

OFFICIAL PLAN

"ACT 537"

HAMILTON TOWNSHIP
ADAMS COUNTY, PENNSYLVANIA

AUGUST 1974

Revised September, 1998

Revised November, 1999

GETTYSBURG ENGINEERING COMPANY, INC.
CONSULTING ENGINEERS
40 EAST HIGH STREET
GETTYSBURG, PENNSYLVANIA 17325

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BACKGROUND INFORMATION

Hamilton Township is a member of the North East Adams Regional Planning Cooperative (NEACOG). A Comprehensive Plan was prepared in 1971 under the direction of John Hall of the Planning Consortium. That portion of the Comprehensive Plan concerning Hamilton Township is attached to and made part of this "Official - Act 537 - Sewer and Water Study" for Hamilton Township.

The following is a Table of Contents of those sections of the Comprehensive Plan which the user of this report may find helpful.

PART I

INTRODUCTION

It is the intent of this report to present to the Township Administrators a guideline through which it is anticipated that they will be able to more effectively plan for the introduction of sanitary sewers in Hamilton Township.

In the preparation of this report, we have attempted to classify certain areas of the Township according to their population and housing density so as to determine the immediate or future need for a municipal sewerage system. We have computed cost estimates for the construction of the facilities which should be given consideration for installation in these areas. Throughout this report we have attempted to show the feasibility of having New Oxford Borough and Hampton Village (Reading Township) accept wastewater from the Hamilton Sewerage System. The costs of connection to an existing system are much less than the costs of acquiring and maintaining an independent treatment facility. It should be noted that although Hampton Village does not have a sewerage system as yet, construction is due to start by the end of 1974. Also, New Oxford is in the process of upgrading their existing facilities to accommodate larger flows. Hamilton Township should make every effort possible to cooperate with these neighboring municipalities as they will require the future services of these systems. This approach is in keeping with the regional concept as promoted by Act 537.

It is anticipated that this Official Plan will serve as a guide for the development of wastewater collection facilities in Hamilton Township. It is not a detailed engineering report suitable for final determination concerning facility design. It should also be noted that there may be a large difference between what is desirable and what is practical to install from a financial standpoint. Even though it would be economically impractical to install sewerage facilities in some areas of Hamilton Township at this time, we have still included them in this report. The Official Act 537 Plan should be considered as an initial step toward the effective sewerage of the various areas of Hamilton Township.

PART II

EXISTING FACILITIES

A. WATER SUPPLY

At present there are no public water supplies in Hamilton Township. Homes and businesses are supplied by individual wells and springs. New Oxford, East Berlin and Abbottstown Boroughs have public water supply systems which could be extended to serve areas of the Township adjacent to the Boroughs. For more information on water supply see the Comprehensive Plan of Hamilton Township prepared by the Planning Consortium.

B. SANITARY SEWERS

No existing sanitary sewer collection or treatment facilities are located in Hamilton Township. The Borough of New Oxford maintains a 10" interceptor line from their Borough along Route 30 to just west of Cross Keys which could be utilized by the Township. East Berlin Borough maintains sewer collection lines which could also be extended to serve adjacent areas in Hamilton Township when future development warrants sewer facilities. Hampton Village in neighboring Reading Township and Abbottstown Borough are in the process of acquiring sewerage services which Hamilton Township could utilize. Hamilton Township administrators should also cooperate with Berwick Township as they plan sanitary sewer service in the Cross Keys areas as proposed by their Official Act 537 Plan. The following feasibility study will show how Hamilton Township relates to these adjacent municipalities.

C. ON LOT DISPOSAL OF SEWAGE

At present all sewage in the Township is disposed by means of individual septic systems. Soils in the Township vary in their ability to absorb, dilute, and dispense septic tank effluents. A complete soil survey conducted by the U.S. Dept. of Agriculture Soil Conservation Service shows that Hamilton Township is dominated by a series of soils of the Penn-Lansdale-Abbottstown Association with the North West area around Conewago Creek composed of the Penn-Reading-Croton Association.

These associations are gently to moderately sloping with shallow to moderately deep shaly soils and are well drained. Because of a low permeability of the sub-soils about 70% of the Township indicates severe limitations for on lot disposal of sewage.

Development is limited because of Pennsylvania Department of Environmental Resources controls which require soils to be suitable for the installation of individual septic systems. Inefficient discharge of effluents is not only a health hazard but a detriment to the natural environment which is essential to life itself.

For more detailed information on soils, see Hamilton Township's Comprehensive Plan and the Adams County Soil Survey prepared by the U.S. Dept. of Agriculture.

PART III

FEASIBILITY

There are three areas in the Township which should be considered for installation of sewer facilities. These include Route 94 from the 700 Road to Cross Keys, the Dick's Dam area, and the area near Cross Keys as it is shown in Berwick Township's Act 537 Plan. There are no existing industrial wastes in Hamilton Township at this time, therefore, for the purpose of this study, all flows will be based on a domestic loading.

A. PA. ROUTE 94 AREA

The Route 94 area encompasses the 700 Road, Pa. Route 94 from 700 Road to Cross Keys, and part of the Pine Run Road. An eight inch collector line would collect sewage from the houses on 700 Road to Pa. Route 94. A series of collector lines and lift stations with force mains would then carry the sewage South along Pa. Route 94 to Cross Keys, accepting wastewater along the way. The Pine Run Road would be serviced by an 8" collector which flows east to an unnamed tributary of Pine Run, where a lift station pumps it back up to Pa. Route 94. The area from Cross Keys to the Pine Run Road is serviced by a collector which flows toward Pine Run Road; all sewage from this system is pumped back up to

Cross Keys via a 4" force main to the 10" interceptor which New Oxford Borough maintains to the Brethren Home. See Plate "A" for the location of these proposed lines.

Table 1 is a tabulation of estimated construction costs of this system. Table 2 shows two methods of financing based on an Environmental Protection Agency grant of 75%. Annual income requirements are shown with and without a \$10.00 front foot assessment. This area to be served has a total of 100 homes and each would be charged a monthly rental to cover yearly expenses.

ALTERNATE SYSTEM

A new type system which is being used to provide sewer facilities is the low pressure sewer system utilizing grinder pumps. Pressure sewer systems are systems in which sewage is handled in a manner similar to municipal water systems, i.e., in small diameter pipes kept full and under pressure. In such systems, wastes from individual homes are collected in a holding tank and periodically discharged into the system through a grinder-pump unit which sheds or grinds the solids and provides the pressure head required for flow. In current practice the normal operating pressure is limited to about 35 PSI and light-weight plastic pipe is used throughout the system. In contrast, water distribution systems operate at pressures up to 80 PSI and use metal or heavy-weight plastic pipe.

The grinder pumps are combination sewage grinders and centrifugal pumps which are submersible. They are installed in a holding tank either in the basement or outside the home. Each home would have its own individual pump where practical. A cluster of up to six homes can be joined to one larger tank and pump. An individual unit would cost each homeowner approximately \$2000 while a cluster system would cost approximately \$6500 installed.

There are certain advantages to this type system. The most outstanding advantage is that sewer lines need not be installed to flow by gravity, but can be laid just below frost line to follow the slope of the land. There is practically no infiltration on a pressure

system. The cost of the collection lines are generally lower than a conventional gravity system because of smaller diameter pipe and the shallow depth.

Of course, there are disadvantages to these pressure systems. The grinder pumps have only recently been developed, and although early indications point to a long and maintenance free life, only time will tell just how long one might expect a pump to function properly before repairs or replacements are needed.

