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THE CODORUS CREEK WASTE WATER MANAGEMENT STUDY. ANALYSIS OF CON--ETC(U)
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THE Codorus Creek WASTEWATER MANAGEMENT STUDY

APRIL 1973

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ANALYSIS OF CONCLUSIONS: SUMMARY OF FINDINGS AND RECOMMENDATIONS

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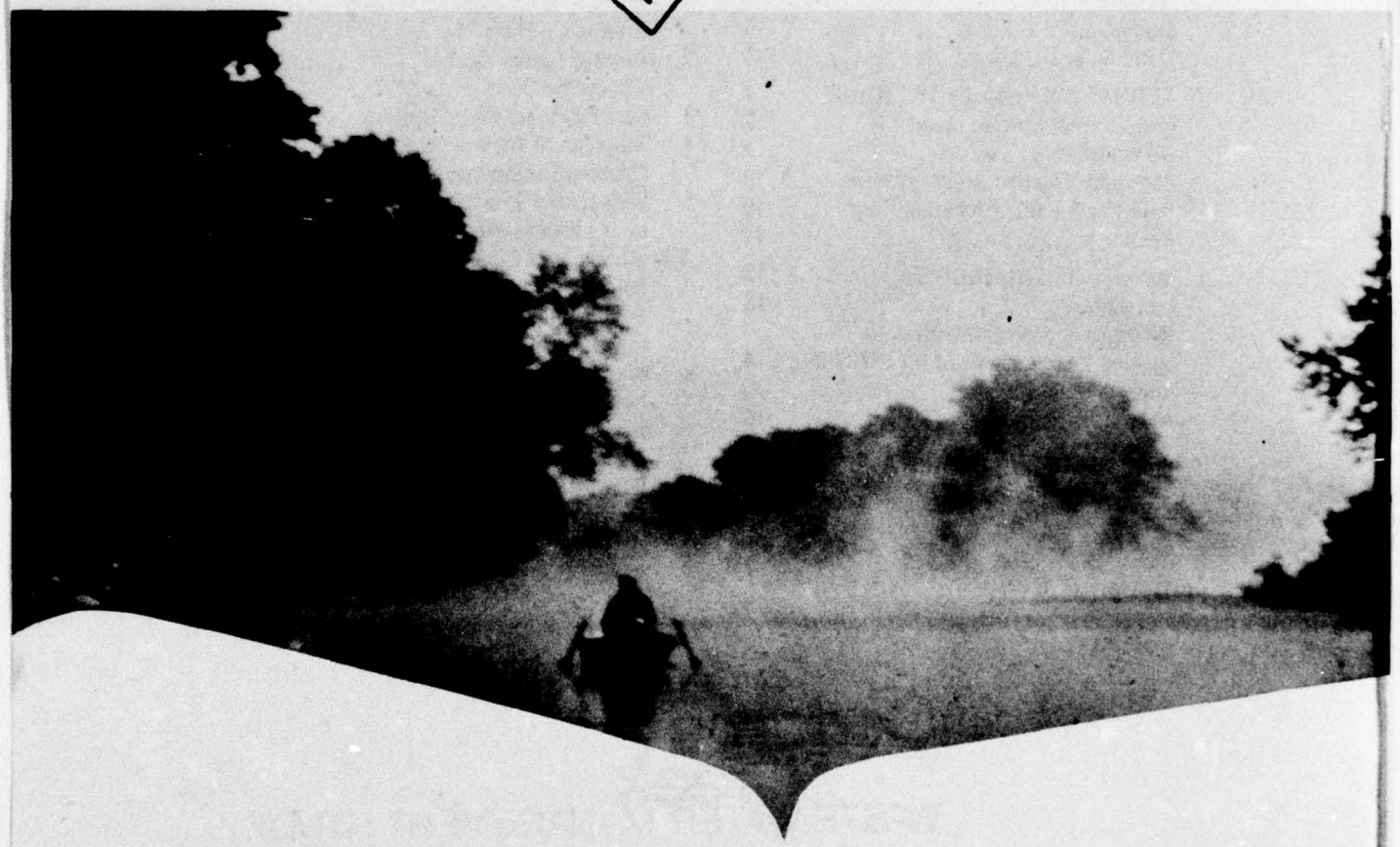


PROLOGUE

The Codorus Creek Wastewater Management Study's *Summary Report and Conclusions*, completed in August 1972, outlined the Alternatives for Choice which were developed to solve the water quality and related problems of the Codorus Creek Basin.

This report, *Analysis of Conclusions: Summary of Findings and Recommendations*, contains the Summary of Findings and Recommendations of the District Engineer, which are the judgments on the study made by the District Engineer, the reasoning behind them, and his recommendations to the residents of the study area for action to be taken by them.

CHAPTER I RECOMMENDATIONS TO RESIDENTS OF THE STUDY AREA

General Discussion

The presently degraded water quality conditions and existing Federal and Commonwealth legal requirements require immediate action to implement a comprehensive regional wastewater management plan in the Codorus Creek Basin.

Based on careful analysis of the information developed by the study, including input from the Environmental Protection Agency, the Commonwealth of Pennsylvania, the York County Planning Commission, and the concerned public, three of the six alternative plans delineated in this report warrant further consideration by study area residents as means for achieving the goals of the Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500. The degree to which all six plans conform to the planning requirements of P.L. 92-500, together with the effects which all six plans produce, are presented and discussed in Chapter IV, Summary of Findings.

Having analyzed my authority, as contained in P.L. 89-298 and Section 235 of P.L. 91-611, and P.L. 92-500, I believe that implementation of a wastewater management plan in the Codorus Creek Basin can best be accomplished now under the provisions of P.L. 92-500, which envisions a regional wastewater management agency and Federal grants under the aegis of the Environmental Protection Agency. I further believe that the choice of a plan should properly be made at the local level. Therefore, in consideration of the findings of this study, I recommend:

Specific Recommendations

1. That the County Commissioners of York County immediately adopt one of the following plans and that they seek certification for funding under P.L. 92-500:

   a. The December Plan
   b. The Basic All Water Plan
   c. The Basic All Land Plan;

(Table 1 is presented showing premise sets which facilitate choice among alternative plans in order to assist the Commissioners in their decision. The effects included in these premise sets may or may not be of equal importance or significance. The County Commissioners and study area residents should arrive at the relative weight to be assigned each effect during their deliberations. A more detailed discussion of these effects, primarily from the perspective of the study area, is presented in Chapters IV and V. It should be noted that when the selected plan is certified by the Commonwealth of Pennsylvania and EPA, other impacts and cumulative effects of this and other similar plans outside the study area will also need to be considered. These other impacts and cumulative effects will be addressed further during the normal review process of this report.)

2. That a county wastewater management authority be established by the County Commissioners of York County to perform detailed planning for and supervise the implementation of the selected plan;

3. That the county wastewater management authority, upon its formation, enter into discussions with the P. H. Glatfelter Company with a view toward reaching agreements on industrial reuse of suitable treated wastewater effluent from the City of York, an option which could be incorporated with any alternative selected;

4. That planning be undertaken by the county wastewater management authority to develop and implement a comprehensive stormwater management plan for the study area;

5. That implementation of the selected plan be initiated immediately in accordance with a timetable established by the Commonwealth of Pennsylvania; and

6. That this report be transmitted to Congress for its information.

GERALD M. BOYD
LTC, Corps of Engineers
Acting District Engineer

TABLE 1

PREMISE SETS FOR CHOICE AMONG ALTERNATIVE PLANS

PREMISE SET I	PREMISE SET II	PREMISE SET III	PREMISE SET IV
In Order To Choose The Plan To Meet Current Standards Over All Other Plans –	In Order To Choose The December Plan Over All Other Plans –	In Order To Choose The Basic All Water Plan Over All Other Plans –	In Order To Choose The Basic All Land Plan Over All Other Plans –
A Study Area Resident Must Prefer To:	A Study Area Resident Must Prefer To:	A Study Area Resident Must Prefer To:	A Study Area Resident Must Prefer To:
1. Ameliorate the anxiety which has been expressed by over 8,000 study area residents about the prospect of public purchase of between 66 and 330 residences, and purchase or other control of between 40 and 200 farms consisting of between 4,000 and 17,000 acres of land; and	1. Obtain a substantial improvement in water quality consistent with the 1985 goals of P.L. 92-500;	1. Obtain a substantial improvement in water quality consistent with the 1985 goals of P.L. 92-500;	1. Obtain a substantial improvement in water quality consistent with the 1985 goals of P.L. 92-500;
2. Implement the most institutionally feasible of all the alternative plans.	2. Preserve and maintain, either through direct purchase or other suitable arrangement with farmers, a minimum of 4,000 acres of open space against urban sprawl;	2. Ameliorate the anxiety which has been expressed by over 8,000 study area residents about the prospect of public purchase of between 66 and 330 residences, and purchase or other control of between 40 and 200 farms consisting of between 4,000 and 17,000 acres of land; and	2. Save the study area public $126,000 annually over the cost of the second least costly plan, from a local viewpoint, the Plan To Meet Current Standards;
And Be Willing To:	3. Exploit the potential to increase farmer income or study area public revenue through agricultural recycling of nutrients on 1,800 acres due to gains in productivity or reduced costs;	3. Experience the satisfaction of applying the best practicable technology.	3. Preserve and maintain, either through direct purchase or other suitable arrangement with farmers, a minimum of 17,000 acres of open space against urban sprawl;
1. Increase study area costs $126,000 annually (from $3,303,000 to $3,429,000) over the least costly alternative, the Basic All Land Plan;	4. Experience the satisfaction of applying the best practicable technology; and	And Be Willing To:	4. Exploit the potential to increase farmer income or study area public revenue through agricultural recycling of nutrients on 10,400 acres due to gains in productivity or reduced costs; and
2. Forego the opportunity to approach the water quality goals of P.L. 92-500; and	5. Implement a regional wastewater management plan which would combine both land oriented and water oriented advanced treatment technologies.	1. Increase study area costs $2,152,000 annually (from $3,303,000 to $5,455,000) over the least costly alternative, the Basic All Land Plan.	5. Experience the satisfaction of applying the best practicable technology.
3. Forego the satisfaction of applying the best practicable technology.	And Be Willing To:		And Be Willing To:
	1. Increase study area costs $1,617,000 annually (from $3,303,000 to $4,920,000) over the least costly alternative, the Basic All Land Plan; and		1. Accept and increase the anxiety which has been expressed by over 8,000 study area residents about the prospect of public purchase of 330 residences, and purchase or other control of 200 farms consisting of 17,000 acres of land.
	2. Accept the anxiety which has been expressed by many study area residents about the prospect of public purchase of 66 residences and purchase or other control of 40 farms consisting of about 4,000 acres of land.		

