PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS AVONDALE AREA SYSTEM

Municipality	Present Connected Population	Present Flow (MGD)	1978 Connected Population	1978 Flow (MGD)	1988 Connected Population	1988 Flow (MGD)
Avondale Borough	0	0	1,900	0.19	3,000	0.30
New Garden Township	0	0	1,200	0.12	1,800	0.18
London Grove Township	0	0	900	0.09	1,400	0.14
TOTAL	0	0	4,000	0.40	6,200	0.62

NOTE: Design capacity of presently planned first stage treatment facility is 0.30 MGD.

Future Considerations

Avondale was selected as the central treatment site because the principal existing population concentration is in Avondale Borough. Also, population growth is expected to occur along the U.S. Route 1 transportation corridor. The recommended treatment facility would be located at the confluence of three streams on the East Branch of the White Clay Creek and thus would be situated to serve three drainage areas. The plant would also be well upstream from the proposed Clay Creek reservoir, and the effluent would receive substantial natural purification before reaching the reservoir.

Regional systems extending northward from the State of Delaware could serve the area in the more distant future. The Chatham area, which presently is experiencing sewage problems (see the Sewage Problem Areas map), should be served by the Avondale area system. However, detailed study may show that interim "package" treatment facilities are required until such time as there is sufficient population to make connection to the area system economically feasible. Any "package" facilities designed for the Chatham area should be located in such a manner as to facilitate phasing out and incorporation of the collection system into the Avondale area system.

Kennett Square Area

Description

The existing Kennett Square Borough sewage treatment plant would be expanded to serve outlying areas in Kennett Township, New Garden Township, and East Marlboro Township. The additional areas would be served by extensions to the existing collection system. The probable sewage flows to the proposed multi-municipal facility are 0.83 MGD by 1978 and 1.24 MGD by 1988. The present and future connected populations and sewage flows for each of the municipalities to be served are shown in the table below.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS KENNETT SQUARE AREA SYSTEM

	Present		1978		1988	
Municipality	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
Kennett Square Borough	5,000	0.49[1]	7,000	0.70	8,600	0.86
Kennett Township	0	0	1,300	0.13	2,600	0.26
East Marlboro Township	0	0	0	0	700	0.07
New Garden Township	0	0	0	0	500	0.05
TOTAL	5,000	0.49	8,300	0.83	12,400	1.24

[1] Existing treatment facility design capacity: 0.50 MGD.

Future Considerations

The Kennett Square Borough treatment plant was selected as an area facility because of its availability and its location. The existing plant is located downstream from the present population center in the Borough and downstream from the expected high density development area along the U.S. Route 1 transportation corridor. Significant development is not anticipated south of the Borough in Kennett Township. If such development does occur in the more distant future, it is probable that sewer service would be provided by a regional system extended northward from Delaware. If such a regional system does develop, the Kennett Square area treatment facility could be phased out and all sewage flows from the Red Clay Creek basin could be conveyed to Delaware for treatment and disposal.

Honeybrook Area

Description

A new sewage treatment plant is proposed for Honeybrook Borough and adjacent portions of Honey Brook Township. It is expected that only the Borough would be served by 1978 and that the areas adjacent to the Borough in Honey Brook Township would be added sometime between 1978 and 1988. The proposed treatment facility would be located on the East Branch of Brandywine Creek in Honey Brook Township. Estimated sewage flows to the treatment plant are 0.15 MGD by 1978 and 0.27 MGD by 1988. Present and probable future connected populations and sewage flows from the Borough and the Township are given in the table below.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS HONEYBROOK AREA

	Present		1978		1988	
Municipality	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
Honeybrook Borough	0	0	1,500	0.15	2,000	0.20
Honey Brook Township	0	0	0	0	700	0.07
TOTAL	0	0	1,500	0.15	2,700	0.27

NOTE: Design capacity of presently planned treatment facility is 0.15 MGD.

Future Considerations

The proposed Honeybrook area facility has been located downstream from the Borough on the West Branch of Brandywine Creek to allow for future growth in Honey Brook Township along U.S. Route 322. The plant would be situated to serve the west branch of Brandywine Creek drainage basin upstream from the plant to Lancaster County. It is anticipated that development between Honeybrook and Coatesville during the next 50 years will not be sufficient to justify connection of the Honeybrook system to the Coatesville Regional System.

Parkesburg Area

Description

The existing Parkesburg sewage treatment plant would be expanded to serve areas lying outside the Borough. Areas to be included are portions of West Sadsbury, Highland, East Fallowfield, and Sadsbury Townships. Sewage from the Pomeroy area of Sadsbury Township would be pumped to the Parkesburg plant for treatment and disposal. The estimated required capacity for the enlarged Parkesburg sewage treatment plant is 0.61 MGD by 1978 and 1.03 MGD by 1988. The table below shows the probable connected populations and probable sewage flows for each of the areas to be served for both 1978 and 1988.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS PARKESBURG AREA

	Present		1978		1988	
Municipality	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
Parkesburg Borough	2,095	0.18[1]	4,600	0.46	6,200	0.62
Highland Township	0	0	0	0	600	0.06
East Fallowfield Township	0	0	200	0.02	500	0.05
West Sadsbury	0	0	500	0.08	800	0.12
Sadsbury Township	0	0	500	0.05	1,800	0.18
TOTAL	2,095	0.18	5,800	0.61	9,900	1.03

[1] Existing treatment facility design capacity: 0.36 MGD.

Future Considerations

The existing Parkesburg Sewage Treatment Plant is in a relatively good location to serve additional areas adjacent to the Borough. Rather than abandon the existing treatment plant and replace it with a new facility it was decided to pump the Pomeroy Heights and Pomeroy areas of Sadsbury Township, and the Humphreyville area of East Fallowfield Township to the present plant site.

The major anticipated growth areas lie along the U.S. Route 30 transportation corridor and to the north in Sadsbury Township. High

density growth is not anticipated in Highland Township to the south of Parkesburg during the study period even though some areas in this vicinity are planned for high density development.

If growth does occur beyond the study period, much of the area in Highland Township north of Highland Road can easily be served by the Parkesburg system.

Over the next twenty years there is no apparent need to locate a treatment facility farther downstream on Buck Run. However, such a possibility exists for the more distant future. Only future development can determine the need for relocating the Parkesburg area facility.

South Coatesville Area

Description

A new multi-municipal system is proposed for the South Coatesville area, with the recently completed sewage treatment plant in South Coatesville serving as the area treatment facility. This plant would serve South Coatesville and Modena Boroughs. Total sewage flow to this facility is estimated to reach 0.46 MGD from a connected population of 4,000 persons by 1978. By 1988, the connected population is expected to reach 6,500 persons contributing a total sewage flow of about 0.70 MGD. The sewage flows expected from each municipality to be served are shown in the table below.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS SOUTH COATESVILLE AREA

Municipality	Present		1978		1988	
	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
South Coatesville	2,000	0.26[1]	3,000	0.36	5,000	0.55
Modena Borough	0	0	1,000	0.10	1,500	0.15
TOTAL	2,000	0.26	4,000	0.46	6,500	0.70

[1] Existing treatment facility design capacity: 0.39 MGD.

Future Considerations

The existing South Coatesville Borough treatment plant was completed in 1967. Since the plant and plant site are available, it is

recommended that flows from Modena Borough be pumped back to the existing facility, and the capacity of the existing facility be suitably expanded.

Extensive development to the south of Modena along the Brandywine Creek is not anticipated. If additional growth occurs in the Hephzibah-Youngsburg area of East Fallowfield and sewers become necessary, the area can easily be served by a trunk sewer along Dennis Run and the proposed pumping station in Modena Borough.