Also, when a cluster system is used an agreement must be written to insure that payment for electricity and maintenance is divided equally among the users. The initial cost to the homeowner is obviously high, but because of the lower cost of installation, the monthly service rental would be kept to a minimum.

While Pennsylvania does not as yet have a pressure system in operation, Pennsylvania DER is writing specifications for their installation. There have been installations in other states and grant monies have been received for installation of these systems from the appropriate state governments, EPA and FHA. It is this consultant's belief that when it is feasible to use the conventional gravity system or when there is little difference in costs, the conventional system should be used to eliminate the many pumps which could pose a problem with maintenance.

The Pa. Route 94 area could possibly benefit from this system. We have shown the construction costs and financing on Table 3.

B. THE DICK'S DAM AREA

The Dick's Dam area is a problem area. It is a densely populated strip development in which sewage systems could pollute not only wells but Conewago Creek. We have included the Reading Township side of Conewago Creek because it is a similar problem area and this outlook, as stated above, is in keeping with the regional concept.

An eight inch collector line would come down the Reading Township side of Conewago Creek and cross over the creek in the vicinity of the bridge at L.R. 01023, the Dick's Dam Road. This collector would then continue down the creek to a 10" interceptor near the dam where it would connect into the Hampton Village Sewage system of Reading Township.

Table 4 is a tabulation of estimated construction costs of this system. Table 5 shows two method of financing based on an Environmental Protection Agency Grant of 75%. Annual income requirements are shown with and without a \$10.00 per foot front assessment. There are 58 homes along this system and each would be charged a monthly rental to cover yearly expenses.

C. CROSS KEYS - U.S. ROUTE 30 AREA

That area of Hamilton Township along U.S. Route 30 from Cross Keys to Kelly Road would be serviced by collector lines along U.S. Route 30. These lines would be part of the regional system which would service those portions of Berwick Township, Oxford Township, and Hamilton Township which lie in the Cross Keys area. (See Plate "A" for the location of these lines.) As the majority of the area to be serviced is in Berwick Township this area would not be serviced until Berwick Township finds it feasible to do so.

It will be necessary for Hamilton Township, Berwick Township, and Oxford Township to form a joint authority or other develop sewer services jointly for this area as many parts of the sewage system will service two and sometimes all the townships.

For more complete information on the Cross Keys area, refer to the Berwick Township Official Act 537 Plan as prepared by Gettysburg Engineering Company.

D. ABBOTTSTOWN AREA

Hamilton Township has no development, in the vicinity of Abbottstown, which would require the installation of public sewers. A portion of U.S. Route 30 west of Abbottstown is proposed to be sewerred by Berwick Township, which has more density in this area. (See Plate "A"). When this sewer line is installed it will also provide sewer service to that portion of Hamilton Township immediately adjacent to U.S. Route 30.

When Abbottstown constructs public sewers it may encourage development in the area. At that time Hamilton must revise their Act 537 Plan to include the proposed development. It is recommended that Hamilton require developers to bear the cost of installing sewer lines.

As no development exists and no development is contemplated in the vicinity of Abbottstown, it would be very difficult for Hamilton to reserve capacity in Abbottstown proposed treatment facilities. It is generally required that the capital cost for that percent of capacity reserved be paid for by the municipality reserving this capacity. Hamilton Township would have no customers to share this cost.

E. EAST BERLIN AREA

That area of Hamilton Township adjacent to East Berlin Boro is similar to the Abbottstown area. There is no development or contemplated development which requires the need of public sewer services.

East Berlin sewer facilities are not now at capacity and in all probability would be capable of accepting some sewage from the Hamilton Township if the need arises. On this basis we can only recommend that Hamilton Township wait until development is planned and at that time work out an agreement with East Berlin Boro to accept the sewage from the proposed development and revise their Act 537 Plan accordingly.

PART IV

SUMMARY AND CONCLUSIONS

The population of Hamilton Township, while dense in certain areas, is at this time too sparse to warrant sanitary sewerage on the basis of economic feasibility. However, as development continues the economic feasibility of installing sewer lines will increase as the cost can be divided among more users.

Planning must begin now to assure that sewers can be available in the future. There are two major areas in the Township to be serviced. Our summary and conclusions are as follows:

Pa. Route 94 to Cross Keys

This area includes Pa. Route 94 from the 700 Road to Cross Keys. The sewage from this area would discharge into a ten inch interceptor maintained by the Borough of New Oxford. The sewage would be treated at New Oxford's Treatment Plant. As only Hamilton Township would be

serviced by these collector lines, a suggested method of administration would be for Hamilton Township to form it's own authority. It would be this Authorities' responsibility for constructing these sewer lines, contracting for treatment with New Oxford and administration of the facilities.

The construction estimates and user's costs shown on Table 1-2-3 are far in excess of being economically feasible at this time. Development is not sufficient to warrant sanitary sewer service. New development will be needed to make sewerage service in this area possible. Also, New Oxford Borough's Treatment Plant must be upgraded before additional sewage can be treated. It is estimated their plant will be completed in three years.

It is our recommendation that Hamilton Township proceed as follows:

- (1) Contact land owners in the areas where sewers are proposed to determine if they are planning to develop and to what extent. Secure an agreement from developers who are requesting sewers that they will develop when sewers become available, and require developers to install dry laid sewer lines to the proposed collector line. This will eliminate the expense of installing sewer lines in new developments and assure that customers will be available when sewer becomes available.
- (2) Establish a sewer authority to administrate the construction of sewer lines.
- (3) Authorize the Authority to have construction drawings and specifications prepared and apply for grant monies for construction of sewers in the area where development is proposed.

Dick's Dam Area

The construction costs and users fees as shown on Tables 4 and 5 indicate that servicing this area may be feasible. Sewering of this area would not be possible until Hampton Village completes Phase II of their proposed system.

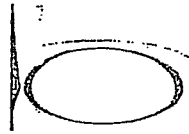
This area of Hamilton Township is a vere severe problem area. Development is about 30% seasonal, consisting overall of 58 dwellings.

The development is very compact with a high percentage of individual sewage system malfunctions. The area is in a flood plain where development normally is discouraged, however, construction of new homes can be permitted with special techniques and materials to lessen damage from flood waters. Also, the higher areas nearby could be encouraged to develop to make sewers feasible.

It is our recommendation that Hamilton Township proceeds as follows:

- (1) Become part of the Hampton Village - Reading Township Authority and encourage the Authority to include this area in their Phase II sewage program.
- (2) Work with existing land owners and developers to encourage the development of land on the higher elevations along the Conewago Creek. This will increase the density of the area and lower the cost per user.
- (3) Secure commitments from developers who are requesting sewers, that they will develop as scheduled as sewers are completed, and require developments to install dry laid sewer lines to the proposed interceptor line. This will assure that sufficient customers will be available to pay for service when sewers are installed.

BUCHART-HORN



CONSULTING ENGINEERS and PLANNERS

612 WEST MARKET STREET · YORK, PENNSYLVANIA 17405
P. O. BOX 1663 PHONE 843-5561 AREA CODE 717

October 17, 1974

Mr. Dean A. Shultz, Vice President
Gettysburg Engineering Co., Inc.
40 E. High Street
Gettysburg, Pennsylvania 17325

RE: Reading Township
 Municipal Authority
 BH #71675

Dear Dean:


This is with reference to our conversation on October 16, 1974, concerning the connection of 58 equivalent domestic units located in Hamilton Township to the Reading Township plant. You requested an estimate of the treatment and transportation costs which may be charged for connecting to the Reading Township system.