CHAPTER II INTRODUCTION

Problem

The Codorus Creek Basin, shown in Figure 1, has an area of 280 square miles and is located in southeastern Pennsylvania, some 25 miles south of Harrisburg, Pennsylvania. It has a current population of 188,000 which is projected to grow to 323,000 by the year 2000. The major economic activities are the manufacturing and service industries; however, the character of the land is predominantly rural with much of it devoted to farming.

The Codorus stream system is severely degraded, with specific problem areas denoted in Figure 2. The system supports only two water uses, wastewater dilution and water supply. By 1985, if nothing is done, the available surface water will not be able to meet the water demands of the basin. To

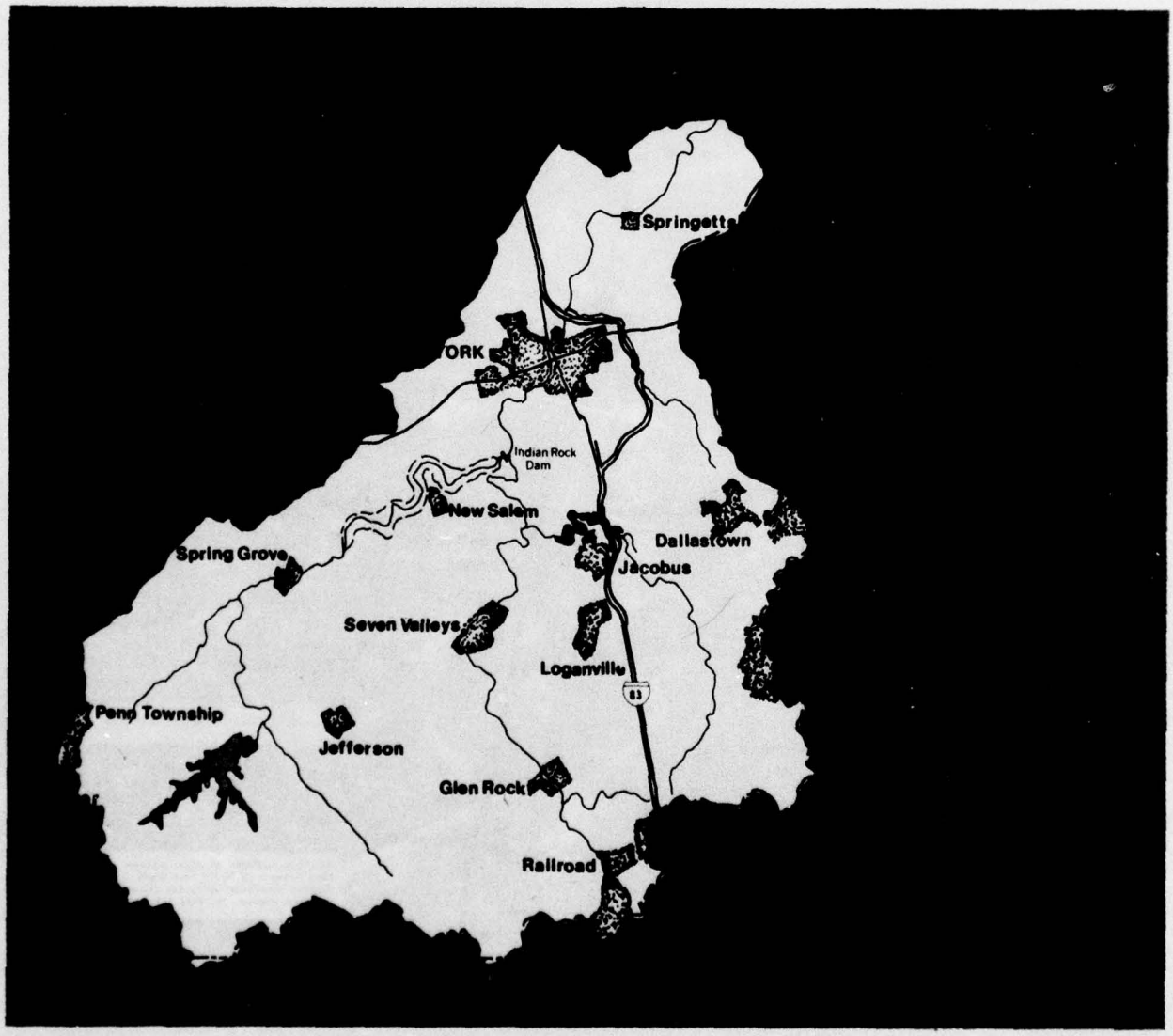


Figure 1. Codorus Creek Basin Study Area

remove the man-made constraints on the Codorus and to free it for more productive use, measures must be undertaken to revitalize and renew this stream and its tributaries.

Study Objective

The objective of the Codorus Creek Wastewater Management Study is to recommend those actions which are necessary to significantly improve the quality of the waters of the creek to the extent that they can provide a basis for the restoration of natural environmental values while simultaneously serving the economic and social needs of the people.

To achieve this objective, it was necessary to establish a series of study goals. These are:

–To formulate technical solutions leading to the definition of the term "significant improvement in water quality;"

–To keep open options for the future by displaying and carrying through the planning

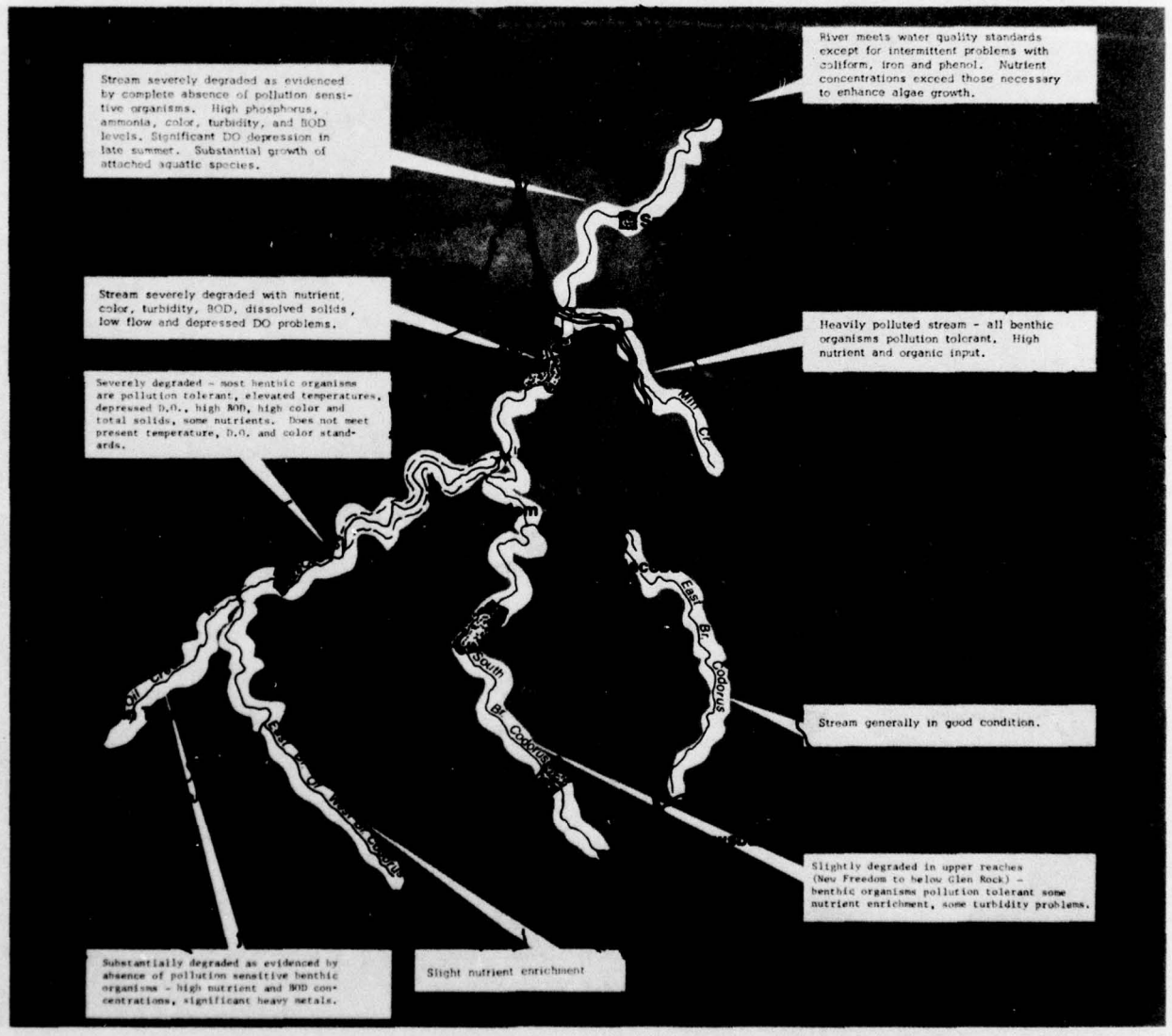


Figure 2. Existing Water Quality Conditions

process a range of technical choice based on the concepts of water process treatment and land application treatment;

—To promote, through comprehensive planning, the rational and integrated management of water resources; and

—To plan and provide guidance for the implementation of a wastewater management program.