West Chester-Taylor Run Area

Description

Enlargement or replacement of the existing West Chester Borough Taylor Run Sewage Treatment Plant would be the basis for a multi-municipal system to serve West Chester Borough, the northern portion of West Goshen Township, and a small part of East Bradford Township. New trunk sewers would be required in West Goshen, one along Taylor Run and the other along the East Branch of Chester Creek terminating at a pumping station near the West Chester Reservoir; from this station sewage would be pumped to the Taylor Run trunk sewer. The estimated required capacity of the Taylor Run treatment plant is 1.31 MGD by 1978 and 1.98 MGD by 1988. The following table shows the present and probable future connected populations and sewage flows from the three municipalities.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS
WEST CHESTER-TAYLOR RUN AREA

	Present		1978		1988	
Municipality	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
West Chester Borough	8,200(1)	0.80(2)	9,500	0.95	12,000	1.20
West Goshen Township	525	0.03(3)	3,500	0.35	7,600	0.76
East Bradford Township	0	0	100	0.01	200	0.02
TOTAL	8,200	0.80	13,100	1.31	19,800	1.98

(1) Estimated.
(2) Existing treatment facility design capacity: 1.0 MGD.
(3) Existing treatment facility design capacity: 0.033 MGD.

Future Considerations

Enlargement of the existing West Chester Borough Taylor Run treatment plant would provide capacity to treat additional sewage flows from the Borough and to treat sewage flows from the northern portion of West Goshen Township. The northwestern part of West Goshen Township drains naturally to the Taylor Run plant, and the northeastern part of the Township is easily pumped to the Taylor Run drainage area.

The proposed Taylor Run area facility is a logical choice for three reasons. First, the facility serves an entire drainage basin by gravity and easily serves an adjacent drainage basin by pumping. Second, it appears to be more economical to pump sewage from the northeastern part of the Township to the Taylor Run facility than to the West Goshen treatment plant. Third, by not pumping the entire northern part of the Township to the West Goshen plant, additional capacity remains at the West Goshen facility to accept flows from the areas contributing to the recommended West Goshen Regional Sewage Treatment Plant.

If detailed study and analysis of the Taylor Run plant indicates that it should be abandoned, it is recommended that the new treatment plant site be located downstream on Taylor Run at the confluence with Brandywine Creek. Such a location would provide for additional future sewer service in East Bradford Township in the area along and between U.S. Route 322 and Pennsylvania Route 162 west of West Chester Borough.

North Coventry Area

Description

The existing North Coventry Township sewage treatment plant would be expanded some time before 1978 to serve anticipated growth in the present service area, additional adjacent areas in the Township, and parts of East Coventry Township. Service to additional areas would be accomplished by extensions to the existing collection system. The present connected population is 3,000 persons and present sewage flow at the treatment facility averages 0.29 MGD. Probable connected populations for 1978 and 1988 are 6,200 persons and 11,000 persons respectively. The estimated sewage flows are 0.62 MGD for 1978 and 1.10 for 1988. The table below shows the present and probable future connected populations and sewage flows for each of the two municipalities.

PRESENT AND PROBABLE FUTURE CONNECTED
POPULATIONS AND SEWAGE FLOWS
NORTH COVENTRY AREA SYSTEM

Municipality	Present Connected Population	Present Flow (MGD)	1978 Connected Population	1978 Flow (MGD)	1988 Connected Population	1988 Flow (MGD)
North Coventry Township	3,000	0.29(1)	5,400	0.54	9,400	0.94
East Coventry Township	0	0	800	0.08	1,600	0.16
TOTAL	3,000	0.29	6,200	0.62	11,000	1.10

(1) Existing treatment facility design capacity: 0.50 MGD.

Future Considerations

The drainage area in which the existing North Coventry sewage treatment plant is located is relatively small. However, the most likely future high density development area lies within this area. With the addition of a trunk sewer along a tributary to the Pigeon Creek and a pumping station, the high density development area of North Coventry can be served.

An additional trunk sewer and pumping station are required to sewer the northern part of East Coventry Township that abuts North Coventry Township.

A problem area exists in the vicinity of Parker Ford in East Coventry Township. Parker Ford is located approximately mid-way between the North Coventry and the Spring City sewage treatment facilities. Over the period of this study it will be necessary to install a localized sewage collection and "package" treatment system for the Parker Ford area, or devise a plan for the conveyance of sewage across the Schuylkill River to the Linwood Area. A detailed feasibility study would be required to define the most economical method. It must be noted that Parker Ford is located at the confluence of the Pigeon Creek and the Schuylkill River, and is the ideal location for a future regional sewage treatment plant to serve the Pigeon Creek Drainage Basin. If future development justifies the construction of such a regional system, it appears that it would be reasonable to abandon the North Coventry treatment plant and pump the sewage flows into a Pigeon Creek Regional System for treatment and disposal

Spring City Area

Description

The existing Spring City sewage treatment plant would be expanded to serve future needs in Spring City itself and in additional areas in East Vincent and East Pikeland Townships. Service to these additional areas would be provided by extensions to the existing collection system. The expected sewage flows from the probable service areas amount to 0.56 MGD by 1978 and 0.81 MGD by 1988. The table below indicates the present and probable future connected populations and sewage flows for each municipality to be served by the facility.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS SPRING CITY AREA SYSTEM

	Present		1978		1988	
Municipality	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
Spring City Borough	2,450	0.25[1]	4,000	0.40	4,700	0.47
East Vincent Township	0	0	1,400	0.14	3,100	0.31
East Pikeland Township	0	0	200	0.02	300	0.03
TOTAL	2,450	0.25	5,600	0.56	8,100	0.81

[1] Existing treatment facility design capacity: 0.25 MGD.

Future Considerations

The Spring City area sewerage system is planned to serve the remaining portions of the present tributary area and additional area in the Stony Creek drainage basin. Sewage flows from the Stony Creek basin would be pumped over the drainage divide to the Spring City Plant. In the more distant future, as the lower portion of the Stony Creek basin (between Phoenixville and Spring City) develops, it would probably be feasible to abandon the recommended pumping station, extend the Stony Creek trunk sewer downstream to the confluence with the Schuylkill River, and pump sewage flows from that point to the Phoenixville Regional System.

The Spring City area system has very little potential for growth, while the Phoenixville Regional System has the potential to serve the entire French Creek Basin. For this reason, it would probably be more economical in the more distant future to tie the Stony Creek Basin system into the larger Phoenixville Regional System than to continue to expand the Spring City System.

Municipal Systems

General

Sewerage systems in the following two areas will probably not be multi-municipal until some time after 1988. Growth in these areas is not expected to be rapid enough to require sewage collection facilities beyond the political limits of the three municipalities.

Atglen Borough

The built-up portions of Atglen should be sewered in the near future and Borough completely sewered by 1988. A sewage treatment plant should be built in the southeastern section of the Borough, with discharge of treated effluent to Valley Creek. The estimated connected populations for 1978 and 1988 are 1,700 persons and 2,500 persons respectively. The probable sewage flow to the proposed treatment plant would be 0.17 MGD by 1978 and 0.25 MGD by 1988. The capacity of the presently proposed facility is 0.09 MGD. However, the estimated 1965 population of Atglen Borough is only 800 persons.

It is not expected that any substantial domestic sewerage service would be provided outside the Borough limits. However there is a possibility that an industrial area may develop east of the Borough between Upper and Lower Valley Roads. This area, if it develops, would require sewer service, and agreements could be worked out between the Borough and the various industries for the Borough to provide sewage treatment and disposal. Potential sewage flows from this industrial area are not included in the projected sewage flows for Atglen Borough, because such flows are highly variable and can be properly determined only when it is known what type of industry is to be served.

Elverson Borough

The populated sections of Elverson should be sewered by 1978, and based on population projections for the area, the entire Borough should be sewered by 1988. Within the study period covered by this report it is not anticipated that the Borough system would be extended into adjacent areas of West Nantmeal Township. However, the proposed treatment plant location, on the French Creek in West Nantmeal, is suitable to serve areas in the Township which are between the Borough and the treatment plant. The probable connected

population for 1978 is 1,100 persons and for 1988 3,300 persons. The expected average flows for the two design years are 0.11 MGD and 0.33 MGD respectively.

Sewage Treated Outside Chester County

Sewage from the following two areas is presently transported out of the County for treatment and disposal. It is anticipated that the agreements will remain in effect and that additional flows from the two areas will also be exported. A brief description of the two areas follows below.