For estimates in your Act 537 study, we suggest you use \$3,000 as the amount of the treatment and transportation fee. This figure is approximately 10% of Reading Township's estimated annual costs. This figure is for estimating purposes only and is not the final figure.

Of course, a formal agreement must be negotiated between the Hamilton Township officials and the Reading Township Municipal Authority to establish the actual fee at the time these homes come on line.

Very truly yours,

BUCHART-HORN


Bowman Stevens, P. E.
Financial Analyst

BS/lb

cc: Mrs. Jane Haverstock
John Saylor

ROUTE 94 AND 700 ROAD TO CROSS KEYS

CONSTRUCTION COSTS

COLLECTOR SYSTEM

15,800 L.F.	8" Sewer Installed	@ 20.00	\$316,000.
40 Ea.	Manholes Complete	500.00	20,000.
4,681 C.Y.	Rock Excavation	15.00	70,215.
7,022 S.Y.	Resurfacing	8.00	<u>56,176.</u>
			\$462,391.

INTERCEPTOR SYSTEM

11,000 L.F.	4" Force Main	@ 10.00	\$110,000.
4 Ea.	Pumping Station	20,000.00	80,000.
1,630 C.Y.	Rock Excavation	15.00	24,450.
2,440 S.Y.	Resurfacing	8.00	<u>19,520.</u>
			\$233,970.

TOTAL CONSTRUCTION COSTS \$696,361.

ROUTE 94 AND 700 ROAD TO CROSS KEYS

FINANCING

Construction Costs	\$696,361
Engineering, Surveying, Inspection	69,636
Less EPA Funding (75%)	574,497
Financing and Legal Expenses	34,818
Right-of-Way Acquisition	3,000
Construction Contingencies	69,636
Interest During Construction @ 7%	23,123
Bond Discount @ 2.5%	<u>8,258</u>
Amount To Be Financed	\$330,335

BOND ISSUE WITHOUT \$10.00 FRONT FOOT ASSESSMENT	
Amount of 40 Year Bond	\$330,335
Annual Cost at \$80/1,000	26,426
Plus 10% Coverage	2,642
*Treatment at \$135.	13,500
Operating and Administration	<u>2,000</u>
Minimum Annual Income Requirement	44,568

Yearly Service Charge = $\frac{\$44,568}{100 \text{ EDU}} = \445.68 per house

BOND ISSUE WITH \$10.00 ASSESSMENT	
Amount of Financing	\$330,335
**Less Five Year Assessment	91,800
Amount of 40 Year Bond	238,535
Annual Cost at \$80/1000	19,082
Plus 10% Coverage	1,908
*Treatment at \$135/EDU	13,500
Operating and Administration	<u>2,000</u>
Minimum Annual Income Requirement	36,490

Yearly Service Charge = $\frac{\$36,490}{100 \text{ EDU}} = \364.90 per house

*Approximate cost New Oxford Borough would charge for treatment of sewage from report prepared for New Oxford Borough by Tracey Engineers, Inc.

**There are 10,200 assessable front feet along this system. Assuming \$10.00 per foot and 90% collection, we arrive at \$91,800.

TABLE 2

ROUTE 94 AND 700 ROAD TO CROSS KEYS

LOW PRESSURE SYSTEM

CONSTRUCTION COSTS

26,800 L.F.	4" Sewer Line	@ \$ 10.00	\$268,000
9,462 S.Y.	Resurfacing	8.00	<u>75,696</u>
	TOTAL CONSTRUCTION COSTS		\$343,696

FINANCING

Construction Costs	\$343,696
Engineering, Surveying, Inspection	34,369
Less EPA Funding (75%)	283,548
Financing and Legal Expenses	17,184
Right-of-Way Acquisition	3,000
Construction Contingencies	34,369
Interest During Construction @ 7%	11,530
Bond Discount at 2.5%	<u>4,118</u>
Amount To Be Financed	\$164,718

BOND ISSUE WITHOUT FRONT FOOT ASSESSMENT	
Amount of 40 Year Bond	\$164,718
Annual Cost at \$80/\$1000	13,177
Plus 10% Coverage	1,317
*Treatment at \$135.	13,500
Operating and Administration	<u>2,000</u>
Minimum Annual Income Requirement	\$ 29,994

Yearly Service Charge = $\frac{\$29,994}{100 \text{ EDU}} = \294.94 per house

Plus each home owner supplies his own grinder pump at \$2000.

*Approximate cost New Oxford Borough would charge for treatment of sewage from report prepared for New Oxford Borough by Tracey, Engineers, Inc.

TABLE 3

DICK'S DAM AREA
CONSTRUCTION COSTS

COLLECTOR SYSTEM

5,600 L.F.	8" Sewer Installed	@ 20.00	\$112,000
14 Ea.	Manholes Complete	500.00	7,000
1,500 C.Y.	Rock Excavation	15.00	22,500
220 S.Y.	Resurfacing	8.00	<u>1,760</u>
			\$143,260

INTERCEPTOR SYSTEM

2,200 L.F.	10" Sewer Installed	25.00	\$ 55,000
6 Ea.	Manholes Complete	500.00	3,000
650 C.Y.	Rock Excavation	15.00	<u>9,750</u>
			\$ 67,750

TOTAL CONSTRUCTION COSTS: \$211,010

TABLE 4

DICK'S DAM AREA

FINANCING

Construction Costs	\$211,010
Engineering, Surveying, Inspection	21,101
Less EPA Funding (75%)	174,083
Financial and Legal Expenses	10,550
Right-of-Way Acquisition	3,000
Construction Contingencies	21,101
Interest During Construction - 1 year @ 7%	7,168
Bond Discount at 2.5%	<u>2,560</u>

Amount To Be Financed \$102,407

BOND ISSUE WITHOUT \$10.00 ASSESSMENT

Amount of 40 Year Bond	\$102,407
Annual Cost of Bond @ \$80/\$1000	8,192
Plus 10% Coverage	819
*Treatment and Transportation	3,000
Operating and Administration	<u>2,000</u>

Minimum Annual Income Requirement \$ 14,011

Yearly Service Charge = $\frac{\$14,011}{58}$ = \$241.57 per EDU

BOND ISSUE WITH \$10.00 ASSESSMENT

Amount of Financing	\$102,407
**Less Five Year Assessment	47,700
Amount of 40 Year Bond	54,707
Annual Cost of Bond at \$80/\$1,000	4,376
Plus 10% Coverage	437
*Treatment and Transportation	3,000
Operating and Administration	<u>2,000</u>

Minimum Annual Income Requirement \$ 9,813

Yearly Service Charge = $\frac{\$9,813}{58}$ = \$169.19 per EDU

*Approximate cost Hampton Village would charge for transportation and treatment as per letter from Bowman Stevens, P.E. of Buchart-Horn Engineering dated October 17, 1974. It is this consultant's belief that this figure is unrealistically low.

**There are 5,300 assessable front feet along this system. Assuming \$10.00 per foot and 90% collection, we arrive at \$47,700.

Part I - Introduction

A. Purpose

This study has been undertaken pursuant to a Department of Environmental Resources Order dated November 1, 1985. That order in part required that "Hamilton Township shall revise its Official Plan and submit the same to the Department ...". This plan, which is obviously intended to respond to the above quoted order, is also intended to serve the development goals of Hamilton Township. An effort has been made herein to analyze and plan for municipal sewage facilities in the areas of the Township for which municipal sewers were planned in the 1974 Official Plan. This earlier plan proposed implementation schedules for the Pa Route 94 area, the Dick's Dam area and the Cross Keys - Route 30 area.