Methodology

All alternative plans considered during this study were designed to meet the needs of the study area through the year 2000. In addition, the study developed a framework to which those implementating the plan could turn for a projection of what facilities would be required in the period from 2000 to 2020. No alternatives were considered which would do less than satisfy the present water quality standards of the Commonwealth of Pennsylvania.

The Baltimore District of the Corps of Engineers had overall responsibility for managing the study. To insure sound, coordinated planning in a short time frame, a multi-agency study management structure, as depicted in Figure 3, was established.

Planning in the Codorus Creek Wastewater Management Study incorporated two separate, but concurrent and complementary, processes.

The first process was the formulation of a plan, through screening and modification of alternative solutions, by the Policy Committee, with input from the Citizens Advisory Committee and the Technical Advisory Committee. This plan came to be known as the December Plan. Due to time constraints, the data upon which Policy Committee decisions were based were often not as complete as desirable. Given this, it was possible that the December Plan might inadvertently foreclose future choices, which in light of more refined information could be superior to the December Plan.

To counteract this shortcoming, the other aspect of the planning process was to formulate two basic alternative solutions building on the fundamental advanced wastewater treatment technologies of land application and water process treatment. This portion of the planning process was the responsibility of the Corps of Engineers and, although it proceeded concurrently with the Policy Committee process, the plans developed during this stage were retained throughout the remainder of the study and were in fact continually refined as better data became available.

The output of the dual plan formulation process was the "Alternatives For Choice," a range of technological alternatives which would provide for better evaluation by all and a more rational decision by study area residents as to which alternative plan would be implemented.

Figure 3. Study Management Organization

CHAPTER III ALTERNATIVE PLANS FOR CHOICE

The Alternatives For Choice are a collection of six alternative plans. Five of these meet the study objective; a sixth plan is presented which would meet the existing water quality standards but would not employ the maximum practicable technology which is available. Figure 4 illustrates these alternatives. Figure 5 and Table 2 present cost comparisons of all six plans,[1] including the probable distribution of costs to the study area, the Commonwealth of Pennsylvania, and the Federal Government.[2]

Plan to Meet Current Standards

The plan which would meet existing standards incorporates the upgrading of existing or programmed sewage treatment plants in the study area. The treatment level attained by this plan would be below that of the other five alternatives, particularly in nutrient removal. The plan has an estimated capital cost of $30,543,000, with a corresponding total average annual cost of $4,699,000. The local share of the average annual cost would be about $3,429,000.

December Plan

The December Plan, which was the plan developed by the Policy Committee and Citizens Advisory Committee, is one of the five plans which provides for the maximum feasible water quality under existing technology. Upper basin wastewater would be spray irrigated for advanced waste treatment; lower basin wastewater would receive advanced treatment by water process treatment

TABLE 2

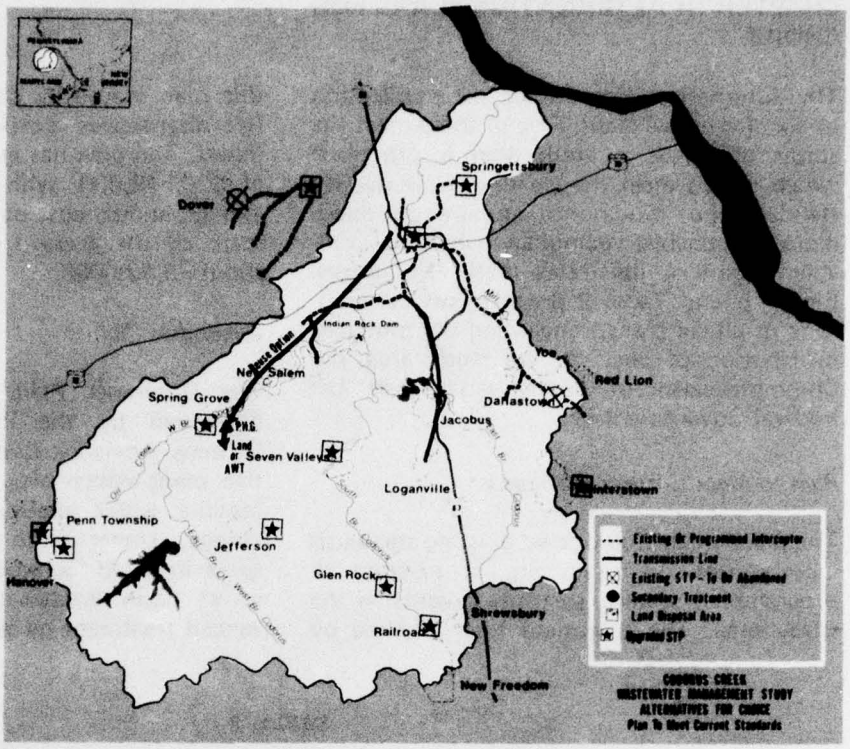
CODORUS CREEK WASTEWATER MANAGEMENT STUDY
AVERAGE ANNUAL COST OF ALTERNATIVE PLANS[1]
(In millions of dollars)

Alternative Plan	Study Area Share			Commonwealth of Pennsylvania Share	Federal Share	Total
	Interest & Amort.	O & M	Total			
	(1)	(2)	(3)	(4)	(5)	(6)
Plan to Meet Current Standards	.1	3.3	3.4	.2	1.1	4.7
December Plan	.4	4.5	4.9	.6	3.1	8.6
Basic All Water Plan	.4	5.1	5.5	.6	2.9	9.0
Basic All Land Plan	.5	2.8	3.3	.7	4.0	8.0
Modified All Land Plan	.6	3.6	4.2	.9	4.6	9.7
Modified All Water Plan	.5	6.5	7.0	.8	3.8	11.6

[1] Assumes that the Federal Government will finance 75 percent of the capital cost, the Commonwealth of Pennsylvania 15 percent of the capital cost, and the Study area 10 percent of the capital cost plus 100 percent of the operation and maintenance cost of any of the alternative plans. Annual cost computed on the basis of six percent interest over 50 years.

[1] The costs of the December Plan and the Basic and Modified All Land Plans are based on the assumption that the 4,000 to 17,000 acres of system required lands will be acquired in fee simple. This assumption was made to facilitate cost comparisons and should not imply that this is either the sole or preferred method of gaining access to or control over land needed for treatment purposes. The choice of method remains with the study area residents.

[2] The local share has been computed assuming that Federal participation in the cost of system construction would be the full 75 percent allowed by P.L. 92-500, and that the Commonwealth of Pennsylvania's share would be 15 percent. All other system costs would be borne by local interests.