Tredyffrin Township (Trout Run Area)

Sewage from the Trout Run Basin in Tredyffrin Township presently is treated at the Upper Merion Township Trout Run Sewage Treatment Plant. Present flow is about 0.31 MGD from an estimated 3,080 persons. A small section of Easttown Township also lies in the Trout Run Basin, and it is proposed that sewage flows from this area be included with the Tredyffrin flows for treatment at the Upper Merion plant. The present and probable future connected populations for the two municipalities are shown in the following table.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS
TREDYFFRIN TOWNSHIP (TROUT RUN AREA) SYSTEM

	Present		1978		1988	
Municipality	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
(Trout Run Area)						
Tredyffrin Township	3,080	0.31	8,000	0.80	10,000	1.00
Easttown Township	0	0	600	0.06	700	0.07
TOTAL	3,080	0.31	8,600	0.86	10,700	1.07

Tredyffrin Township (Radnor-Haverford-Marple Area)

Sewage from the southeastern portion of Tredyffrin is conveyed to the Radnor-Haverford-Marple sewage plant for the treatment and disposal. It is anticipated that increased sewage flows resulting from additional population growth will also be transported to the Radnor-Haverford-Marple plant. The present and estimated future connected populations and sewerage flows for this area are shown in the following table.

PRESENT AND PROBABLE FUTURE CONNECTED POPULATIONS AND SEWAGE FLOWS TREDDYFFRIN TOWNSHIP SYSTEM (RADNOR-HAVERFORD-MARPLE AREA)

Municipality	Present		1978		1988	
	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)	Connected Population	Flow (MGD)
(Radnor-Haverford-Marple Area)						
Tredyffrin Township	3,500	0.35	6,500	0.65	8,000	0.80
TOTAL	3,500	0.35	6,500	0.65	8,000	0.80

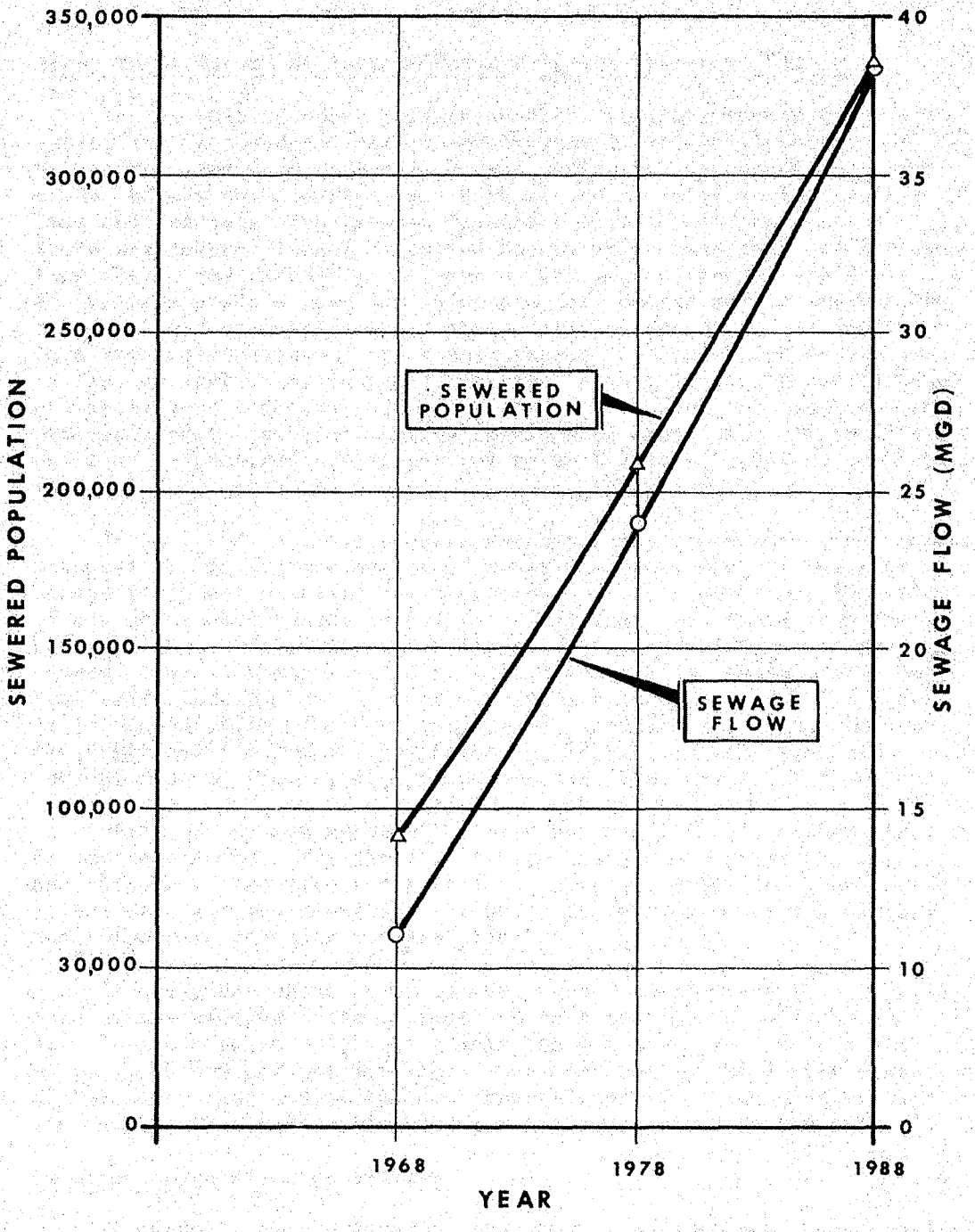
Table 11

Summary of Proposed
Regional, Multi-Municipal, and
Municipal Treatment Facilities

Name	Present Use (MGD)	Design Capacity (MGD)	Required 1978 (MGD)	Capacity 1988 (MGD)
Coatesville	2.00	4.00	2.45	3.43
Downingtown	1.80	1.40	2.87	4.52
Paoli Area	--	--	3.53	5.97
West Goshen	0.60	2.00	2.15	4.59
West Chester (Goose Creek)	1.20	2.00	1.58	1.93
West Whiteland	--	--	0.93	1.86
Phoenixville	1.86	2.00[1]	2.84	4.20
Oxford Area	0.21	0.35	0.73	1.12
West Grove Area	0.18	0.20	0.37	0.55
Avondale Area	--	--	0.40	0.62
Kennett Square Area	0.49	0.50	0.83	1.24
Honeybrook Area	--	--	0.15	0.27
Parkesburg Area	0.18	0.36	0.61	1.03
South Coatesville Area	0.26	0.39	0.46	0.70
West Chester-Taylor Run	0.80	1.00	1.31	1.98
North Coventry Area	0.29	0.50	0.62	1.10
Spring City Area	0.25	0.25	0.56	0.81
Atglen	--	--	0.17	0.25
Elverson	--	--	0.11	0.33
TOTALS	10.12	14.95	22.62	36.50

(1) Expansion to 4.0 MGD planned.

FIGURE 2



PRESENT AND PROBABLE FUTURE SEWERED POPULATION AND SEWAGE FLOWS CHESTER COUNTY, PENNSYLVANIA

Areas to be Served by Interim Package Sewage Treatment Plants

In the next category fall those areas that are remote from existing and proposed collection and treatment facilities and cannot be incorporated into regional systems during the study period. Such areas, as was noted before, would be served by local collection systems and "package" type sewage treatment plants. At the present time, there are several locations in the County which need systems of this type now. These areas can be seen on the Sewage Problem Areas map. Any problem areas on the map which are not located near or within the bounds of the proposed sewered areas will, of necessity, be served by localized collection and treatment systems. The decision to use localized collection systems and "package" plants in some areas is based primarily upon financial considerations. Some problem areas, and some proposed medium and high density development areas, are too far from existing or proposed public systems to be feasibly served by such systems.

In addition to those areas presently experiencing on-site sewage disposal problems there are other areas which may require "package" sewage treatment plants. The proposed land use plan allows for relatively dense development in several areas that are remote from the proposed area-wide sewerage facilities. If population growth does indeed occur in these locations, localized sewerage systems will be required. Some probable future development locations are: Cochranville, Russelville, the Forestville-Lincoln University area, New London, Kemblesville, Homeville, Pocopson, Rockville, the Glenmore-Springton area, Brownbacks, Lenape, Marshallton, and Nottingham.[a]

"Package" sewage treatment plants are available in either steel or concrete units. The steel units are fabricated at the factory and shipped to the site for erection. Concrete units are constructed at the site and equipment for the units is fabricated at the factory and shipped to the site for installation.