B. Scope

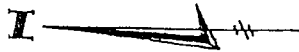
This study as was the 1974 plan, is intended to provide recommendations relative to the installation of municipal sewer facilities in the several areas of the Township which were outlined in the earlier Act #537 Plan. There are in particular three areas, the Dick's Dam area, the Pa Route 94 area and the Cross Keys - U.S. Route 30 area, where developmental pressures as well as the need to correct existing waste disposal problems indicate a need for an updated analysis relative to municipal sewers.

A fourth area, referred to in the earlier Act #537 Plan as the Abbottstown area is dependant on the progress and success of the currently proposed Abbottstown - Paradise Joint Sewage System which is illustrated on the attached Figure I. There has been only minimal development along U.S. Route 30 west of the Borough of Abbottstown. However, the proposed Abbottstown - Paradise Joint Sewage System is planned to install sewers along U.S. Route 30 potentially serving portions of Hamilton Township and the more densely developed Berwick Township in this area.

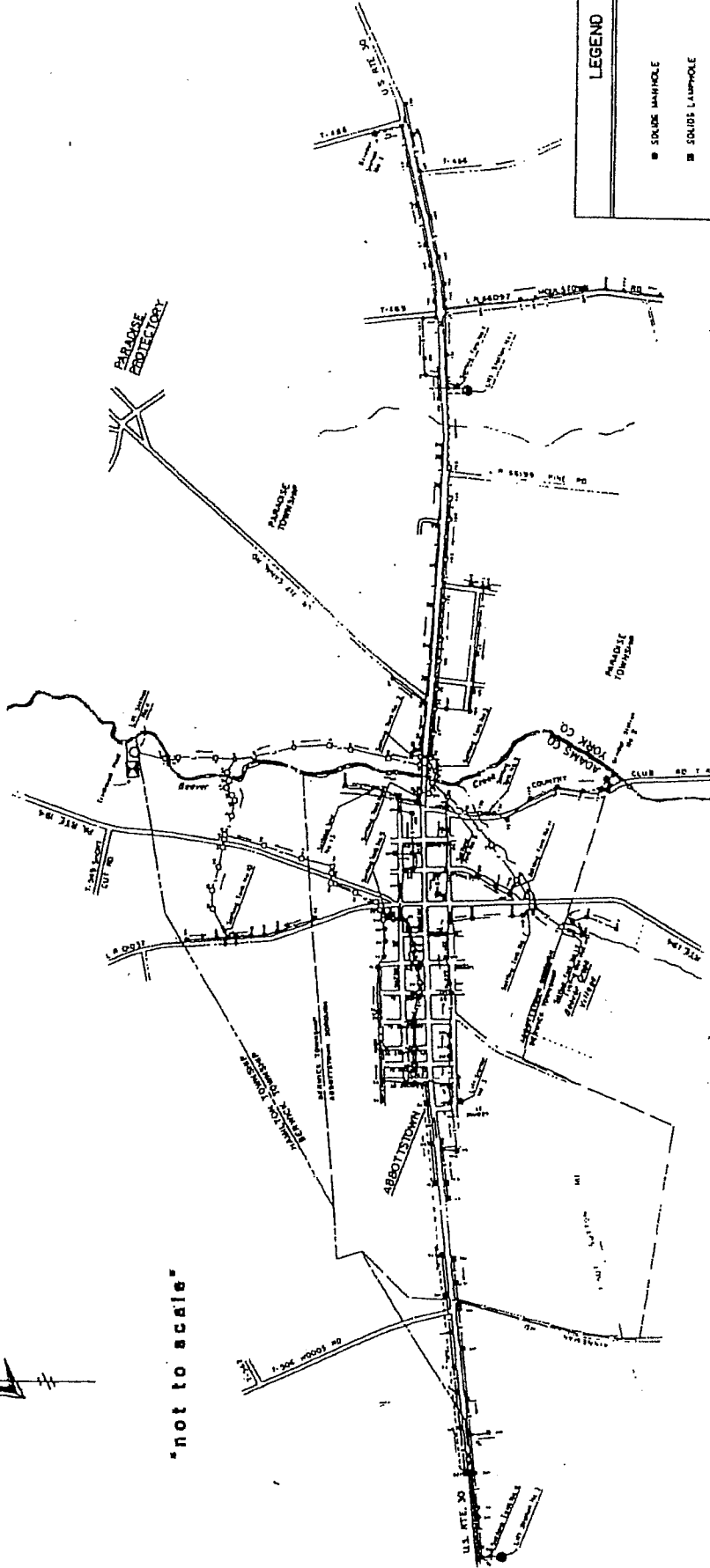
It is likely that when the proposed Abbottstown - Paradise system is constructed its existence may encourage development along its lines. As such development occurs Hamilton Township will utilize its existing subdivision and zoning controls to require developers to interconnect with the Abbottstown system including bearing the expense of the installation of any facilities necessary to make such interconnection.

In as much as very little development currently exists in this area of Hamilton Township, no reserve capacity has been established in the Abbottstown conveyance and treatment facilities. Therefore, any connection of Hamilton Township sewage generators to the Abbottstown facility will be contingent upon the availability of capacity within the Borough's system. It is assumed that since Hamilton Township has not participated in the capital development for the Abbottstown - Paradise Joint Sewage System any service provided to Hamilton Township development may be at user rates somewhat higher than that paid by residents of Abbottstown Borough and Paradise Township.

The fifth area of Hamilton Township discussed in the earlier Act # 537 Plan was that area of the Township adjacent to the Borough of East Berlin.



"not to scale"



LEGEND	
●	SOLIDS MANHOLE
■	SOLIDS LAMPHOLE
○	LIQUIDS MANHOLE
□	LIQUIDS LAMPHOLE
—	LIQUIDS & SOLIDS MANHOLE
---	LIQUIDS FORCE MAIN
---	SOLIDS FORCE MAIN
⊙	GRIINDER STATION
□	BOX TANK

**PROPOSED ABBOTTSTOWN - PARADISE -JOINT SEWER AUTHORITY-
SANITARY SEWERAGE SYSTEM**

Figure 1

Hamilton Township's strategy for this area remains the same as outlined in the earlier plan.

In the development of this updated Act #537 Plan not only was protection of the environment and public safety a primary concern, but so too was the limit to which local residents can participate in providing the finances necessary to construct, operate, and maintain adequate municipal sewerage facilities. Establishing planning objectives and being able to meet those objectives may prove to be greatly different in their degree of difficulty, when attempting to achieve each.

The reduction in the scope and funds available from the United States government through the Environmental Protection Agency's construction grants program will prove to be a real hinderance for municipalities such as Hamilton Township in their efforts to obtain municipal sewerage facilities.

Part II - Analysis

A. Waste Water Contribution Criteria

For the purposes of this study a liquid waste contribution of 100 gallons per capita per day has been used for the domestic contribution. The contribution of a dwelling has been taken as 330 gallons per day. A field survey has been made in order to locate the various commercial establishments within the study areas. The waste water contribution for such establishments has been computed using Pennsylvania Department of Environmental Resources criteria, where available. These commercial flows have been converted into equivalent dwelling units.

In this study, in order to convert daily flows to peak flows, a factor of 4 has been used for laterals, and 2.5 for main, trunk, and outfall sewers.