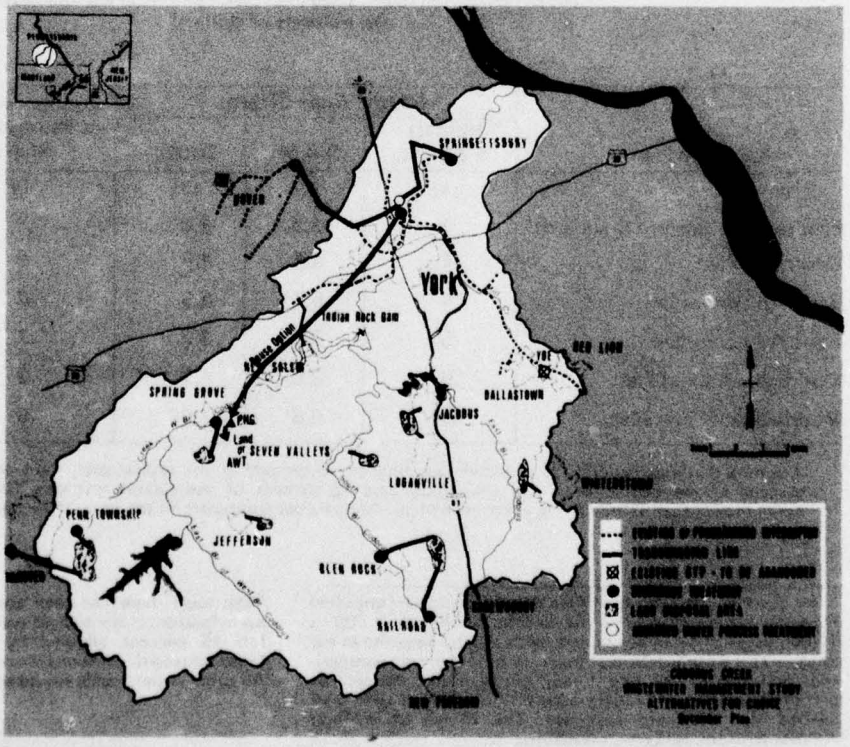
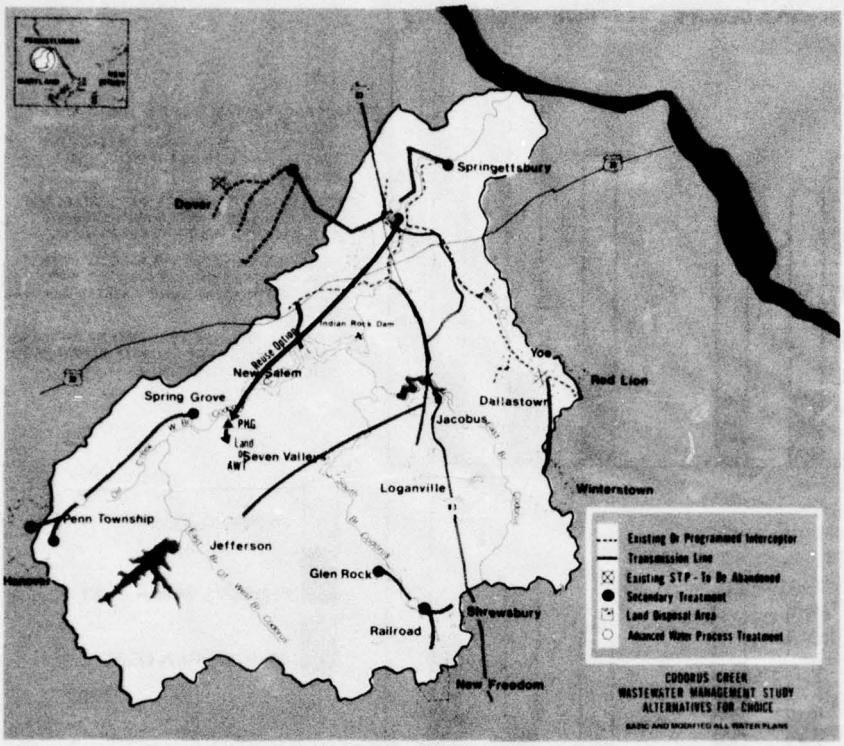
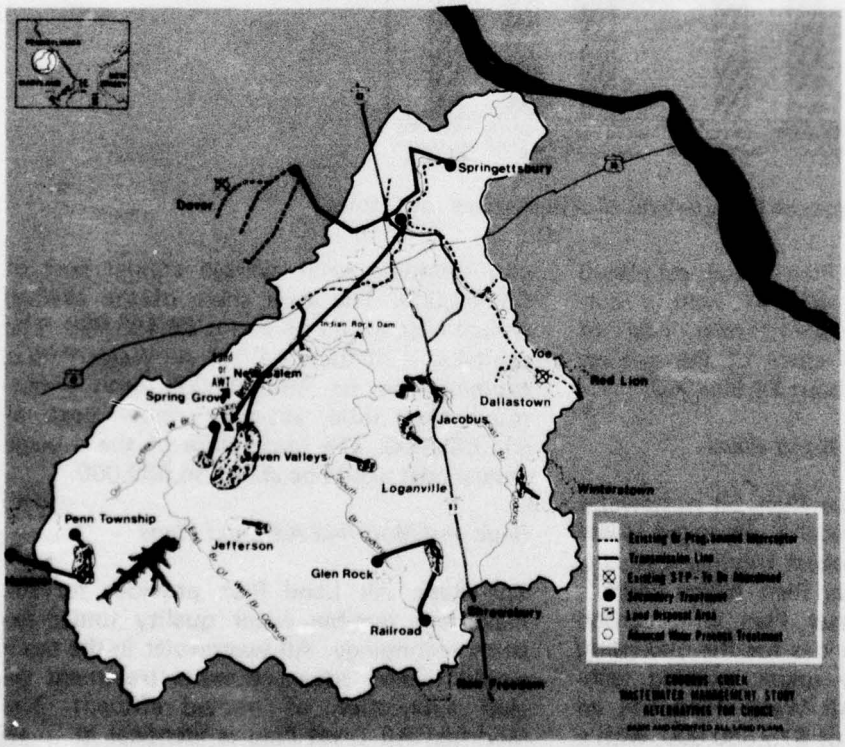


Figure 4. Alternatives For Choice


Springettsbury
Dover
Indian Rock Dam
Yoe
Red Lion
New Salem
Spring Grove
Dallastown
Jacobus
PMG
Land
Seven Valleys
Loganville
Winterstown
Penn Township
Jefferson
Glen Rock
Railroad
Shrewsbury
New Freedom
Existing Or Programmed Interceptor
Transmission Line
Existing STP - To Be Abandoned
Secondary Treatment
Land Disposal Area
Advanced Water Process Treatment
CODORUS CREEK
WASTEWATER MANAGEMENT STUDY
ALTERNATIVES FOR CHOICE
BASIC AND MODIFIED ALL WATER PLANS


Springettsbury
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New Freedom
CODORUS CREEK
WASTEWATER MANAGEMENT STUDY
ALTERNATIVES FOR CHOICE

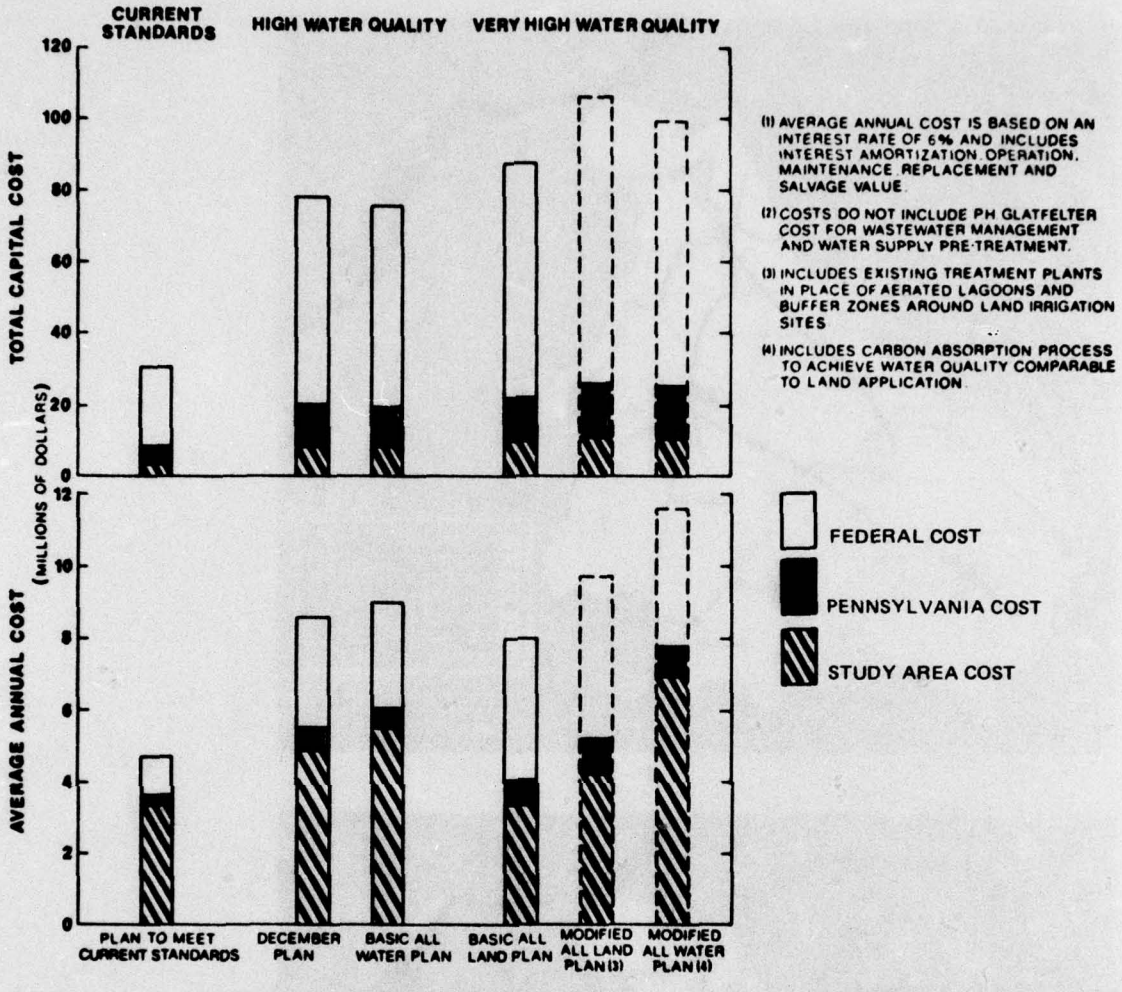

Figure 5. Cost–Performance Comparison of Alternatives for Choice

plants. The December Plan has an estimated capital cost of $78,166,000 with a corresponding total average annual cost of $8,567,000. The local share of the average annual cost would be about $4,920,000.

Basic and Modified All Water Plans

With the Basic All Water Plan, all wastewater in the basin would receive advanced waste treatment in water process treatment plants. The Modified All Water Plan, which consists of the Basic All Water Plan with carbon adsorption added, provides for the maximum feasible water quality under existing technology. The Basic All Water Plan has an estimated capital cost of $75,680,000, with a corresponding total average annual cost of $8,961,000. The local share of the average annual cost would be about $5,455,000. The capital cost of the Modified All Water Plan is estimated to be $99,334,000 with a corresponding total average annual cost of $11,635,000. The local share of the average annual cost would be about $6,989,000.

