre-empting alternative uses in the future; (7) the treatment plant at the existing site alternate would have an impact on the community growth patterns and land use trends by discouraging the continuance of residential growth in the area.

SELECTED PLAN

Alternative 2, which consists of abandoning the existing site and building a secondary treatment plant with an HCR system, ranks higher than both the other alternatives. The added costs associated with moving the plant downstream are overridden by the environmental and acceptability factors. Building a treatment plant and nine acre storage pond at the existing site would discourage the residential development trend occurring in this area. This trend includes a second and third phase for the residential development just south along Ash Street Extension as well as a multi-family development just across the street. The Development Authority site had no developments surrounding it and was used in the past for timber production. The downstream sites require a 90-day holding pond instead of 145 days due to higher stream flows.

The other factor which weighed toward Alternative 2 was acceptability by the public. The existing pond site is located within Springfield, and complaints have been made concerning the existing odor. Any expansion to the facility in its current location would not enhance its acceptability to the existing residential development surrounding it. The Development Authority site is very secluded with little chance of there being any problems of acceptability. Moreover, the Development Authority wants a treatment plant at their site.

DESCRIPTION OF TREATMENT SYSTEM

Abandoning the existing treatment pond will involve removal of the influent and effluent structures, baffles, and piping between the pump station and influent structure. The pond will eventually be converted to a City fish pond and recreational park.

The existing pneumatic injector pump station will be rehabilitated into a triplex submersible pump station. This will require demolition of the existing pump house, conversion of the existing dry well into a wet well, and installation of concrete slab and hoist beam. The new pump station will have one large pump capable of pumping the 20-year peak flow (800 gpm) and two smaller pumps with 400 gpm capacity.

The twelve inch force main will run along Ash Street Extension, power easements, State Route 21, and property lines. Some easements will be required along the force main route because of restrictions in the amount of usable road right-of-way. The force main will discharge into a concrete chamber with steps which will be used for releasing the hydrogen sulfide gas prior to it entering the aeration basin.

The extended aeration treatment plant will be designed utilizing the following criteria and as shown in Figure 2 - Process Flow Diagram:

Flow	0.50 MGD	
Influent:	BOD_5	250 mg/l
	NH_3N	30 mg/l
Effluent:	BOD_5	25 mg/l
	NH_3N	5 mg/l
	D.O.	2 mg/l

A two channel aeration basin will be constructed above ground with ample room for the future addition of channels, if necessary.

The aeration basin effluent will enter a forty foot diameter clarifier and then a chlorine contact chamber (30 minutes retention time). Sludge will be pumped utilizing two 300 gpm submersible pumps. A thirty foot diameter aerobic digestor will be utilized prior to the sludge drying beds. The sludge drying beds will have approximately 8,750 square feet or 1.75 square feet/capita.