B. Facilities Criteria

In this study, all liquid waste facilities conform to the Commonwealth of Pennsylvania Department of Environmental Resources regulations and manuals.

C. Possible Arrangements in Governmental Structure

1. General

In Pennsylvania, the two primary forms of Governmental Organizations which are empowered to finance, construct, and operate sewage facilities are:

- a. An Authority created by one or more municipalities.
- b. Municipal governmental bodies either unilaterally, or in concert with other Boroughs, Townships, Cities, etc.

**AMENDMENT TO
HAMILTON TOWNSHIP ACT 537 PLAN
ROUTE 94 STUDY AREA**

Prepared for
**HAMILTON TOWNSHIP BOARD OF SUPERVISORS
ADAMS COUNTY, PENNSYLVANIA**

October, 1997

Revised September, 1998
Revised November, 1999

Engineer's Project No. 2997.6.01.00

C. S. DAVIDSON, INC.
Consulting Engineers
38 North Duke Street
York, PA 17401

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**IMPLEMENTATION SCHEDULE
FOR
HAMILTON TOWNSHIP ACT 537 PLAN AMENDMENT**

<u>Event</u>	<u>Date</u>
• Township Adoption of Act 537 Plan Revision	December 2, 1997
• Submission of Act 527 Plan Revision to PA DEP for review and approval	January 8, 1998
• PA DEP Approval of Act 537 Plan Revision	November, 1998
• Township Adoption of On-Lot Sewage Disposal Ordinance, Well Drillers Ordinance, Planning Module Requirements and Public Education Program	March, 1999

**VOID
TO BE REVISED**

IMPLEMENTATION SCHEDULE
FOR
HAMILTON TOWNSHIP ACT 537 PLAN AMENDMENT

<u>Event</u>	<u>Date</u>
• Township Adoption of Act 537 Plan Revision	December 2, 1997
• Submission of Act 527 Plan Revision to PA DEP for review and approval	January 8, 1998
• PA DEP Approval of Act 537 Plan Revision	November, 1998
• Township Adoption of On-Lot Sewage Disposal Ordinance, Well Drillers Ordinance, Planning Module Requirements and Public Education Program	March, 1999

**I. RESOLUTION FOR PLAN REVISION
PA DEP APPROVAL LETTER
TOWNSHIP CONCURRENCE LETTER**

RESOLUTION FOR PLAN REVISION

RESOLUTION OF THE SUPERVISORS OF HAMILTON TOWNSHIP, ADAMS COUNTY, PENNSYLVANIA (hereinafter "the municipality").

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the Pennsylvania Code, requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, Hamilton Township Board of Supervisors of Adams County, Pennsylvania has prepared an Amendment to the Act 537 Plan which assesses the sewage disposal needs in the area along Route 94 (Carlisle Road), just North of Cross Keys in Hamilton Township, and

WHEREAS, Hamilton Township finds that the Facility Plan described above conforms to applicable zoning, subdivision, other municipal ordinances and plans and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the Supervisors of the Township of Hamilton hereby adopts and submits to the Department of Environmental Protection for its approval as an amendment to the "Official Plan" of the municipality, the above referenced Facility Plan. The municipality hereby assures the Department of the complete and timely implementation of the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended).

I, _____, Secretary, Hamilton Township Board of Supervisors, hereby certify that the foregoing is a true copy of the Township's Resolution No. _____, adopted _____, 1999.

AUTHORIZED SIGNATURE

TOWNSHIP SEAL

II. EXECUTIVE SUMMARY

II. Executive Summary

In February, 1996, Hamilton Township was directed by the Pennsylvania Department of Environmental Protection (DEP) to study the area along Route 94 (Carlisle Road), just north of Cross Keys, to assess the sewage disposal needs. This area was chosen to be studied due to a history of on-lot disposal system malfunctions. The study identifies specific areas that have sewage disposal needs.

Information was obtained regarding the study area via a mail survey, well sampling (nitrates and coliforms) and on-lot disposal system inspections performed by the Township's Sewage Enforcement Officer.

Analysis of the obtained information concluded that immediate sewage disposal needs areas were located at Dogwood Court, Gun Club Road and along Route 94 between Cedar Road and Forest Drive. It was also concluded that the remaining portion of the study area could be categorized as a future sewage disposal needs area.

Three (3) alternatives were evaluated for the purpose of providing a public sewer system to the study area. Alternative No. 1 involves the construction of a conventional gravity system and sewage pumping stations which would convey sewage to the New Oxford Municipal Authority's (NOMA's) Wastewater Treatment Plant (WWTP) through Oxford Township's collection system. Alternative No. 2 involves the construction of a conventional gravity system and sewage pumping stations which would convey sewage to Berwick Township's proposed collection system and proposed WWTP. Alternative No. 3 involves the construction of a conventional gravity system and sewage pumping stations which would convey sewage to a proposed Hamilton Township WWTP.

The evaluation of all alternatives based upon the estimated cost per user and the potential for future growth in the Township indicates that the most sensible option is Alternative No. 2. The estimate cost per user for the various combinations of the collection area used to evaluate Alternative No. 1 were less expensive than Alternative No. 2; however, the benefit of conveying the sewage to Berwick

Township's proposed WWTP outweighs the cheaper costs of Alternative No. 1. Alternative No. 1 requires purchasing 90,000 gallons per day (gpd) of capacity from the NOMA WWTP. Future growth within the collection area is likely to exceed the purchased capacity and the availability of additional capacity from the NOMA WWTP is unlikely. Alternative No. 2 requires purchasing an initial 100,000 gpd of capacity from Berwick Township's proposed WWTP. Even though it is likely that future growth will exceed the initial capacity, the possibility for future expansion and additional capacity is more likely with Berwick Township than with NOMA. Alternative No. 3 has been determined to be too costly.

The Township has determined the most effective option is serving the entire collection area with Alternative No. 2. Even though the cost per user per year is estimated at \$1,536 compared to \$1,420 for serving the entire collection area with Alternative No. 1, the potential for future growth within the collection area makes Alternative No. 2 more ideal in the long term.

III. INTRODUCTION

III. Introduction

In February 1996, Hamilton Township was directed by the Pennsylvania Department of Environmental Protection (DEP) to study the area along Route 94 (Carlisle Pike), just north of Cross Keys (See Exhibit A), to assess the sewage disposal needs. This area was chosen due to a history of on-lot disposal system malfunctions. A "*Plan of Study*" drafted by the Township and its Engineer was approved by DEP in a letter dated April 11, 1996. This "*Plan of Study*" was intended to be consistent with Act 537, Chapter 71, Sections 71.21 and 71.31 of DEP Regulations, and with information contained in the DEP Guide for Preparing Act 537 Update Revisions (February 1998) and Act 537 Sewage Disposal Needs Identifications Guidance (March 1996)

The purpose of this study is to identify and address specific areas that have sewage disposal needs. This study is not only intended to be a logical approach to alternatives and solutions for sewage disposal needs, but also an essential document for needs prioritized funding.

Sources of information relied upon in preparing this study included:

- Pennsylvania Code, Title 25, Chapter 71.
- DEP Guide for Preparing Act 537 Update Revisions (February 1998).
- Act 537 Sewage Disposal Needs Identification Guidance (March 1996).
- "Hamilton Township 1987 Updated Act 537 Plan" prepared by Martin and Martin, Inc., dated May, 1987 (Incorporated by reference).
- Well sampling performed by Enviro-Lab, Inc. from 11/25/96 to 12/5/96.
- On-Lot Disposal Systems (OLDS) field verification performed by the Hamilton

Township's Sewage Enforcement Officer (SEO) on December 10 and 23, 1996.