Basic and Modified All Land Plans

The Basic All Land Plan provides for the maximum feasible water quality under existing technology. All wastewater in the basin would receive advanced waste treatment via land application of treated effluent. The Modified All Land Plan is identical in treat-

ment performance to the Basic All Land Plan. The difference in cost between the two is due to the fact that the Modified All Land Plan retains all existing treatment plants and includes more residential acquisition and relocations. The Basic All Land Plan has an estimated capital cost of $87,833,000 with a corresponding total average annual cost of $8,044,000. The local share of the average annual cost would be about $3,303,000. The capital cost of the Modified All Land Plan is estimated to be $105,968,000 with a corresponding average annual cost of $9,682,000. The local share of the average annual cost would be about $4,239,000.

Reuse

As shown in Figure 4, the Reuse Option is applicable to any of the Alternatives For Choice. Reuse embodies the concept of recycling wastewater to make it more productive and simultaneously freeing other water for beneficial uses, such as water supply and recreation.

The key to successful implementation of reuse is the P.H. Glatfelter Company, since this large manufacturer of paper products generates 59 percent of the industrial wastewater in the study area. Reuse would involve piping secondary treated wastewater to the P.H. Glatfelter plant where it would be used as raw process water for papermaking. It would then receive advanced waste treatment by either water process or land application. Other industries in the study area could similarly be connected to the system.

To illustrate the potential economic benefits of reuse, Table 3 shows the estimated costs of the Alternatives For Choice with and without reuse.

A direct result of implementing the Reuse Option is an increase in the amount of available industrial water supply. The value of this water is not included or reflected in Table 3. The only beneficial effect of reuse reflected there is the saving in advanced waste treatment costs resulting from reusing secondary effluent. The entries in Table 3, therefore, provide the answer to the following question: "Does the saving in advanced waste treatment costs resulting from reuse offset the cost of adding the reuse facilities to the Alternatives For Choice?" Comparing the average annual cost with and without reuse shown in the table, it is evident that for each of the Alternatives For Choice, except the Plan To Meet Current Standards, the saving in treatment cost is greater than the cost of reuse facilities.

TABLE 3

COST ESTIMATE: REUSE OPTION
(All Costs in $1,000)

Alternatives For Choice	Construction Cost		Average Annual Cost	
	Without Reuse	With Reuse	Without Reuse	With Reuse
Plan to Meet Current Standards	46,436	52,625	8,318	8,663
Basic All Water Plan	91,573	89,832	12,580	11,887
Basic All Land Plan	103,726	95,757	11,644	10,312
December Plan	94,059	92,319	12,186	11,493

NOTE: 1. Average annual cost is based on an interest rate of 6% and includes interest, amortization, operation, maintenance, replacement, and salvage value.
2. All costs include P.H. Glatfelter costs totaling $15,893,000 for wastewater management and water supply pre-treatment. The Glatfelter costs are not included with the costs of alternative plans as presented elsewhere in this report. It is necessary to include them here in order to illustrate the overall cost savings offered by the implementation of the Reuse Option.

CHAPTER IV SUMMARY OF FINDINGS

P.L. 92-500

The recently enacted Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, will have great impact on the Nation's water quality improvement programs for years to come. However, in the case of the Codorus Creek Wastewater Management Study, P.L. 92-500 had an immediate effect.

Since this law is the guidance for determining eligibility for Federal financial assistance of any comprehensive wastewater management plan, I, as Acting District Engineer, saw it as my direct responsibility to the People of the Codorus Creek Basin to identify and describe the effects or changes produced by the Alternatives For Choice in terms of the applicable provisions of P.L. 92-500. And, on the basis of my analysis and evaluation, I have reduced from six to four the number of alternatives which should be considered for implementation.

The provisions of P.L. 92-500 which are applicable to this study are found in Sections 101(a), 201, 208, and 212. These provisions are of two general kinds. The first consists of those requirements with which all wastewater management planning must comply in order for plans to be eligible for financing under the law. For example, wastewater planning, among other things, must:

I. Meet or comply with the goals of the Act;
II. To the extent practicable, be comprehensive;
III. Encourage the provision of multiple purpose or integrated revenue producing facilities;
IV. Provide for the application of the best practicable technology; and
V. Contain a cost-efficiency analysis and identify the most cost-effective alternative.

In this chapter, each of these broad requirements is defined and the response of each of the six alternative plans to these requirements is assessed. A summary table which reflects my findings on the response of each plan to each requirement, Table 4, is also presented. The table uses numerical values to rate the response of each alternative plan to each requirement. No weighting is indicated or implied in this table; also, it should be noted that the requirements are not all of equal importance. Therefore, the temptation to add the table's numerical values should be avoided.

And the second kind of provision in P.L. 92-500 which is relevant has to do with identification and measurement of the effects, changes, or impacts which individual wastewater management plans produce. For example, the law requires identification of several general classes of impacts or effects, namely, economic, social, and environmental effects. In order to support a discussion of the economic, environmental and social impacts of the alternative plans, Tables 5 through 8 are presented which describe the effects or changes produced by each plan in terms of the following:

—Effluent Water Quality Improvement

—Land Use Changes

—Water Use Changes

—Land Value Changes

—Revenues from Recycling and Reuse

—Employment

—Social Tranquility and Stability

—Aspirations of the People

—Housing

—Institutional Aspects

In addition to identifying effects produced by alternative plans, I also have indicated where the effects are likely to happen—whether, for example, in the study area, the Chesapeake Bay Region, or in the rest of the Nation.

Identification of the above specific classes of effects or impacts and their locations geographically is considered consistent with the provisions of P.L. 92-500 which requires identification of the more general economic, social, and environmental impacts.

Response of Alternative Plans to Planning Requirements of P.L. 92-500

REQUIREMENT I: Meeting the Goals of the Act

Definition: The following goals are stated in Section 101(a) of the Federal Water Pollution Control Act Amendments of 1972:

1. It is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985.

2. It is the national goal that wherever attainable an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water be achieved by 1 July 1983.

Response of Alternatives: The Plan To Meet Current Standards was not designed for, nor does it respond to, the 1985 goal of elimination of pollutant discharges. It does, however, adequately meet the standards for Codorus Creek as established by the Commonwealth of Pennsylvania. The standards are consistent with the interim goal of P.L. 92-500. The remaining alternatives come very close to meeting the goal of elimination of pollutant discharges before 1985 by providing almost complete removal of oxygen-demanding wastes, suspended solids, and nutrients.

REQUIREMENT II: Comprehensive Regional Planning

Definition: The Federal Water Pollution Control Act Amendments of 1972 require that planning for wastewater management be regional in coverage and comprehensive in scope. In this regard, the law requires that "waste treatment management shall be on an area-wide basis and provide control or treatment of all point and non-point sources of pollution including in place or accumulated pollution sources." It further states that any plan should include, as a minimum, proposals for meeting "the anticipated municipal and industrial waste treatment needs of the area over a twenty year period."

Response of Alternatives: All of the Alternatives For Choice respond well to this requirement. They all provide area-wide coverage, treatment of all municipal and industrial wastewater, and meet the anticipated municipal and industrial waste treatment needs of the area for more than the next twenty years. All of the alternatives, however, fall short of complete satisfaction of this requirement due to the absence of measures to control and treat pollution from non-point and stormwater sources.

REQUIREMENT III: Provision for Multiple-Purpose or Integrated Revenue Producing Facilities

Definition: P.L. 92-500 encourages wastewater treatment management which results in the construction of revenue producing facilities providing for (1) the recycling of potential sewage pollutants through the production of agriculture, silvaculture, or aquaculture products; (2) the confined and contained disposal of unrecycled pollutants; (3) wastewater reclamation; and (4) ultimate sludge disposal without environmental hazards.

The law also encourages the development of plans which integrate sewage treatment recycling facilities "with facilities to treat, dispose of, or utilize other industrial and municipal wastes, including but not limited to solid waste and waste heat and thermal discharges." In addition, wastewater management is encouraged "which combines 'open space' and recreational considerations with such management."

Response of Alternatives: Since all the Alternatives For Choice offer the Reuse Option, they all provide at least a minimum positive response to this criterion. The Basic and Modified All Water Plans, by providing an increase in water quality and thus an increase in recycling potential, provide a slightly better

response to this criterion than the Plan To Meet Current Standards. The Basic and Modified All Land Plans, however, call for an advanced wastewater treatment process, i.e., land application which recycles potential pollutants (nutrients) through the production of agricultural and silvacultureal products. The All Land Plans also provide, within the project area, the land required to accomodate solid waste disposal, and, with the storage ponds, potential cooling water for electric power generating facilities. Both the All Land Plans preserve open space in a manner which complements the land use plan developed by the York County Planning Commission. The December Plan offers the same beneficial features as the All Land Plans, but to a lesser degree since it would only irrigate about 20 percent as much land as either of the All Land Plans.

REQUIREMENT IV: Application of Best Practicable Technology

Definition: P.L. 92-500 states that "waste treatment management plans and practices shall provide for the application of the best practicable waste treatment technology before any discharge into receiving waters . . ."

Response of Alternatives: The Plan To Meet Current Standards provides a high level of waste treatment with efficient control of biochemical oxygen demand, significant reduction in phosphorus, and the discharge of an effluent with a high level of dissolved oxygen. The plan does not include the highest practicable level of phosphorus reduction nor does it provide for nitrogen removal. The remaining alternatives, however, provide the best practicable technologies for nutrient removal in addition to equaling or slightly improving on the other treatment capabilities of the Plan To Meet Current Standards.