Single steel units which can be shipped to the site in one or more pieces are available in sizes up to about 35,000 gallons per day. Field erected "package" plants are available in single units up to 1,000,000 gallons per day. When considering the larger sizes of "package" plants detailed cost comparisons should be made between the "package" unit and a treatment plant constructed on the site.

On-Site Sewage Disposal Systems

Throughout the remainder of the County, on-site sewage disposal methods will be relied upon for many years to come. Detailed study of On-Site Sewage Disposal Soil Suitability maps should be made in order to determine the areas where these systems can be used. It is

a. included also are the villages of Knauertown, Harmonyville and Unionville.

expected that the supervision of on-site sewage disposal systems will be under the jurisdiction of the Chester County Health Department in accordance with the provisions of the Pennsylvania Sewage Facilities Act (Act 537). The Act assigns to the County Health Departments jurisdiction over new construction on lots less than one acre in area.

Although the present law limits Health Department jurisdiction to lots one acre and less in size, there are now pressures being exerted in various quarters to extend jurisdiction to all lots, regardless of size. The Chester County Health Department has taken jurisdiction of all lots and permits are required for on-site sewage disposal systems on all lots in the County.

Areas Needing Detailed Study in the Near Future

In accordance with the requirements of Act 537, areas needing systems in the near future (within three years) are listed below. Many of the areas (municipalities) listed have already initiated detailed feasibility studies or even detailed engineering plans. Such municipalities are listed for information purposes, and the extent of planning either in progress or completed is indicated.

Table 12

Areas Needing Detailed Studies
Within the Next Three Years

Municipality	Status of Needed Planning
Atglen Borough	Design Complete
Avondale Borough	Design Complete
Caln Township	Design Complete
East Bradford Township	None
East Brandywine Township	None
East Caln Township	Design Underway
East Coventry Township	None
East Fallowfield Township	None
East Goshen Township	Design Underway
East Pikeland Township	Feasibility Study Complete
Easttown Township	Feasibility Study Complete
East Whiteland Township	Design Underway
Elverson Borough	None
Honey Brook Borough	Feasibility Study Complete
Kennett Township	None
London Grove Township	None
Lower Oxford	None
Malvern Borough	Feasibility Study Underway
Modena Borough	None
New Garden Township	Design Complete
Sadsbury Township	None
Schuylkill Township	Feasibility Study Complete
Tredyffrin Township (Paoli Area)	Design Underway
Uwchlan Township	Feasibility Study Complete
Valley Township	Feasibility Study Complete
West Bradford Township	None
Westtown Township	Feasibility Study Underway
West Whiteland Township	Feasibility Study Complete
Willistown Township	Feasibility Study Complete
a Westtown Township	Partial Feasibility Study Complete

Municipality	Status of Needed Planning
New London Township	None
Pennsbury Township	None
East Marlbor Township	None
Charlestown Township	Partial Study Underway
North Coventry Township	None
Warwick Township	None

ADMINISTRATION AND FINANCING

General

In order to implement the recommendations of the Master Sewage Facilities Plan, administrative and financing programs must be developed. Several alternative methods of administration and financing are presented in this section of the report. Also presented is a discussion of available State and Federal Aid for sewage facilities projects.

Administrative Alternatives

A number of administrative methods are available for assisting in the development and implementation of individual sewage facilities plans in accordance with the Master Sewage Facilities Plan. These methods can be generally considered from the standpoint of the degree of assistance and participation by the County in the planning and administration of projects.

Individual Municipal Authority

When only one municipality is involved in a sewage facilities program, a separate municipal authority can be created to finance, construct and operate the desired facilities. Such an authority would essentially be limited to control of facilities within the particular municipality.

With such an arrangement, the County could advise the individual municipality and authority with regard to planning, financing, operation, and participation in "regional" cooperative projects, but would not be able to participate directly in such matters except at the specific invitation of the municipality or authority, nor be able to participate to the degree that the Department of Health or the Delaware River Basin Commission would be influenced by advice or recommendations made by the County in its review of the project.

The individual municipal authority setup would involve some disadvantages. It would probably restrict or lessen the scope of consideration of possible solutions to local sewage problems, in that investigation by the municipality alone would tend to overlook some potentially more desirable alternatives which would be considered by a regional authority.

In addition, an individual municipality would generally not be able to exert as much influence in requests for financial assistance from State and Federal agencies as would a group of municipalities or a regional authority.

County Authority

A County Sewer Authority could be appropriately organized and have sufficient staff competence for effective implementation of regional or County-wide planning, financing, and operation of sewerage systems. It would also be in a very strong position with regard to application for, and negotiation of, requests for loans or grants-in-aid from appropriate State and Federal agencies. However, substantial administrative, financial, and legal obstacles indicate that the County Authority approach would not be practical at this point in time and at this stage of the County's development.

Joint or Regional Authority

A joint or regional authority approach would answer most of the objections to either the individual or county-wide approaches, and, with the proper degree of County involvement, maintain the principal desirable aspects of both. The advantages include the relative ease of financing because of a large population base and the preferential consideration given to joint, or regional, project requests for governmental financial assistance.

Because of their limited area of responsibility, joint or regional authorities can include a greater degree of individual municipality participation than can a county-wide authority, and therefore are often more sensitive to the needs and desires of the individual municipal participants.

The County could more effectively assist a relatively few regional authorities than it could assist many individual authorities, and a greater degree of planning of a truly comprehensive nature could also result. Additionally, because of the number of separate governmental unit participants in joint or regional authorities, it could even be possible to arrange for County representation in the membership of such an administrative group. This, in turn, could insure that the County is kept fully aware of the status of planning and financing, and would also give the County the opportunity to participate in the development of satisfactory comprehensive planning.

Sewage Facilities Committee

The first step in developing participation of the individual municipalities in a regional or joint authority approach would be to acquaint the many municipalities of Chester County with the benefits to be derived from such a solution to their sewage problems. Then, provided the municipalities agree to such an approach, the County could assist them in creating the necessary administrative bodies, and in initiating activity within them.

This assistance could be provided by the County through a Sewer Committee created by the County for this express purpose. In order that activities of the various regional authorities would not conflict with the other regional and county-wide planning activities, it is recommended that the Planning Commission participate in the Sewer Committee membership.

Financing Alternatives

The financing to be used can be determined only when the method of administration has been decided upon. In Pennsylvania, there are three available methods of financing for construction of sewage collection and treatment facilities.

General Obligation Bonds

The General Obligation Bond method of financing pledges the full faith and credit of a municipality, backed by its taxing power, to repay the amount borrowed with regard to any specific fund or specific user charges that may be assigned and collected. The chief advantage of such an approach is the low bond interest rate generally obtainable, since the bonds are considered to be essentially free of risk. The chief disadvantages include: the usual requirement for a referendum which incurs a risk of rejection unless the voters are adequately educated to the need for the system: and the limitation placed on the financial power of the municipality by committing a significant portion of its permitted total indebtedness for a long period of time for a single project.

Authority Bonds

Authority Bond financing overcomes the arguments against General Obligation Bond financing in that, as an independent legal entity, an Authority can issue what are essentially non-debt revenue bonds, without referendum and without encroaching on the debt limitations of the sponsoring municipality. Of course, since the sponsoring municipality does not directly pledge its general taxing power in support of such bonds, there is a certain element of risk involved to investors, and the consequent bond interest rates required to promote the sale of such bonds are somewhat higher than those encountered in the sale of General Obligation Bonds.

These higher interest rates can often be reduced by utilizing what is termed "lease-back" operation, wherein the sponsoring municipality leases the sewerage facilities from the Authority and operates them, paying to the Authority an agreed-upon, fixed annual payment

which is used to retire the bonded indebtedness. In a sense, therefore, the municipality pledges general taxing power to support the repayment of the borrowed monies, but does not have to pledge direct support of bonding or submit such a decision to referendum.