- Mail-in survey results received in September, 1996.
- Hamilton Township, Adams County Tax Assessment Maps K-9, K-10, and K-11 as indicated in January, 1997.
- Main-in survey results received in October, 1999.

IV. DATA COLLECTED

IV. Data Collected

Mail Survey

A survey form was mailed to each resident in the Hamilton Township Route 94 study area in early September 1996 (See Appendix A). The purpose of the mail survey was to aid in the assessment of each resident's OLDS by collecting valuable information directly from the homeowner (See Exhibit B). As shown in Table 1, 132 survey forms were mailed out and 90 survey forms were returned. This return rate of 68% is well above the required 25% as set forth in the Act 537 Sewage Disposal Needs Identification Guidance (March 1996).

TABLE 1. Route 94 Study Area - Mail Survey Response

# Parcels in Study Area	# Mail Surveys Sent Out	# Responses	% Returned	% Required
132	132	90	68	25

The 90 survey forms returned were reviewed and individually assigned a "type of response" based on the following definitions:

Potential Malfunction: Any OLDS installed prior to 1972 (a pre-regulatory system) or any system with unpermitted repairs.

Suspected Malfunction: Any OLDS reportedly exhibiting malfunction characteristics such as, but not limited to, green lush grass in the vicinity of an absorption area, wetness or spongy areas, water ponding, sewage backups, surface discharge of septage, or a combination of malfunction characteristics. Also included is any surface discharge of wash water.

No Apparent Malfunction: No reported evidence of any problems with OLDS.

Undeveloped Land: Survey response indicated parcel as undeveloped land.

Holding Tank:

Survey response indicated some type of holding tank in use.

As shown in Table 2, 44.5% of the 90 responses were evaluated as potential malfunctions. The majority of these potential malfunctions are a resultant of their construction prior to OLDS permitting requirements (pre-regulatory systems).

TABLE 2. Route Study Area - Mail Survey Results

Type of Response	# Responses	% of Total Response
Potential Malfunction	40	44.5
Suspected Malfunction	26	29.0
No Apparent Malfunction	16	18.0
No Dwelling/Vacant	5	5.5
Holding tank	3	3.0
Total	90	100.0

Suspected malfunctions accounted for 29% of the responses, with 44.5% for potential malfunctions, indicating 73.5% of the responses may be contributing to endangering public health in the Route 94 study area.

Well Sampling

Random well sampling was performed in the Route 94 study area from November 25, 1996 to December 5, 1996 (See results in Appendix B). A total of 40 wells (47% of mail survey responses which indicated the use of an OLDS) were sampled and analyzed by ENVIRO-LAB, Inc. for total coliform, fecal coliform, and nitrate-nitrogen (NO₃-N) concentration.

Coliform bacteria are found in the intestinal tracts and fecal discharges of humans and warm-blooded animals. The detection of coliform bacteria in a water supply indicates that it may be unsafe to drink based on US EPA water quality standards. The detection of coliform bacteria is a good indicator that an OLDS is malfunctioning. Out of the 40 wells sampled, 24 wells (60%) had total coliform

present in the water and 3 of these 24 wells (12.5%) were contaminated with fecal coliform. Exhibit C shows the location and results for total and fecal coliform concentrations. Sample locations exhibiting concentrations of total coliform greater than or equal to 50 colonies per 100 ml and/or fecal coliform greater than zero (0) colonies per 100 ml are shown on Exhibit C as centrally located in the same areas of concern previously mentioned.

The detection of NO₃-N in a water supply indicates pollution usually associated with wastewater and/or agricultural runoff. It is reasonably assumed that any well with NO₃-N concentration above 5.0 mg/l may be affected by a malfunctioning OLDS. U.S. Public Health standards for nitrates in potable water is 10 milligrams per liter (mg/l) as NO₃-N. Well sampling locations and results for NO₃-N concentrations are shown on Exhibit D. Out of 40 wells sampled, 13 wells (32.5%) had NO₃-N concentrations between 5.0 - 10.0 mg/l and 3 wells (7.5%) had NO₃-N concentrations greater than 10.0 mg/l. These 16 wells that have relatively high NO₃-N concentrations are centrally located in the same area where the mail surveys and field verifications indicated suspected and confirmed OLDS malfunctions.

Field Verifications of OLDS

In order to ensure an accurate understanding of the area's sewage disposal needs, a random field verification of the surveyed OLDS was performed on December 10 and 23, 1996; Of the 90 mail responses returned, 54 were field verified (60%). These field verifications were performed by two (2) certified Pennsylvania Sewage Enforcement Officers (SEO's) who were authorized to do so by the Township Supervisors. The results of the field verification are shown in Table 3. The 54 field verified OLDS were each assigned a "*type of verification*" based on the following definitions:

Potential Malfunction: Any OLDS that appeared to be operating satisfactorily but was constructed prior to system permitting requirements (pre-regulatory system) or any system with unpermitted repairs.

Suspected Malfunction: Any OLDS exhibiting some malfunction characteristics such as, but not limited to, abnormally green grass in the vicinity of an absorption area, odors, wetness or spongy areas, and water ponding.

Confirmed Malfunction: Any OLDS exhibiting definite malfunction characteristics such as, but not limited to, surface discharge of septage and/or a combination of malfunction characteristics. Also included is the surface discharge of wash water.

No Apparent Malfunction: No apparent evidence of problems with OLDS.

TABLE 3. Route 94 Study Area - Field Verification Results

Type of Verification	# Field Verified	% of Total Verified
No Apparent Malfunction	10	18.5
Potential Malfunction	10	18.5
Suspected Malfunction	18	33.0
Confirmed Malfunction	16	30.0
Total	54	100.0

Data from the mail survey and field verifications were integrated and illustrated on Exhibit B. This exhibit clearly indicates that the majority of suspected and confirmed OLDS malfunctions are centrally located at Dogwood Court, Gun Club Road, Pine Run Road, and along Route 94 (Carlisle Pike) between Cedar Road and Forest Drive. Isolated from the centrally located malfunctions is 700 Road which exhibited several suspected and confirmed OLDS malfunctions. It should be noted that field conditions during the time of OLDS verification were extremely wet due to excessive precipitation in the months prior.

In conclusion, it is evident from Exhibits B, C and D that the "immediate" sewage disposal needs area is located at Dogwood Court, Gun Club Road, Pine Run Road, and along Route 94 (Carlisle Pike)

between Cedar Road and Forest Drive. It is also evident that the remaining portion of the study area can be categorized as a "future" sewage disposal needs area if it is not feasible to construct facilities in these areas at this time.

V. ALTERNATIVES IDENTIFICATION

V. Alternatives Identification

Wastewater planning in the Route 94 area can be accomplished in various ways. Connection can be made to the New Oxford Municipality Authority WWTP, the proposed Berwick Township WWTP or a proposed Hamilton Township WWTP.

The alternatives evaluated for the purpose of providing a public sewer system to the study area are as follows:

- a. Alternative No. 1 - Construct a conventional gravity collection system and pump sewage to Oxford Township's collection system and New Oxford Municipal Authority's Wastewater Treatment Plant.
- b. Alternative No. 2 - Construct a conventional gravity collection system and pump sewage to Berwick Township's proposed collection system and wastewater treatment plant.
- c. Alternative No. 3 - Construct a conventional gravity collection system and wastewater treatment plant.