REQUIREMENT V: Cost-Efficiency in Satisfying The Goals of P.L. 92-500

Definition: P.L. 92-500 requires that proposed wastewater management plans must be demonstrated to be "the most cost-efficient alternative to comply with . . . the requirements of Section 201 of this Act." The costs considered here are the monetary costs of each plan on an average annual cost basis. The average annual cost is the total project cost (monetary) on an annual basis and includes capitalization of the initial investment (interest and amortization) and allowances for operation, maintenance, and replacement. Other costs or effects, such as economic, social, and environmental, are considered later in the chapter under the heading "Impacts Resulting From Alternative Plans."

Response of Alternatives: This cost-efficiency test cannot meaningfully be applied to the Plan To Meet Current Standards since this plan, by not satisfying the Act's stated goals, specifically the 1985 goal pertaining to elimination of discharge of pollutants, does not meet the requirements of Section 201 for "the development and implementation of waste treatment management plans and practices which will achieve the goals of this Act."

From the viewpoint of the National economy, there is little difference in cost-efficiency among the Basic All Land Plan, the December Plan, and the Basic All Water Plan. As shown in Table 2, the Basic All Land Plan is the more cost-efficient, followed in order by the December Plan and the Basic All Water Plan. All three approach the 1985 goal in terms of effluent water quality improvement and their capital costs vary within about 12 percent. The Modified All Land and Modified All Water Plans, while attaining substantially the same effluent water quality improvement as the "Basic" versions of these plans, nevertheless are much more costly—and hence, much less cost-efficient. In fact, these two plans are so much less cost-efficient that in my judgment they should receive no further consideration for implementation by study area residents. From the viewpoint of study area residents, the Basic All Land Plan costs $126,000[3] or about four percent per year less than the Plan to Meet Current Standards, which is the next least costly alternative.

[3] If Federal or Commonwealth policy should result in the local share of the capital cost being more than 13 percent, the Plan To Meet Current Standards would be the least costly from a local viewpoint.

TABLE 4

CODORUS CREEK WASTEWATER MANAGEMENT STUDY
RESPONSE OF ALTERNATIVE PLANS TO PLANNING REQUIREMENTS OF P.L. 92-500

Planning Requirement		Section of P.L. 92-500	Alternative Plans					
			Plan to Meet Current Standards	December Plan	Basic All Water Plan	Modified All Water Plan	Basic All Land Plan	Modified All Land Plan
I.	Meeting the Goals of the Act	101 (a) (1) 101 (a) (2) 201 (a)	4	7	7	7	7	7
II.	Comprehensive Regional Planning	201 (c) 208 (b) (2) (A)	6	6	6	6	6	6
III.	Provision for multiple purpose or integrated revenue producing facilities	201 (d) 201 (e) 201 (f)	3	6	4	4	7	7
IV.	Application of best practicable technology	201 (b)	5	8	8	8	8	8
V.	Cost-efficiency in satisfying the Goals of the Act	212 (2) (B)	N/A	7	6	2	8	3

Rating Key: 8-fully meets requirement; 7, 6, 5-approaches meeting requirement*; 4, 3, 2-contains some provisions to meet requirement*; 1-contains little or no provision to meet requirement.

*Within this rating category, three graduations are required to differentiate between degrees of response to Planning Requirements of P.L. 92-500.

Impacts Resulting from Alternative Plans

P.L. 92-500 requires that any plan prepared in accordance with the act shall include identification of "the economic, social, and environmental impact of carrying out the plan. . . ." Accordingly, the remainder of this chapter is devoted to discussing the economic, social, and environmental impacts of each alternative plan. These three impact areas can best be analyzed by breaking them into specific components and studying each alternative's contribution to the component. This breakdown and analysis is presented in Tables 5 through 8. The tables describe the effects or changes produced by each plan in terms of the ten impact areas previously listed on page 13. The discussions on economic, social, and environmental impacts draw, for support, on the information presented in the tables. It is worth noting here that some of the effects listed in the tables may apply to more than one of the three main impact areas.

Tables 5 through 8 also show the geographic distribution of alternative-produced effects, that is, whether they occur in the study area, the Chesapeake Bay Region, or the rest of the Nation. The tables show that, for the most part, noticeable effects would be expected only within the study area. This is a predictable conclusion since the alternative plans are designed to control the municipal and industrial wastewater of a watershed with an area of approximately 280 square miles while the Susquehanna has a drainage area of approximately 28,000 square miles at its mouth and 26,000 square miles at the mouth of Codorus Creek. Therefore, although most alternative plans would provide effective nutrient reduction which would be expected to reduce algal growth potential in the lower Susquehanna River and in Chesapeake Bay, the effects in the Bay and the Susquehanna might be immeasureable. Nutrient reduction, however, such as these plans would provide, would be very effective in reducing eutrification in the

TABLE 5

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY THE PLAN TO MEET CURRENT STANDARDS

	Cedarus Creek Study Area	Chesapeake Bay Region	Rest of Nation
Effluent Water Quality Improvement Concentration mg/l BOD . . . . . 7 COD . . . . . 45 Phosphorus . . . . 20 Nitrogen . . . . . 20 SS . . . . . 3 TDS 400	By providing the best practicable technology for the removal of BOD, and an 80 percent reduction in phosphorus from M and I sources, would increase instream concentration of DO and reduce the potential for algal growth.	Insignificant by itself but would be consistent with a region-wide program to reduce eutrophication in lower Susquehanna reservoirs; since it would not control nitrogen, would not reduce eutrophication in Chesapeake Bay.	Consistent with interim (1983) goals of P.L. 92-500, but would not respond to 1985 goals.
Land Use Changes	Improved water quality resulting from complete control of M and I pollution would enhance the potential use of streambank property.	Insignificant	No impact
Water Use Changes	Improved water quality would enhance all water-oriented recreational uses; incorporation of Reuse Option increases recreation potential of Lake Marburg and increases streamflow in lower West Branch.	Insignificant by itself, but effective increment of a region-wide program to protect the region's fishing, shellfishing, and recreation industries.	No impact
Land Value Changes	Improved water quality would enhance land value throughout study area.	Insignificant	No impact
Revenues from Recycling and Reuse	Incorporation of Reuse Option would significantly increase the study area's available water supply and perhaps free alternative water sources for other uses.	No impact	No impact
Employment	Some increase in short term employment opportunity due to system construction and long term employment due to system operation.	Insignificant	No impact
Social Tranquility and Stability	No impact	No impact	No impact
Aspirations of the People	While not providing best practicable technology, at least partially responds to local desire for water quality improvement.	Results in water quality improvement which, as a minimum, is consistent with the water quality goals of the affected states.	Insignificant
Housing	Insignificant	No impact	No impact
Institutional	Would best be implemented by a region-wide authority, but probably not necessary; implementation of the Reuse Option depends upon successful negotiations between the wastewater authority and the P.H. Glatfelter Company.	No impact	No impact

TABLE 6

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY DECEMBER PLAN

	Cedarus Creek Study Area	Chesapeake Bay Region	Rest of Nation
Effluent Water Quality Improvement Concentration mg/l BOD . . . . . 3-4 COD . . . . . 5-30 Phosphorus 0.05-0.2 Nitrogen . . . . 0.2-2 SS . . . . . 0-2 TDS 350-400	By providing the best practicable technology for the removal of BOD, phosphorus, and nitrogen from M and I sources, would increase instream concentration of DO and reduce the potential for algal growth.	Insignificant by itself but would be consistent with a region-wide program to reduce eutrophication in lower Susquehanna reservoirs and Chesapeake Bay.	Consistent with national water quality goals as established in P.L. 92-500.
Land Use Changes	Improved water quality resulting from complete control of M and I pollution would enhance the potential use of streambank property; operation of upstream irrigation system would maintain about 4000 acres of land in an agricultural state.	Insignificant	No impact
Water Use Changes	Improved water quality and local streamflow increases would enhance all water-oriented recreational uses; incorporation of Reuse Option increases the recreation potential of Lake Marburg.	Insignificant by itself, but an effective increment of a region-wide program to protect the region's fishing, shellfishing, and recreation industries.	No impact
Land Value Changes	The public purchase of 66 residences would reduce local tax bases, although to a lesser extent than the Basic All Land Plan; purchasing the 40 farms would have a similarly negative effect although acquisition of the farmland by other than fee simple would eliminate this problem; satisfaction of system land requirements without purchase, while maintaining private ownership, would nonetheless restrict land use to agriculture which might be viewed as a constraint on realizing the land's highest and best use; improved water quality would enhance land values throughout study area.	Insignificant	No impact
Revenues from Recycling and Reuse	Would either increase agricultural productivity or decrease the cost of maintaining the current level of productivity; incorporation of Reuse Option would significantly increase the study area's available water supply and perhaps free alternative water sources for other uses.	No impact	No impact
Employment	Increase in short term employment opportunity due to system construction and long term employment due to system operation.	Insignificant	No impact

TABLE 6

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY DECEMBER PLAN (Continued)

	Codorus Creek Study Area	Chesapeake Bay Region	Rest of Nation
Social Tranquility and Stability	Requires relocation of between 66 and 106 families, thereby generating local upstream anxiety and opposition which, although significant, should be less intense than has been exhibited towards the Basic All Land Plan.	No impact	No impact
Aspirations of the People	Responds well to the local desire for a clean Codorus Creek; offers the satisfaction of applying the best practicable technology.	Results in water quality improvement which, as a minimum, is consistent with the water quality goals of the affected states.	Insignificant
Housing	Relocation of between 66 and 106 families would increase the demand on the already somewhat oversubscribed housing supply.	Insignificant	No impact
Institutional	Necessitates the creation of a region-wide wastewater management authority for system implementation and operation; implementation of the Reuse Option depends upon successful negotiations between the wastewater authority and the P.H. Glatfelter Co.; depletion of local tax could have detrimental effect on local public services.	No impact	No impact