Non-Debt Revenue Bonds

Non-debt Revenue Bond financing is quite similar to Authority Bond financing without the benefit of "lease-back" operation. This type of financing has been used infrequently in Pennsylvania and has encountered somewhat higher bond interest rates than have been experienced with Authority Bond financing. However, this method of financing might be considered advantageous in the case of the regional or county-wide authority method of administration.

Before making any decision with regard to methods of financing, the administrative body so chosen (be it an individual, joint, regional, or county-wide authority) should seek the advice of qualified, experienced financial advisors and legal counsel.

Federal and State Aid

Federal Aid

Aid in the form of loans and grants is available under several programs administered by various agencies of the Federal Government. Those programs applicable to the municipalities in Chester County, or to the County itself, are described below. These descriptions are intended to show, in a general fashion, the available aid and the extent of project coverage provided by each of the aid programs. Since the programs are almost continuously added to or revised, it is recommended that the municipalities and the County obtain the latest information on each of the applicable aid programs as specific sewerage projects arise.

The Federal Water Pollution Control Act (Water Quality Act of 1965), Public Law 89-234, provides funds for public sewage collection and treatment facilities. The Federal Water Pollution Control Administration of the Department of the Interior, and the Pennsylvania State Health Department, administer this act. The Act, as amended in 1966, provides for grants-in-aid equal to 30 percent of the total eligible costs of qualifying pollution abatement projects. The eligible items are limited to treatment works and necessary facilities and include: engineering, legal and fiscal studies and designs, supervision and inspection of construction, sewage treatment works, interceptor sewers, outfall sewers, pumping stations and force mains. Increases in this percentage are allowed when the individual States participate in grants-in-aid programs.

The Housing and Urban Development Act of 1965, Public Law 89-174, provides for loans and grants-in-aid to local public bodies or agencies having the authority to provide public water and sewage facilities. This Act is administered by the Department of Housing and Urban Development. The purpose of the Act is to assist and encourage communities to construct adequate basic water and sewerage facilities, to construct neighborhood facilities for programs of necessary social services, and to acquire land for future public works and facilities. The Act provides for loans and grants-in-aid not to exceed 50 percent of the eligible development costs of qualifying public water and sewage projects. In regard to public sewage facilities, the aid is available for most items other than those considered eligible under the Federal Water Pollution Control Act.

Public Law 560, Section 702 of the Federal Housing Act of 1954, as amended, provides for interest-free loans to any non-Federal public body or agency with the authority to plan, finance, and construct public works. This Act is administered by the Department of Housing and Urban Development for the purpose of providing advances needed to finance planning for local public works. The Act provides for interest-free loans for planning costs from a revolving fund. Repayment of advances is made upon the start of construction. Advances may be repaid in proportion to the percentage of construction undertaken. All types of preliminary and final public works planning are eligible except public housing. Loans are not made for projects when other planning funds are available.

The Consolidated Farmers Home Administration Act, as amended, Public Law 80-240, provides for loans and grants-in-aid to municipalities having a population of less than 5,500 inhabitants. The purpose of this Act is to furnish financial assistance for planning and construction of certain public works facilities for rural residents. The Act is administered by the Farmers Home Administration, U. S. Department of Agriculture. The Act provides for grants-in-aid to qualifying projects, not to exceed 50 percent of project development costs, defined as the costs of the construction of a facility including the land, easements, and right-of-way and water rights necessary to its construction and operation. Projects providing for the construction of public sewage collection, treatment, and disposal facilities are eligible.

State Aid

Under the provisions of the "Land and Water Conservation and Reclamation Act" recently enacted by the Pennsylvania Legislature, the Sanitary Water Board is authorized to award construction grants-in-aid to eligible sewage facility projects. Administration and awarding of funds under this grant program is being coordinated with the Federal Water Pollution Control Act. Under criteria adopted by the Sanitary Water Board, the total of Federal and State grants for any particular

project shall be not less than 30 percent of the estimated project costs which costs shall include preliminary planning, engineering, architectural, legal, fiscal and economic investigations and studies, surveys, design, plans, working drawings, specifications, procedures, and other actions necessary to the erection, building, acquisition, alteration, extension, etc. of treatment works including inspection and supervision of construction of such works. Eligible facilities are considered to be essentially those qualifying under the Federal Water Pollution Control Act. It is possible that this Act may constitute sufficient participation to qualify projects for increases in the percentage of grant-in-aid authorized under the Federal Water Pollution Control Act.

Under Act No. 13, the Community Facilities Act (Harness Racing Bill) the Department of Commerce, Commonwealth of Pennsylvania has been authorized to utilize certain monies accruing to the Commonwealth from harness racing track operation to provide grants-in-aid to qualifying sewage facility projects. The maximum grant-in-aid under this program is twenty-five (25%) percent of the project costs with the dollar amount not to exceed $100,000 per project. Projects for which grants-in-aid are requested are evaluated on the general basis of their impact on both the health and economic strength of the community they are to serve.

The Pennsylvania State Department of Health is authorized to subsidize a portion of the annual operating costs of public sewage facilities via annual grants-in-aid to local municipalities or authorities. These annual grants have been set at two percent of the eligible acquisition or construction costs of the facilities. The applicable facilities are sewage treatment works, intercepting or trunk sewers, and pumping stations.

CONCLUSIONS

The population of Chester County is forecasted to grow to more than double the present population by 1990. The magnitude and pace of the expected growth are indicated by the following tabulation:

Year	Chester County Population
1965	246,800
1970	295,500
1975	357,800
1980	425,400
1985	499,300
1990	579,200

At the present time about 91,000 people (36 percent of the total county population) are served by public or semi-public sewerage systems. The rest of the County relies on on-site sewage disposal systems of various types.

Interpretation of the County Soils Map and of other available soils data indicates that much of the total area of the County is unsuitable for on-site disposal systems. Only 7.5 percent is classified as having "Slight Limitations" and 41.4 percent as having "Moderate Limitations," whereas 46.8 percent of the area has "Severe Limitations," and 4.3 percent is unsuitable because of high risk of ground water contamination.

In several areas the residents are already experiencing generalized problems with on-site systems according to complaints received by the Pennsylvania Department of Health. These areas are shown on the Sewage Problem Areas map. Such areas should be sewered as soon as possible, either by connection to existing systems or by construction of new sewage collection and treatment systems.

Careful projections of population growth, densities, and distribution are the most reliable bases for forecasting the areas that should be sewered in the future. Soil characteristics, lot sizes, and topographical features are important factors in the selection of the kind of facilities required in particular areas.

Based on such projections and selection factors, a combination of regional, multi-municipal, individual municipal, and on-site disposal systems appears to be the most effective approach to solution of Chester County's sewage problems. Under the programs outlined in this report about 210,000 people (50 percent of the County total) would be sewered by 1978, and about 335,000 people (60 percent of the County total) by 1988. The 60 percent forecasted to be connected to public sewerage systems in 1988 would be distributed over less than 25 percent of the total area of the County.

RECOMMENDATIONS

General

It is recommended that the County give consideration to the establishment of a committee to coordinate the specific sewage projects and encourage the concept of a regional approach to the collection and treatment of sewage which is the basis of this report. Such a committee should be set up when there is sufficient activity by the various municipalities to indicate a definite need.

The Chester County Planning Commission should be included in the membership of the Sewage Facilities Committee.

Maintain the sewage treatment agreements currently in force between Tredyffrin Township and Upper Merion, Haverford, Radnor and Marple Townships; modify them if necessary to provide for continued treatment of expected additional sewage flows from the respective Tredyffrin Township areas.

Sewerage Systems

Develop plans for establishing the following sewerage systems and for organizing the required administrative bodies:

Regional Systems

1. Coatesville Area -- with participation by the City of Coatesville, and by East Fallowfield, Valley, West Caln, and Caln Townships. Expected sewage flows--2.45 MGD by 1978; 3.43 MGD by 1988.

2. Downingtown Area -- with participation by Downingtown Borough, and by East Caln, West Bradford, Caln, and Uwchlan Townships. Expected sewage flows -- 2.87 MGD by 1978; 4.52 MGD by 1988.