The study area was divided into three (3) collection areas. (See Exhibit E) Collection Area No. 1 is located north of Cedar Road and encompasses the 700 Road area. Collection Area No. 2, the most populated area, covers the area between Cedar Road and Berlin Road. Collection Area No. 3 is located between Berlin Road and Route 30. User estimates (EDU's) for the three collection areas are as follows:

Collection Area 1, 2 & 3 - 124.5 EDU's

Collection Area 1 & 2 - 103 EDU's

Collection Area 2 - 85 EDU's

Alternative No. 1 involves the construction of a conventional gravity collection system and sewage pumping stations to convey sewage to a manhole in the Rolling Meadows Mobile Home Park. Exhibit F details the proposed layout for the three collection areas.

Alternative No. 2 involves the construction of a conventional gravity collection system and sewage pumping stations to convey sewage to a pumping station along York Road (Route 30). Exhibit G details the proposed layout for the three collection areas.

Alternative No. 3 involves the construction of a conventional gravity collection system and sewage pumping stations to convey sewage to a proposed wastewater treatment plant located along the Conewago Creek and Carlisle Road (Route 94). Exhibit H details this proposed layout for the three collection areas.

A financial analysis of each Alternative has been completed to determine the most economical way to serve the residents of the Route 94 study area and prepare for future growth.

VI. COST ESTIMATES

VI. Cost Estimates

Cost estimates for each alternative are shown on Tables 4 through 12 on the following pages. The estimates were developed showing the cost for Collection Area 2, Collection Areas 1 & 2 and Collection Area 1, 2, & 3. As shown for all collection areas, the total estimated project cost for Alternative No. 1 is \$1,831,000, for Alternative No. 2 is \$1,955,000 and for Alternative No. 3 is \$2,795,000.

Table 4 - Estimated Project Costs

Alternative # 1 - Collection Areas 1, 2 & 3

Flow to Oxford Twp. Collection System and NOMA Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$35,000.00	\$35,000.00
Maintenance and Protection of Traffic	LS	1	\$15,000.00	\$15,000.00
Clearing and Grubbing	LS	1	\$5,000.00	\$5,000.00
Boring and jacking 24" dia. casing pipe	LF	80	\$400.00	\$32,000.00
Select Material Stone Backfill	TON	7,700	\$10.00	\$77,000.00
Soil Erosion & Sedimentation Control	LS	1	\$15,000.00	\$15,000.00
Finish Grading and Seeding	LS	1	\$20,000.00	\$20,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	1,575	\$26.00	\$40,950.00
6" Dia. PVC Pipe(boring)	LF	1,040	\$75.00	\$78,000.00
8" Dia. PVC Pipe	LF	16,600	\$34.00	\$564,400.00
8" x 6" wyes	EA	107	\$40.00	\$4,280.00
1/8" bends	EA	107	\$10.00	\$1,070.00
4" Dia. PVC pressure pipe	LF	7,300	\$18.00	\$131,400.00
Manholes	EA	58	\$900.00	\$52,200.00
Standard Fame and Cover	EA	58	\$200.00	\$11,600.00
Cleanouts	EA	107	\$75.00	\$8,025.00
Pump Stations	EA	3	\$100,000.00	\$300,000.00
Trench Resoration Payment Items				
Trench Paving	SY	3,420	\$15.00	\$51,300.00
Trench Paving (Driveway)	SY	550	\$12.00	\$6,600.00
Subtotal				\$1,448,825.00
Contingency(+/-10%)				\$144,175.00
Estimated Construction Cost				\$1,593,000.00
Estimated Design Cost(+/-15%)				\$238,000.00
Estimated Total Project Cost				\$1,831,000.00

Table 5 - Estimated Project Costs

Alternative # 1 - Collection Areas 1 & 2

Flow to Oxford Twp. Collection System and NOMA Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$30,000.00	\$30,000.00
Maintenance and Protection of Traffic	LS	1	\$12,000.00	\$12,000.00
Clearing and Grubbing	LS	1	\$4,000.00	\$4,000.00
Boring and jacking 24" dia. casing pipe	LF	80	\$400.00	\$32,000.00
Select Material Stone Backfill	TON	7,700	\$10.00	\$77,000.00
Soil Erosion & Sedimentation Control	LS	1	\$12,000.00	\$12,000.00
Finish Grading and Seeding	LS	1	\$16,000.00	\$16,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	1,455	\$26.00	\$37,830.00
6" Dia. PVC Pipe(boring)	LF	880	\$75.00	\$66,000.00
8" Dia. PVC Pipe	LF	12,300	\$34.00	\$418,200.00
8" x 6" wyes	EA	95	\$40.00	\$3,800.00
1/8" bends	EA	95	\$10.00	\$950.00
4" Dia. PVC pressure pipe	LF	7,300	\$18.00	\$131,400.00
Manholes	EA	43	\$900.00	\$38,700.00
Standard Frame and Cover	EA	43	\$200.00	\$8,600.00
Cleanouts	EA	95	\$75.00	\$7,125.00
Pump Stations	EA	3	\$100,000.00	\$300,000.00
Trench Resoration Payment Items				
Trench Paving	SY	3,420	\$15.00	\$51,300.00
Trench Paving (Driveway)	SY	500	\$12.00	\$6,000.00
Subtotal				\$1,252,905.00
Contingency(+/- 10%)				\$125,095.00
Estimated Construction Cost				\$1,378,000.00
Estimated Design Cost(+/- 15%)				\$206,000.00
Estimated Total Project Cost				\$1,584,000.00

Table 6 - Estimated Project Costs

Alternative # 1 - Collection Area 2

Flow to Oxford Twp. Collection System and NOMA Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$24,000.00	\$24,000.00
Maintenance and Protection of Traffic	LS	1	\$10,000.00	\$10,000.00
Clearing and Grubbing	LS	1	\$3,000.00	\$3,000.00
Boring and jacking 24" dia. casing pipe	LF	80	\$400.00	\$32,000.00
Select Material Stone Backfill	TON	4,510	\$10.00	\$45,100.00
Soil Erosion & Sedimentation Control	LS	1	\$10,000.00	\$10,000.00
Finish Grading and Seeding	LS	1	\$13,000.00	\$13,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	895	\$26.00	\$23,270.00
6" Dia. PVC Pipe(boring)	LF	800	\$75.00	\$60,000.00
8" Dia. PVC Pipe	LF	9,700	\$34.00	\$329,800.00
8" x 6" wyes	EA	71	\$40.00	\$2,840.00
1/8" bends	EA	71	\$10.00	\$710.00
4" Dia. PVC pressure pipe	LF	6,300	\$18.00	\$113,400.00
Manholes	EA	35	\$900.00	\$31,500.00
Standard Frame and Cover	EA	35	\$200.00	\$7,000.00
Cleanouts	EA	71	\$75.00	\$5,325.00
Pump Stations	EA	2	\$100,000.00	\$200,000.00
Trench Resoration Payment Items				
Trench Paving	SY	2,020	\$15.00	\$30,300.00
Trench Paving (Driveway)	SY	460	\$12.00	\$5,520.00
Subtotal				\$946,765.00
Contingency(+/-10%)				\$94,235.00
Estimated Construction Cost				\$1,041,000.00
Estimated Design Cost(+/-15%)				\$156,000.00
Estimated Total Project Cost				\$1,197,000.00