TABLE 7

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY THE BASIC ALL WATER PLAN

	Codorus Creek Study Area	Chesapeake Bay Region	Rest of Nation
Effluent Water Quality Improvement Concentration mg/l BOD . . . . . 4 COD . . . . . 30 Phosphorus . . . . 0.2 Nitrogen . . . . . 2 SS . . . . . 3 TDS 350	By providing the best practicable technology for the removal of BOD, phosphorus, and nitrogen from M and I sources, would increase instream concentration of DO and reduce the potential for algal growth.	Insignificant by itself but would be consistent with a region-wide program to reduce eutrophication in lower Susquehanna reservoirs and Chesapeake Bay.	Consistent with national water quality goals as established in P.L. 92-500.
Land Use Changes	Improved water quality resulting from complete control of M and I pollution would enhance the potential use of streambank property.	Insignificant	No impact

TABLE 7

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY THE BASIC ALL WATER PLAN (Continued)

	Codorus Creek Study Area	Chesapeake Bay Region	Rest Of Nation
Water Use Changes	Improved water quality would enhance all water-oriented recreational uses; incorporation of Reuse Option increases recreation potential of Lake Marburg and increases streamflow in lower West Branch.	Insignificant by itself, but an effective increment of a region-wide program to protect the region's fishing, shellfishing, and recreation industries.	No impact
Land Value Changes	Improved water quality would enhance land value throughout study area.	Insignificant	No impact
Revenues from Recycling and Reuse	Incorporation of Reuse Option would significantly increase the study area's available water supply and perhaps free alternative water sources for other uses.	No impact	No impact
Employment	Increase in short term employment opportunity due to system construction and long term employment due to system operation.	Insignificant	No impact
Social Tranquility and Stability	No impact	No impact	No impact
Aspirations of the People	Responds well to the local desire for a clean Codorus Creek; offers the satisfaction of applying the best practicable technology.	Results in water quality improvement which, as a minimum, is consistent with the water quality goals of the affected States.	Insignificant
Housing	Insignificant	No impact	No impact
Institutional	Necessitates the creation of a region-wide wastewater management authority for system implementation and operation; implementation of the Reuse Option depends upon sucessful negotiations between the wastewater authority and the P.H. Glatfelter Company.	No impact	No impact

TABLE 8

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY THE BASIC ALL LAND PLAN

	Codorus Creek Study Area	Chesapeake Bay Region	Rest of Nation
Effluent Water Quality Improvement Concentration mg/l BOD . . . . . .3 COD . . . . . .5 Phosphorus . . . 0.05 Nitrogen . . . . . .2 SS . . . . . .0 TDS 400	By providing the best practicable technology for the removal of BOD, phosphorus, and nitrogen from M and I sources, would increase instream concentration of DO and reduce the potential for algal growth.	Insignificant by itself but would be consistent with a region-wide program to reduce eutrophication in lower Susquehanna reservoirs and Chesapeake Bay.	Consistent with national water quality goals as established in P.L. 92-500.

TABLE 8

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY THE BASIC ALL LAND PLAN (Continued)

	Codorus Creek Study Area	Chesapeake Bay Region	Rest of Nation
Land Use Changes	Improved water quality resulting from complete control of M and I pollution would enhance the potential use of streambank property; operation of irrigation system would maintain 17,000 acres of land in an agricultural state.	Insignificant	No impact
Water Use Changes	Improved water quality and local streamflow increases would enhance all water-oriented recreational uses; incorporation of Reuse Option increases the recreation potential of Lake Marburg.	Insignificant by itself, but an effective increment of a region-wide program to protect the region's fishing, shellfishing, and recreation industries.	No impact
Land Value Changes	The public purchase of 330 residences would reduce local tax bases, particularly in North Codorus Township; purchasing the 200 farms would have a similarly negative effect, although acquisition of the farmland by other than fee simple would eliminate this problem; satisfaction of system land requirements without purchase, while maintaining private ownership, would nonetheless restrict land use to agriculture which might be viewed as a constraint on realizing the land's highest and best use; improved water quality would enhance land values throughout study area.	Insignificant	No impact
Revenues from Recycling and Reuse	Would either increase agricultural productivity or decrease the cost of maintaining the current level of productivity; incorporation of Reuse Option would significantly increase the study area's available water supply and perhaps free alternative water sources for other uses.	No impact	No impact
Employment	Increase in short term employment opportunity due to system construction and long term employment due to system operation.	Insignificant	No impact
Social Tranquility and Stability	Requires relocation of between 330 and 530 families, the possibility of which has produced a unanimously negatively response from over 8000 study area residents.	No impact	No impact
Aspirations of the People	Responds well to the local desire for a clean Codorus Creek; offers the satisfaction of applying the best practicable technology.	Results in water quality improvement which, as a minimum, is consistent with the water quality goals of the affected States.	Insignificant

TABLE 8

SUMMARY OF EFFECTS OR CHANGES PRODUCED BY THE BASIC ALL LAND PLAN (Continued)

	Codorus Creek Study Area	Chesapeake Bay Region	Rest of Nation
Housing	Relocation of between 330 and 530 families would increase the demand on the already somewhat oversubscribed housing supply.	Insignificant	No impact
Institutional	Necessitates the creation of a region-wide wastewater management authority for system implementation and operation; implementation of the Reuse Option depends upon sucessful negotiations between the wastewater authority and the P.H. Glatfelter Co.; depletion of local tax base could have detrimental effect on school system in North Codorus Township.	No impact	No impact

River and the Bay if incorporated throughout the Bay Region. Based on the information presented in Tables 5 through 8, therefore, the following discussions of economic, social, and environmental impacts address mainly the study area.

ECONOMIC IMPACTS

With the Plan To Meet Current Standards, it would be plausible to expect an influx of business and industry from outside the area, with accompanying employment increases, because the plan would enhance the quality of life in the study area such that it would be a highly desirable place to live and work. Thus, positive economic impacts would include both short and long term economic stimulation, first from project construction and later from increased economic activity due to the attractiveness of the area. The increased activity should in turn result in secondary effects such as higher land values and a broadened tax base. These latter two effects would also directly result from the enhancement of streambank and other property due to an improvement in study area streams.

Short term economic stimulation should be even more pronounced as produced by the other alternative plans since they would require a larger influx of construction funds. Long term effects could also be more positive because the Basic All Water and All Land Plans and the December Plan could attract new employers and more workers by making the study area an even more desirable place to live and work than would be expected with the Plan To Meet Current Standards. This would produce positive spillover effects on employment, land values, and the tax base.

The Basic All Land Plan and, to a lesser extent, the December Plan have a potential for producing other economic impacts which is not shared by the Basic All Water or December Plans. For instance, spray irrigation of treated wastewater would increase the productivity of agricultural land or, as a minimum, would reduce the necessity for purchasing fertilizer. The Basic All Land Plan would restrict nonagricultural development on about 17,000 acres of land; the December Plan would similarly constrain about 4,000 acres. Residential relocations would decrease the local tax base; the Basic All Land Plan and

the December Plan would result in the relocation of 330 and 66 families, respectively. If irrigation sites were purchased, the Basic All Land Plan would remove 17,000 acres of land from the tax roles and the December Plan would remove about 4,000 acres.

SOCIAL IMPACTS

Examination of Tables 5 through 8 reveals that the alternative plans would produce many effects or changes which could have social impacts. Whether the impacts would be positive (good) or negative (bad) depends upon the point of view of the reader; therefore, such a determination is not made here. Rather, the following discussion merely serves to focus on those effects or changes which should be socially significant.

All of the alternative plans will improve the quality of Codorus Creek and its tributaries. This improvement could be expected to enhance the use and value of streambank property, remove existing constraints on surface water use, improve the study area's water-oriented recreational opportunities, and generally contribute towards a higher quality of life in the Codorus Creek Basin. These two statements generally apply to the Plan To Meet Current Standards as well as to the other alternative plans. The other alternatives, however, by providing better wastewater treatment, should cause more changes which are socially significant than the Plan To Meet Current Standards.

At present, Codorus Creek, especially as it flows through the York Urban Area, is ignored as a social asset. Improvement in the quality of the creek could reverse this trend. Instead of turning its back on the creek, appropriate urban development could focus attention on it, utilizing it as a unifying link and activity generator in the presently decaying urban environment. In addition, the lower reaches of the creek, which present an extremely scenic and picturesque landscape only a short distance from downtown York, could provide a natural retreat from urban life. Throughout the watershed, recreational opportunities, such as day hiking, picnicking, fishing, canoeing, and swimming could be fully exploited. The accrual of all of these socially significant benefits seems much more likely with the full commitment inherent in the Basic All Water, Basic All Land, and December Plans than with the legally mandated Plan To Meet Current Standards.

The Basic All Land Plan and, to a lesser extent, the December Plan would enhance crop production in a region where a majority of the land is devoted to agriculture. These two plans would also preserve open space in a manner consistent with the York County Planning Commission's 50-year land use plan. The fact that these plans would restrict development on significant amounts of land (Basic All Land Plan: 17,000 acres, December Plan: 4,000 acres) could be viewed as either positive or negative, or both, from a social well-being viewpoint.