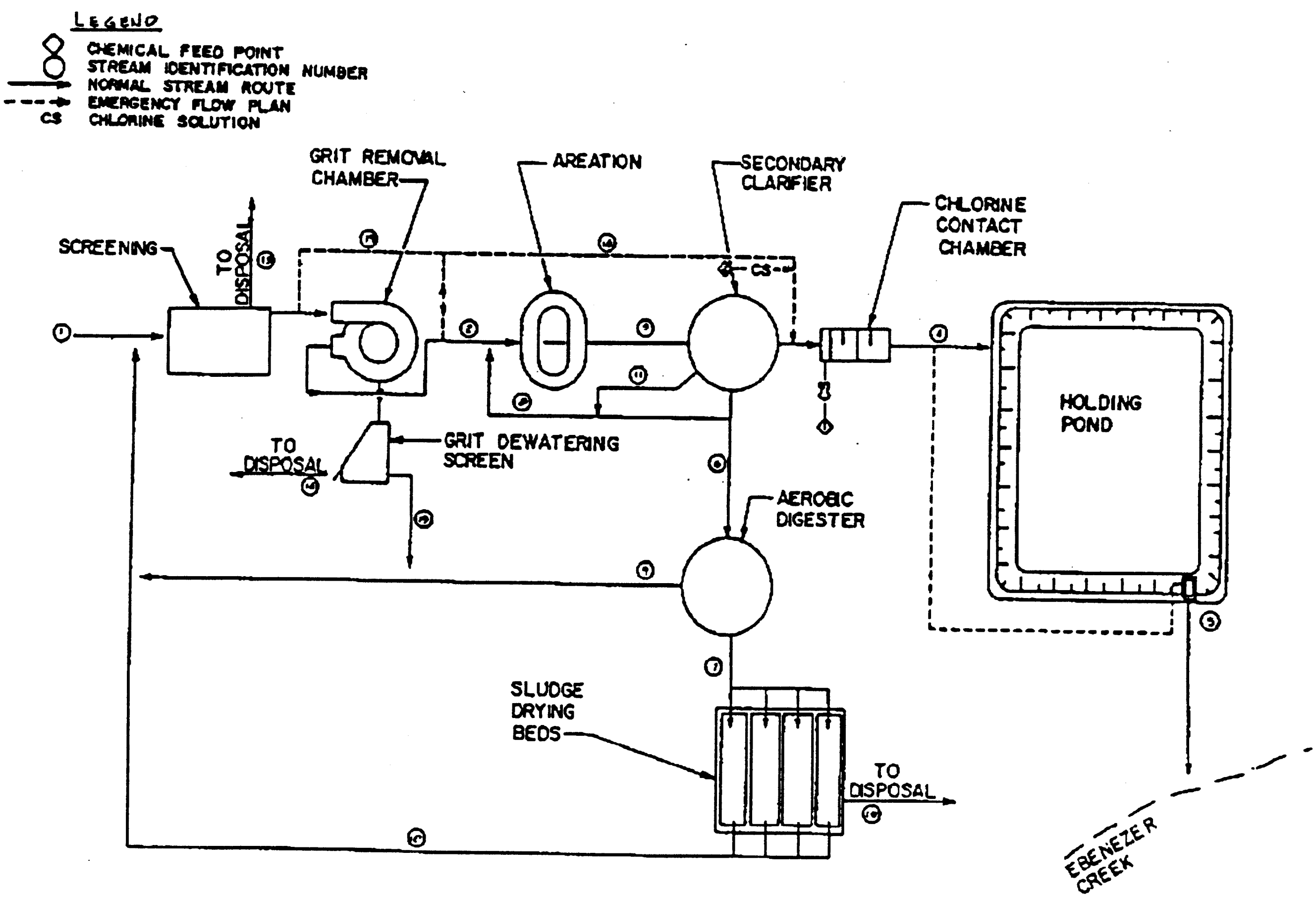

Figure 2. 0.5 MGD Wastewater Treatment Facility.

A stage-discharge relationship will be developed for Ebenezer Creek at the site. The treatment plant effluent will gravity flow into a junction box with manually operated slide gates. When the creek flows are sufficient for release of all the effluent, the slide gate will be opened all the way. When only a portion of the flow is allowed to enter the stream, the slide gate will be partially closed and the remaining effluent will flow into the storage pond pump station. When no discharge is allowed, the slide gate will be completely closed. 100% of the effluent will enter the pond. The United States Geological Survey will operate a gaging station to give stream flow readings continuously via telephone line to the sewage treatment plant. When stream flows are high, the pond effluent and plant effluent will be released by gravity simultaneously in accordance with the NPDES permit.

The storage pond will be approximately nine acres and have a depth of eleven feet. A one-and-one-half foot minimum depth will be maintained at all times to minimize maintenance requirements. Two feet of freeboard will be provided. This pond is sized for a 90-day storage volume of the projected 5-year flows.

A concrete and fiberglass flume structure with flow recorder will be constructed along the common treatment plant and storage pond effluent channel. This will allow the treatment facility effluent flow rate to be monitored on a continuous basis.

INDIVIDUAL VERSUS COMBINED FACILITIES

The cost of the individual facilities to the four cooperating governments is shown in Table 3. The cost of a joint project lead by Springfield is shown in Table 4.

Table 3. Individual Construction Costs

	Type of Facility	Design/Flow (mgd)	Est. Constr. Cost
Guyton	55 acres Land Treatment	0.13	$1,500,000
School Board	25 acres Land Treatment	0.06	$1,000,000
Springfield	35 acres Secondary Treatment and HCR	0.50	$2,000,000
Industrial Authority	20 acres Secondary Treatment and HCR	0.50	$2,000,000
Totals	135 acres	1.19	$6,500,000

Table 4. Joint Construction Costs.

	SEWAGE PLANT	TREATMENT TRANSPORT SYSTEM COST	IMPACT FEES
Guyton	.0	$ 150,000	$ 50,000 (1989)
School Board	.0	$ 600,000	$ 700,000 (1989)
Springfield	.5 mgd 20 acre Secondary Plant and HCR	$2,000,000	$ 592,000 (future)
Industrial Authority	.0	$ 300,000	$ 250,000 (future)
Totals	.5 mgd 20 acre Secondary Plant and HCR	$3,050,000	$1,984,000

CONCLUSIONS

It is clear from the above analysis that individual facilities cost twice as much as a joint facility and require over six times as much land. Rural counties may not have the resources to initiate the advanced technology to protect our water quality resources without combining efforts. The joint project described here permits the use of Ebenezer Creek at a point where the stream flow was the highest or where the tributary watershed was largest. The pooling of resources resulted in at 50% - 70% less cost than building individual treatment plants. A modern wastewater treatment facility for Springfield, the School Board, the Development Authority and Guyton individually would not have been possible or would have resulted in excessive public debt and high sewage bills. All government agencies providing public water and sewer services should come to the table with coordinated planning efforts based on economics and environmental resources. The goal of all public agencies should be to provide public services at the lowest possible cost, while protecting our water resources.