3. Paoli Area (Valley Creek Basin) -- with participation by Tredyffrin, East Whiteland, Willistown, and Easttown Townships and Malvern Borough. Expected sewage flows--3.53 MGD by 1978; 5.97 MGD by 1988.

4. West Goshen-West Chester Area -- with participation by West Goshen, East Goshen, Willistown and Westtown Townships. Expected sewage flows--2.15 MGD by 1978; 4.59 MGD by 1988. Also, it is anticipated that operation of the West Chester Goose Creek Plant would be continued through the study period with expected sewage flows of 1.58 MGD by 1978 and 1.93 MGD by 1988.

5. West Whiteland Area -- with participation by West Whiteland, East Bradford, and Uwchlan and Upper Uwchlan Townships. Expected sewage flows--0.93 MGD by 1978; 1.86 MGD by 1988.

6. Phoenixville Area -- with participation by the Borough of Phoenixville and East Pikeland, Schuylkill and Charlestown Townships. Expected sewage flows--2.84 MGD by 1978 and 4.20 MGD by 1988.

Multi-Municipal Systems

1. Oxford Area -- with participation by Oxford Borough and East Nottingham and Lower Oxford Townships. Expected sewage flows--0.73 MGD by 1978; 1.12 MGD by 1988.

2. West Grove Area -- with participation by West Grove Borough and London Grove Township. Expected sewage flows--0.37 MGD by 1978; 0.55 MGD by 1988.

3. Avondale Area -- with participation by Avondale Borough and New Garden and London Grove Townships. Expected Sewage flows--0.40 MGD by 1978; 0.62 MGD by 1988.

4. Kennett Square Area -- with participation by Kennett Square Borough and Kennett, East Marlboro and New Garden Townships. Expected sewage flows--0.83 MGD by 1978; 1.24 MGD by 1988.

5. Honeybrook Area -- with participation by Honeybrook Borough and Honey Brook Township. Expected sewage flows--0.15 MGD by 1978; 0.27 MGD by 1988.

6. Parkesburg Area -- with participation by Parkesburg Borough and Highland, East Fallowfield, Sadsbury, and West Sadsbury Townships. Expected sewage flows--0.61 MGD by 1978; 1.03 MGD by 1988.

7. South Coatesville Area -- with participation by South Coatesville and Modena Boroughs. Estimated sewage flows--0.46 MGD by 1978; 0.70 MGD by 1988.

8. West Chester-Taylor Run Area -- with participation by West Chester Borough and West Goshen and East Bradford Townships. Expected sewage flows--1.31 MGD by 1978; 1.98 MGD by 1988.

9. North Coventry Area -- with participation by North Coventry and East Coventry Townships. Expected sewage flows--0.62 MGD by 1978; 1.10 MGD by 1988.

10. Spring City Area -- with participation by Spring City Borough and East Vincent and East Pikeland Townships. Expected sewage flows--0.56 MGD by 1978; 0.81 MGD by 1988.

Individual Municipal Systems

1. Atglen Borough -- expected sewage flows--0.17 MGD by 1978; 0.25 MGD by 1988.

2. Elverson Borough -- expected sewage flows--0.11 MGD by 1978; 0.33 MGD by 1988.

APPENDIX A

SCHUYLKILL RIVER BASIN
RECOMMENDED WATER QUALITY STANDARDS

REPORT OF THE DIVISION OF SANITARY ENGINEERING
TO THE SANITARY WATER BOARD
RECOMMENDED WATER QUALITY STANDARDS
FOR SURFACE WATERS

SCHUYLKILL RIVER BASIN

I. PURPOSE OF REPORT:

In order to control pollution and to manage the quality of Pennsylvania's waters, it is necessary to continually review and, where necessary, revise the stream classification program that the Board has been utilizing since 1944. This report is a part of this program in that it recommends water quality criteria for the surface waters and provides information on the steps necessary to obtain the water quality specified by the criteria. This report will be distributed to interested persons and municipalities prior to a public hearing to be held in Reading, Pennsylvania on December 21, 1967. The hearing will give those interested persons and municipalities an opportunity to express their veiws and desires related to these criteria and plan of implementation. Based on this report and the testimony at the hearing, the Board should then establish water quality criteria and pollution control measures (implementation plan) necessary for management of the waters considered in the report. The Board should then issue appropriate orders as provided for the implementation plan.

II. SCOPE OF REPORT:

This report considers the surface waters of the Schuylkill River Basin. These waters include all rivers, streams, creeks, rivulets, lakes, dammed water, ponds, springs and all other bodies of surface water, or parts thereof, whether natural or artificial, within the boundaries of this basin.

III. DESCRIPTION OF AREA:

A. Location - The area considered in this report is the Schuylkill River Basin in Berks, Bucks, Carbon, Chester, Delaware, Lancaster, Lebanon, Lehigh, Montgomery, Philadelphia and Schuylkill Counties.

B. Natural Features of the Area - The Schuylkill River has a drainage area of 1,916 square miles. There are 185 named streams and about 1,600 unnamed streams in the basin. Major streams include the Schuylkill River, Wissahickon Creek, Perkiomen Creek, French Creek, Manatawny Creek, Tulpehocken Creek, Maiden Creek, and the Little Schuylkill River. There are no natural lakes or ponds in this area.

The Schuylkill County, or headwaters area, of the basin is in the Appalachian Mountain Section of the Ridge and Valley Province. At the confluence of the Little Schuylkill, the river flows through a water gap in the Blue Mountains and enters the Great Valley Section of the Valley and Ridge Province. Leaving the Great Valley, the Schuylkill enters the Piedmont Province and then the Coastal Plain Province near Philadelphia.

The topography varies from rugged valleys and ridges in the Appalachian Mountain Section through a rolling to hilly area in the Great Valley Section and Piedmont Province to the relatively flat Coastal Plain area.

The geology of the basin is varied and complex. Anthracite coal, together with shales and sandstones, are found in the Appalachian Mountain Section. The Great Valley is composed principally of limestone and dolomite. The Piedmont Province is composed principally of shales and sandstones, although igneous rocks are common, and limestone, dolomite, and schist are found on the southern edge of the Piedmont. Economic minerals are found throughout the basin, and consist principally of anthracite coal and limestone.

Average stream flows range from 1.5 cubic feet per second per square mile (cfsm) to 2.0 cfsm, while drought flows range of 0.005 cfsm to 0.32 cfsm. The higher drought flows generally occur in limestone and anthracite mining areas, while the lower flows generally occur in the shale and sandstone portions of the Piedmont Province. The higher drought flows in the anthracite area may be due to pumped and gravity mine discharges rather than to natural conditions.

In general, the portion of the basin above the confluence of the Little Schuylkill River lies above 400 feet mean sea level (MSL), while the lower and southern portion of the basin generally lies below 400 feet MSL.

C. Cultural Features - The schuylkill River Basin encompasses portions of 11 counties and all or portions of 223 cities, boroughs and townships. In 1960, over 1,000,000 persons lived within the basin and its waters were used by more than 2,000,000 persons.

The basin contains the Reading urbanized area, and forms part of the Philadelphia urbanized area. It lies within 50 miles of the Allentown-Bethlehem, Lancaster, Harrisburg, Wilkes-Barre and Scranton urbanized area.

The Schuylkill River has been a center of Pennsylvania's urban and industrial activity since colonial times. The canal system increased urban and industrial activity, and river communities such as Leesport, Bridgeport, Port Kennedy, Port Clinton, Port Carbon and Schuylkill Haven still bear witness to the river's transportation activity.

Numerous water supply reservoirs, particularly in headwater areas, have been constructed on the basin to serve its municipal and industrial needs by storing water during periods of high runoff and using this stored water during dry periods.

The major water users on the basin are municpal (presently about 250 million gallons per day) and the mining, textile, paper, power and metallurgical industries (about 800 million gallons per day), or a total water use of 1,050 million gallons per day. Since the drought flow at Philadelphia is about 230 million gallons per day, the water is frquently reused, about 4.6 times during drought conditions.

D. Water Quality Problems - The water quality problems of the Schuylkill River Basin are numerous and complex.

Mine drainage, much of it acid in nature, affects the entire Schuylkill River and many of its tributaries above the Reading area. In the vicinity of Reading, the acid is neutralized but the dissolved solids and hardness content of the river remain high. Much of this mine drainage comes from abandoned mines.