Information on all of the alternative plans has been widely distributed throughout the study area, and the large amount of land and residential relocations required by the Basic All Land Plan has aroused intense opposition to the plan from upper basin landowners and sympathyzing neighbors. The existence and intensity of this opposition is suggestive of the anxiety which the plan has aroused. A similar, but less intense, reaction has been observed toward the December Plan. In order to facilitate an understanding of this opposition, Table 9 is presented which lists the real estate requirements of each alternative plan.

ENVIRONMENTAL IMPACTS

The Plan To Meet Current Standards, since its treatment performance level is significantly lower than any of the other plans, is inferior to them in ability to improve the aquatic ecology. It does not provide the level of nutrient removal as do the other plans. There are no significant adverse terrestrial ecology impacts associated with this plan, except minor disruptions involved with treatment plant enlargement. The higher quality water yielded by the plan will lessen any public health risk associated with the stream system. Visual impacts are insignificant.

TABLE 9

REAL ESTATE REQUIREMENTS OF ALTERNATIVE PLANS

Plans	Acres Required	Farms Affected	Residences Relocated
Current Standards	0[1]	0	0
December Plan	4,000	40	66
Basic All Water Plan	87[1]	0	0
Basic All Land Plan	17,000	200	330

[1] Acres required for sludge disposal not included. Present sludge disposal practices would be continued.

The Basic All Water Plan has a highly positive impact on the aquatic ecology. It significantly reduces the level of pollutants, such as nitrogen, phosphorus, and organics, and thus provides a better aquatic environment for the growth of desirable aquatic life. It affects the terrestrial ecology adversely in small localized areas where treatment plant construction would occur. Public health risk will be greatly lessened by the yield of high quality water. Visual impacts will be caused by the plan's new advanced wastewater treatment plants—whether they are positive or negative will depend, to a great degree, on design.

The Basic All Land Plan has a highly positive impact on the aquatic ecology. A better aquatic environment is provided for the growth of desirable aquatic life by the significant reduction of pollutant levels of substances such as nitrogen, phosphorus and organic components. The terrestrial ecology is significantly affected by this plan. Large land areas are required for irrigation and several hundred acres are needed for storage lagoons. Plant life, to include crops, will be greatly enhanced by the land application process. However, the storage lagoons will eliminate what terrestrial life there now is on these land areas. Pipeline construction will change the terrestrial ecology—careful design and construction would minimize adverse impacts. The public health risk associated with water quality would be minimized by this plan. However, precautions would have to be taken to guard against possible insect, odor, and groundwater problems. The visual environment would be changed by the construction of the large spray irrigation system with physical features such as spray irrigation rigs, pipelines, and collection wells. As in the case with the Basic All Water Plan, these features could be viewed as either positive or negative effects.

The December Plan also has a highly positive impact on the aquatic ecology. The terrestrial ecology is affected by the land application components of this plan to a lesser degree than the Basic All Land Plan, since the acreage requirements are much less (4000 acres vs. 17,000 acres). Also, the December Plan utilizes existing plants for secondary treatment and thus there are no adverse environmental effects associated with treatment lagoons. The construction of the water process portion of the December Plan will cause minor disruption to the terrestrial ecology. Public health risk associated with water quality would be minimized by this plan. The monitoring features for possible insect, odor, and groundwater problems would be incorporated into the land application portion of the plan. The visual environment would be changed by construction of the advanced waste treatment plant and of the upstream spray irrigation system.

CHAPTER V PREMISE SETS FOR CHOICE AMONG ALTERNATIVE PLANS

In Chapter IV, the effects produced by each of the alternative plans have been discussed and summarized, and an attempt was made to relate these effects to areas outside of the study area. The purpose of this chapter is to organize the effects in terms of "premise sets" which should facilitate choice among the alternative plans.

Since the Modified All Land and Modified All Water Plans were found, in Chapter IV, to have little or no advantage over less costly versions of these plans—the Basic All Land and Basic All Water Plans—the focus of this chapter is on the remaining four: the Plan To Meet Current Standards, the December Plan, the Basic All Water Plan, and the Basic All Land Plan.

In Chapter IV, it was also shown that, for the most part, noticeable effects from implementing any of the alternatives would be expected only within the study area. The premise sets, therefore, are all addressed to study area residents, particularly the County Commissioners of York County.

Table 10 presents the premise sets. A basic assumption in formulating the premise sets is that the Federal government would finance 75 percent of the capital cost of any plan implemented and that the Commonwealth would finance 15 percent, leaving to the study area the responsibility to pay ten percent of the capital cost and all of the other costs, operation, maintenance, and replacement. Should either the Federal government or the Commonwealth of Pennsylvania adopt some other cost-sharing policy, the local costs cited in Table 10 would change accordingly.

As can be seen from Premise Set I, Table 10, in order for study area residents to choose the Plan To Meet Current Standards over the other three plans, they would have to forego—or postpone for later consideration—the opportunity to approach the water quality goals of P.L. 92-500, particularly the goal of elimination of discharge of pollutants by 1985. Other opportunities would be foregone as well in making this choice including, for example, the opportunity to apply the best practicable technology. And there would be an increase to residents of $126,000[4] annually over the next least costly plan, the Basic All Land Plan. It is for these reasons that I have not recommended, as part of my specific recommendations in Chapter I, that the Current Standards Plan receive further consideration for implementation.

If the above judgment and recommendation are accepted, then the real choice for the study area residents is among the December, Basic All Water, and Basic All Land Plans. The Basic All Land Plan, from the viewpoint of study area taxpayers, is the most cost effective of the three, costing, respectively, $1.6 million and $2.2 million annually less than the December and Basic All Water Plans. However, in order to choose the Basic All Land Plan, study area residents must be willing to accept the anxiety which has been expressed by more than 8,000 people about the relocation of 330 non-farming families and public control of 200 farms consisting of 17,000 acres of land. Whether the lower cost to the study area and the preservation of 17,000 acres of open space is worth the resulting anxiety, which has been expressed by owners of system required lands and their neighbors, is a matter which the residents of the study area must decide for themselves.

[4] If Federal or Commonwealth policy should result in the local share of the capital cost being more than 13 percent, the Plan To Meet Current Standards would be the least costly from a local viewpoint.

TABLE 10

PREMISE SETS FOR CHOICE AMONG ALTERNATIVE PLANS

PREMISE SET I	PREMISE SET II	PREMISE SET III	PREMISE SET IV
In Order To Choose The Plan To Meet Current Standards Over All Other Plans—	In Order To Choose The December Plan Over All Other Plans—	In Order To Choose The Basic All Water Plan Over All Other Plans—	In Order To Choose The Basic All Land Plan Over All Other Plans—
A Study Area Resident Must Prefer To:	A Study Area Resident Must Prefer To:	A Study Area Resident Must Prefer To:	A Study Area Resident Must Prefer To:
1. Ameliorate the anxiety which has been expressed by over 8,000 study area residents about the prospect of public purchase of between 66 and 330 residences, and purchase or other control of between 40 and 200 farms consisting of between 4,000 and 17,000 acres of land; and	1. Obtain a substantial improvement in water quality consistent with the 1985 goals of P.L. 92-500;	1. Obtain a substantial improvement in water quality consistent with the 1985 goals of P.L. 92-500;	1. Obtain a substantial improvement in water quality consistent with the 1985 goals of P.L. 92-500;
2. Implement the most institutionally feasible of all the alternative plans.	2. Preserve and maintain, either through direct purchase or other suitable arrangement with farmers, a minimum of 4,000 acres of open space against urban sprawl;	2. Ameliorate the anxiety which has been expressed by over 8,000 study area residents about the prospect of public purchase of between 66 and 330 residences, and purchase or other control of between 40 and 200 farms consisting of between 4,000 and 17,000 acres of land; and	2. Save the study area public $126,000 annually over the cost of the second least costly plan, from a local viewpoint, the Plan To Meet Current Standards;
And Be Willing To:	3. Exploit the potential to increase farmer income or study area public revenue through agricultural recycling of nutrients on 1,800 acres due to gains in productivity or reduced costs;	3. Experience the satisfaction of applying the best practicable technology.	3. Preserve and maintain, either through direct purchase or other suitable arrangement with farmers, a minimum of 17,000 acres of open space against urban sprawl;
1. Increase study area costs $126,000 annually (from $3,303,000 to $3,429,000) over the least costly alternative, the Basic All Land Plan;	4. Experience the satisfaction of applying the best practicable technology; and	And Be Willing To:	4. Exploit the potential to increase farmer income or study area public revenue through agricultural recycling of nutrients on 10,400 acres due to gains in productivity or reduced costs; and
2. Forego the opportunity to approach the water quality goals of P.L. 92-500; and	5. Implement a regional wastewater management plan which would combine both land oriented and water oriented advanced treatment technologies.	1. Increase study area costs $2,152,000 annually (from $3,303,000 to $5,455,000) over the least costly alternative, the Basic All Land Plan.	5. Experience the satisfaction of applying the best practicable technology.
3. Forego the satisfaction of applying the best practicable technology.	And Be Willing To:		And Be Willing To:
	1. Increase study area costs $1,617,000 annually (from $3,303,000 to $4,920,000) over the least costly alternative, the Basic All Land Plan; and		1. Accept and increase the anxiety which has been expressed by over 8,000 study area residents about the prospect of public purchase of 330 residences, and purchase or other control of 200 farms consisting of 17,000 acres of land.
	2. Accept the anxiety which has been expressed by many study area residents about the prospect of public purchase of 66 residences and purchase or other control of 40 farms consisting of about 4,000 acres of land.		