Untreated sewage is discharged by some communities in the anthracite region.

In the remainder of the basin, most wastes receive secondary treatment, but large water uses and the numerous treated waste discharges still cause water quality degradation, as do materials that are difficult to remove and scattered discharges of untreated wastes. Some of the existing or potential problem areas include:

1. Main Schuylkill River - Mine drainage causes acid conditions in the headwater areas and increased hardness and dissolved solids content throughout the entire river. A concerted mine drainage abatement program is needed to solve this problem. Cost of abatement will include a public cost because much of the drainage is coming from abandoned mines.

2. Schuylkill River - Dissolved oxygen problems occur in the vicinity of metropolitan areas, particularly Pottsville (untreated wastes), near Reading, and below Norristown. Secondary treatment is needed at Pottsville while tertiary treatment is needed in the other areas.

3. Schuylkill River - Copper concentrations as great as 0.34 mg/L have been found in the Schuylkill River. In addition, unnatural discoloration occurs in certain areas, and the presence of oil on the river has recently become a frequent occurrence. Better industrial waste treatment, together with better "spill" control, is needed. Superheated water occurs in some areas and this will need further control.

4. Tulpehocken Creek - Nutrients, particularly as discharged in sewage treatment plant effluents, can seriously affect beneficial uses in the proposed Blue Marsh Reservoir.

5. Perkiomen Creek - Nutrients presently affect this stream.

6. Wissahickon Creek - This stream receives large volumes of treated sewage and industrial waste, and is rapidly being lost to eroded silt from various construction areas. On a basin-wide basis, wastes on Wissahickon Creek receive a higher level of treatment than any other area in the State. Even with all of the pollution control effort expended on Wissahickon Creek, additional treatment may now be needed. In the future, as the population grows, additional treatment will certainly be needed.

Throughout the entire Schuylkill Basin, widespread water use impairment, particularly to swimming, is caused by the presence of unnaturally high numbers of bacteria. These bacteria come from treated and untreated sewage, farm animals, and from dislodged soil and vegetation.

IV. STANDARD LIST OF WATER USES:

The following Standard List of Water Uses is used to simplify and shorten Section VI which recommends specific water uses and water quality criteria for each of the waters considered. More detailed water use descriptions are given in

Appendix A. The water uses included in the standard list are followed by an X. Where there is or should be an exception to the standard use list, the exception is indicated by listing the appropriate water use number, preceded by "Add" or "Delete" in Section VI.

Water Uses	Code (Standard List = X)
1.0 Aquatic Life	
1.1 Cold Water Fish	0
1.2 Warn Water Fish	X
1.3 Migratory Fish	0
1.4 Trout (Stocking only)	0
2.0 Water Supply	
2.1 Domestic	X
2.2 Industrial	X
2.3 Livestock	X
2.4 Wildlife	X
2.5 Irrigation	X
3.0 Recreation	
3.1 Boating	X
3.2 Fishing	X
3.3 Water Contact Sports	X
3.4 Natural Area	X
3.5 Conservation Area	0
4.0 Other	
4.1 Power	X
4.2 Navigation	0
4.3 Treated Waste Assimilation	X

V. WATER QUALITY CRITERIA:

A. Purpose

The purpose of the water quality criteria is to provide a basis for engineering of Pollution Abatement Projects. Where natural conditions preclude achievement of the criteria, the statement "or natural conditions" is implied.

B. General Water Quality Criteria

The "General Water Quality Criteria" apply to all waters at all times and are as follows:

The water shall not contain substances attributable to municipal, industrial or other waste discharges in concentrations or amounts sufficient to be inimical or harmful to the water uses to be protected or to humna, animal, plant or aquatic life. Specific substances to be controlled include, but are not limited to, floating debris, oil, scum and other floating materials; toxic substances; substances that produce color, tastes, odors or settle to form sludge deposits.

C. Specific Water Quality Criteria

A list of the Specific Water Quality Criteria used in Section VI follows:

a. pH

Not less than 6.0; not to exceed 8.5.

b. Dissolved Oxygen

b_1 Minimum daily average of 6.0 mg/L with no value less than 5.0 mg/L.
b_2 Minimum daily average of 5.0 mg/L with no value less than 4.0 mg/L.
b_3 For the period 3/15 to 6/30 of any year; no value less than 4.0 mg/L. For the remainder of the year; no value less than 4.0 mg/L.
b_4 No value less than 7.0 mg/L.
b_5 For lakes, ponds and impoundments only; no value less than 4.0 mg/L in the epilimnion.
b_6 For lakes, ponds and impoundments only; no value less than 5.0 mg/L at any point.

c. Total Iron

Not to exceed 1.5 mg/L.

d. Temperature

d_1 Not to exceed 58°F or natural temperatures, whichever is greater.

d_2 Not to exceed 5°F rise above ambient temperature or a maximum of 87°F, whichever is less; not to be changed by more than 2°F during any one hour period.

e. Dissolved Solids

Not to exceed 500 mg/L as a monthly average value; not to exceed 750 mg/L at any time.

f. Bacteria (Coliforms/100 ml)

For the period 5/15-9/15 of any year; not to exceed 1,000/100 ml as an arithmetic average value; not to exceed 1,000/100 ml in more than two consecutive samples; not to exceed 2,400/100 ml in more than one sample.

For the period 9/16-5/14 of any year; not to exceed 5,000/100 ml as a monthly average value, nor to exceed this number in more than 20% of the samples collected during any month; nor to exceed 20,000/100 ml in more than 5% of the samples.

E. Standard List of Water Quality Criteria

The following Standard List of Water Quality Criteria is used to simplify and shorten Section VI. A brief discussion of some of the more common water quality indicators for which criteria are recommended is presented in Appendix B.

The Water Quality Criteria are directly related to the protection of the indicated water uses. For most zones and the standard list of water uses, a standard list of water quality criteria is used.

Where exceptions to water quality criteria occur in Section VI, the exception is indicated by listing the appropriate water quality criteria letter, preceded by "Add" or "Delete" in Section VI.

Water Quality Indicator	Code	Criteria
pH	a	Not less than 6.0; not to exceed 8.5.
Dissolved Oxygen	b_2	Minimum daily average of 5.0 mg/L with no value less than 4.0 mg/L.
Total Iron	c	Not to exceed 1.5 mg/L.
Temperature	d_2	Not to exceed 5°F rise above ambient temperature or a maximum of 87°F, whichever is less; not to be changed by more than 2°F during any one hour period.
Dissolved Solids	e	Not to exceed 500 mg/L as a monthly average value; not to exceed 750 mg/L at any time.
Bacteria (Coliforms/100 ml)	f	For the period 5/15-9/15 of any year; not to exceed 1,000/100 ml as an arithmetic average value; not to exceed 1,000/100 ml in more than two consecutive samples; not to exceed 2,400/100 ml in more than one sample. For the period 9/16-5/14 of any year; not to exceed 5,000/100 ml as a monthly average value, nor to exceed this number in more than 20% of the samples collected during any month; nor to exceed 20,000/100 ml in more than 5% of the samples.

VI. WATER USES AND WATER QUALITY CRITERIA FOR WATERS CONSIDERED IN THIS REPORT:

The specific water uses and water quality criteria which apply to all waters in this hearing area are described in this section. There are nearly 2,000 different bodies of water in this area.

Because of the latitude and elevation of this area, and because of the population density, most waters appear to have

the Standard List of Water Uses as appropriate uses, and the Standard List of Water Quality Criteria as pertinent criteria. There are, however, certain waters where other present and future uses differ from the Standard List and where appropriate changes should be made to the recommended Water Quality Criteria.

The criteria recommended for streams are, in all cases, maximum or minimum values that should be reached only during critical flow conditions. The critical flow is considered as the average minimum flow that occurs during seven consecutive days or any one year, and having a recurrence interval of ten years, whether the flow is regulated or not. For flows lower than this, the general water quality criteria apply. The criteria recommended for lakes, dammed water, ponds and all other bodies of surface water apply at all times.

It is recommended that the Sanitary Water Board adopt the General Water Quality Criteria for all waters at all times (Section V-B) and the following specific water quality criteria for the zones hereafter described, for the protection of the present and future water uses described.

Description of Zones	Exceptions to Standard Water Use List	Exceptions to Standard Water Quality Criteria List
A. All waters in the hearing area described in Section II and Section III-A of this report, except as hereafter described.	None	None

B. Exceptions to Section VI-A - Exceptions are listed below along with an explanation of the water uses on which the exceptions are based.

Valley Creek - Valley Creek is a tributary to the Schuylkill River at Valley Forge. It is stock with trout.

Description of Zone

Zone Name	Limits of Zone	Exceptions to Standard Water Use List	Exceptions to Standard Water Quality Criteria List
Valley Creek Basin	None	Add 1.4	Delete b_2; Add b_3

Pickering Creek - Pickering Creek is stocked with trout.

Description of Zone

Zone Name	Limits of Zone	Exceptions to Standard Water Use List	Exceptions to Standard Water Quality Criteria List
Pickering Creek Basin	None	Add 1.4	Delete b_2; Add b_3

French Creek - French Creek is stocked with trout, and its headwaters lie above an elevation of 400 MSL, where the waters should generally be cold.

Description of Zone

Zone Name	Limits of Zone	Exceptions to Standard Water Use List	Exceptions to Standard Water Quality Criteria List
French Creek Basin	From its source to, but not including, the South Branch of French Creek, and all tributaries named and unnamed	Add 1.1	Delete b_2, d_2; Add b_1 and b_6, d_1
French Creek Basin	From and including the South Branch of French Creek to its mouth, and all tributaries, named and unnamed	Add 1.4	Delete b_2; Add b_3

Schuylkill River - The presence of toxic heavy metals, particularly copper and zonc, in the Schuylkill River and some of its tributaries is a matter of concern. These materials should be controlled, even in the acid portions of the stream, because the materials carry into alkaline portions of the stream. It is recommended that the following specific criteria be adopted for all surface waters of the Schuylkill River Basin:

Copper - Not to exceed 0.02 mg/L as Cu
Zinc - Not to exceed 0.05 mg/L as Zn

VII. ABATEMENT PLAN:

General: Upon approval of the criteria presented in Section VI, the Division of Sanitary Engineering recommends that the Sanitary Water Board, in accordance with its powers under the Clean Streams Law, issue appropriate orders, modify permits or take other appropriate action to have all persons or municipalities under its jurisdiction abate pollution to comply with the criteria. It is recommended that the Board, in all cases, require either immediate abatement or the submission of a detailed abatement schedule providing for abatement within as short a period of time as is technically possible and that the Board cause appropriate investigations to be made to assure itself of compliance with the standards.

Facilities are expected to be designed to meet the criteria at the critical periods. In addition, facilities must be operated at all times at that level of efficiency needed to meet requirements for the critical conditions. This will result in stream quality higher than the criteria most of the time.

Specific: A minimum of secondary treatment is required for all waste discharges in this area.

Secondary treatment is that degree of treatment which, in the opinion of the Sanitary Water Board, will remove practically all of the suspended solids; will remove at least eighty-five (85) percent of the organic pollution load as measured by the biochemical oxygen demand test; will accomplish the removal of oils, greases, acids, alkalis, toxic, putrescible, taste and odor producing substances, and other substances inimical to the public interest in the receiving stream; will provide effective disinfection to control disease producing germs; will provide satisfactory disposal of sludge; and will produce a final effluent that is suitable for discharge into the receiving waters.

In certain waters of this area, secondary treatment of the present waste discharges is inadequate now, or will be in the future, if the water quality criteria recommended in Section VI of this report are to be met. Tertiary treatment pf wastes or other methods of advanced water quality control will be needed for the following waters of this area:

Watershed	Zone Name	Limits of Zone	Abatement Requirements
Schuylkill River	Schuylkill River	From Black Rock Dam to Fairmount Dam	BOD Reduction - 92% to 94%
Valley Creek	Valley Creek Watershed	From source to mouth, and all tributaries, named and unnamed	BOD Reduction - 92% to 94%

APPENDIX B

INTERSTATE STREAM STANDARDS

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RULES AND REGULATIONS
OF THE
SANITARY WATER BOARD
OF THE
COMMONWEALTH OF PENNSYLVANIA

ARTICLE 301

WATER QUALITY CRITERIA

Section 1. General Scope

It is the scope of this Article to set forth general and specific water quality criteria for the waters of the Commonwealth. These criteria are based upon the water uses which are to be protected and will be considered by the Sanitary Water Board in its regulation of discharges.

Section 2. Water Uses

A. The water uses which are to be protected, and upon which the development of water quality criteria are based, are set forth in subsection B of this section.

B. Water Uses which are to be Protected:

1.0 - Aquatic Life

1.1 Cold Water Fishes - Maintenance and propagation of the family Salmonidae and fish food organisms.
1.2 Warm Water Fishes - Maintenance and propagation of fish food organisms and all families of fishes except Salmonidae.
1.3 Migratory Fishes - Passage, maintenance and propagation of anadromous and catadromous fishes, and other fishes which ascend to flowing waters to complete their life cycle.

2.0 - Water Supply

2.1 Domestic Water Supply - Use by humans after conventional treatment, for drinking, culinary and other purposes.
2.2 Industrial Water Supply - Use by industry for inclusion into products, for processing and for cooling.
2.3 Livestock Water Supply - Use by livestock and poultry for drinking and cleansing.
2.4 Wildlife Water Supply - Use for water fowl habitat and by widlife for drinking and cleansing.

2.5 Irrigation Water Supply - Used to supplement precipitation for growing of crops.

3.0 - Recreation

3.1 Boating - Power boating, sailboating, canoeing and rowing for recreational purposes.
3.2 Fishing - Use of the water for the taking of fish by legal methods.
3.3 Water Contact Sports - Use of the water for swimming and related activities.
3.4 Natural Area - Use of the water as an esthetic setting to recreational pursuits.

4.0 - Other

4.1 Power - Use of the water energy to generate power.
4.2 Navigation - Use of the water for the commercial transfer and transport of persons, animals and goods.
4.3 Treated Waste Assimilation - Use of the water for the assimilation and transport of treated wastewaters.

Section 3. Standard Water Use List

The standard water uses are set forth below. Those uses followed by an "X" were considered in determining the water quality criteria applicable to the particular waters listed in Section 7 of this Article except where otherwise indicated in Section 7. Those uses followed by an "O" were considered only where specifically set forth in Section 7.

1.0	Aquatic Life	
1.1	Cold Water Fish	O
1.2	Warm Water Fish	X
1.3	Migratory Fish	O
2.0	Water Supply	
2.1	Domestic	X
2.2	Industrial	X
2.3	Livestock	X
2.4	Wildlife	X
2.5	Irrigation	X

3.0 Recreation

3.1	Boating	0
3.2	Fishing	X
3.3	Water Contact Sports	X
3.4	Natural Area	X

4.0 Other

4.1	Power	X
4.2	Navigation	0
4.3	Treated Waste Assimilation	X

Section 4. Applicable Water Quality Criteria

Water quality criteria applicable to the waters of the Commonwealth shall be the general criteria set forth in Section 5 of this Article and the specific criteria indicated for the particular waters as set forth in Section 7 of this Article.

Section 5. General Criteria

The water shall not contain substances attributable to municiapl, industrial or other waste discharges in concentration or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant or aquatic life. Specific substances to be controlled include, but are not limited to, floating debris, oil, scum and other floating materials; toxic substances; substances that produce color, tastes, odors or settle to form sludge deposits.

Section 6. Specific Criteria

A. Determination of Specific Criteria - Each of the waters for which specific criteria has been established is listed in Section 7. The references to specific criteria are keyed to the standard list of specific criteria set forth in subsection B of this section and to the groups of criteria set forth in subsection C of this section.

B. Standard List of Specific Criteria

a - pH

a_1 - Not less than 6.0; not to exceed 8.5
a_2 - Not less than 6.5; not to exceed 8.5
a_3 - Not less than 7.0; not to exceed 9.0