Table 7 - Estimated Project Costs

Alternative # 2 - Collection Areas 1, 2 & 3

Flow to Berwick Township Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$35,000.00	\$35,000.00
Maintenance and Protection of Traffic	LS	1	\$15,000.00	\$15,000.00
Clearing and Grubbing	LS	1	\$5,000.00	\$5,000.00
Boring and jacking 24" dia. casing pipe	LF	160	\$400.00	\$64,000.00
Select Material Stone Backfill	TON	8,600	\$10.00	\$86,000.00
Soil Erosion & Sedimentation Control	LS	1	\$15,000.00	\$15,000.00
Finish Grading and Seeding	LS	1	\$20,000.00	\$20,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	1,575	\$26.00	\$40,950.00
6" Dia. PVC Pipe(boring)	LF	1,040	\$75.00	\$78,000.00
8" Dia. PVC Pipe	LF	18,100	\$34.00	\$615,400.00
8" x 6" wyes	EA	107	\$40.00	\$4,280.00
1/8" bends	EA	107	\$10.00	\$1,070.00
4" Dia. PVC pressure pipe	LF	7,000	\$18.00	\$126,000.00
Manholes	EA	63	\$900.00	\$56,700.00
Standard Frame and Cover	EA	63	\$200.00	\$12,600.00
Cleanouts	EA	107	\$75.00	\$8,025.00
Pump Stations	EA	3	\$100,000.00	\$300,000.00
Trench Resoration Payment Items				
Trench Paving	SY	3,820	\$15.00	\$57,300.00
Trench Paving (Driveway)	SY	450	\$12.00	\$5,400.00
Subtotal				\$1,545,725.00
Contingency(+/-10%)				\$154,275.00
Estimated Construction Cost				\$1,700,000.00
Estimated Design Cost(+/-15%)				\$255,000.00
Estimated Total Project Cost				\$1,955,000.00

Table 8 - Estimated Project Costs

Alternative # 2 - Collection Areas 1 & 2

Flow to Berwick Township Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$30,000.00	\$30,000.00
Maintenance and Protection of Traffic	LS	1	\$12,000.00	\$12,000.00
Clearing and Grubbing	LS	1	\$4,000.00	\$4,000.00
Boring and jacking 24" dia. casing pipe	LF	160	\$400.00	\$64,000.00
Select Material Stone Backfill	TON	8,600	\$10.00	\$86,000.00
Soil Erosion & Sedimentation Control	LS	1	\$12,000.00	\$12,000.00
Finish Grading and Seeding	LS	1	\$16,000.00	\$16,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	1,455	\$26.00	\$37,830.00
6" Dia. PVC Pipe(boring)	LF	880	\$75.00	\$66,000.00
8" Dia. PVC Pipe	LF	13,800	\$34.00	\$469,200.00
8" x 6" wyes	EA	95	\$40.00	\$3,800.00
1/8" bends	EA	95	\$10.00	\$950.00
4" Dia. PVC pressure pipe	LF	7,000	\$18.00	\$126,000.00
Manholes	EA	48	\$900.00	\$43,200.00
Standard Frame and Cover	EA	48	\$200.00	\$9,600.00
Cleanouts	EA	95	\$75.00	\$7,125.00
Pump Stations	EA	3	\$100,000.00	\$300,000.00
Trench Resoration Payment Items				
Trench Paving	SY	3,820	\$15.00	\$57,300.00
Trench Paving (Driveway)	SY	400	\$12.00	\$4,800.00
Subtotal				\$1,349,805.00
Contingency(+/-10%)				\$134,195.00
Estimated Construction Cost				\$1,484,000.00
Estimated Design Cost(+/-15%)				\$222,000.00
Estimated Total Project Cost				\$1,706,000.00

Table 9 - Estimated Project Costs

Alternative # 2 - Collection Area 2

Flow to Berwick Township Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$24,000.00	\$24,000.00
Maintenance and Protection of Traffic	LS	1	\$10,000.00	\$10,000.00
Clearing and Grubbing	LS	1	\$3,000.00	\$3,000.00
Boring and jacking 24" dia. casing pipe	LF	160	\$400.00	\$64,000.00
Select Material Stone Backfill	TON	5,410	\$10.00	\$54,100.00
Soil Erosion & Sedimentation Control	LS	1	\$10,000.00	\$10,000.00
Finish Grading and Seeding	LS	1	\$13,000.00	\$13,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	895	\$26.00	\$23,270.00
6" Dia. PVC Pipe(boring)	LF	800	\$75.00	\$60,000.00
8" Dia. PVC Pipe	LF	11,200	\$34.00	\$380,800.00
8" x 6" wyes	EA	71	\$40.00	\$2,840.00
1/8" bends	EA	71	\$10.00	\$710.00
4" Dia. PVC pressure pipe	LF	6,000	\$18.00	\$108,000.00
Manholes	EA	40	\$900.00	\$36,000.00
Standard Frame and Cover	EA	40	\$200.00	\$8,000.00
Cleanouts	EA	71	\$75.00	\$5,325.00
Pump Stations	EA	2	\$100,000.00	\$200,000.00
Trench Resoration Payment Items				
Trench Paving	SY	2,420	\$15.00	\$36,300.00
Trench Paving (Driveway)	SY	360	\$12.00	\$4,320.00
Subtotal				\$1,043,665.00
Contingency(+/-10%)				\$104,335.00
Estimated Construction Cost				\$1,148,000.00
Estimated Design Cost(+/-15%)				\$172,000.00
Estimated Total Project Cost				\$1,320,000.00

Table 10 - Estimated Project Costs

Alternative # 3 - Collection Areas 1, 2 & 3

Flow to Hamilton Township Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$40,000.00	\$40,000.00
Maintenance and Protection of Traffic	LS	1	\$20,000.00	\$20,000.00
Clearing and Grubbing	LS	1	\$5,000.00	\$5,000.00
Boring and jacking 24" dia. casing pipe	LF	80	\$400.00	\$32,000.00
Select Material Stone Backfill	TON	7,700	\$10.00	\$77,000.00
Soil Erosion & Sedimentation Control	LS	1	\$15,000.00	\$15,000.00
Finish Grading and Seeding	LS	1	\$20,000.00	\$20,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	1,575	\$26.00	\$40,950.00
6" Dia. PVC Pipe(boring)	LF	1,040	\$75.00	\$78,000.00
8" Dia. PVC Pipe	LF	20,100	\$34.00	\$683,400.00
8" x 6" wyes	EA	107	\$40.00	\$4,280.00
1/8" bends	EA	107	\$10.00	\$1,070.00
4" Dia. PVC pressure pipe	LF	6,400	\$18.00	\$115,200.00
4" Dia. PVC pressure pipe(boring)	LF	40	\$75.00	\$3,000.00
Manholes	EA	71	\$900.00	\$63,900.00
Standard Fame and Cover	EA	71	\$200.00	\$14,200.00
Cleanouts	EA	107	\$75.00	\$8,025.00
Pump Stations	EA	3	\$100,000.00	\$300,000.00
Trench Resoration Payment Items				
Trench Paving	SY	3,420	\$15.00	\$51,300.00
Trench Paving (Driveway)	SY	750	\$12.00	\$9,000.00
Subtotal				\$1,581,325.00
Contingency(+/-10%)				\$157,675.00
Estimated Construction Cost				\$1,739,000.00
Estimated Design Cost(+/-15%)				\$261,000.00
Estimated Total Project Cost				\$2,000,000.00
Wastewater Treatment Plant Items				
100,000 gallons per day plant	GPD	100,000	\$5.00	\$500,000.00
Land for Treatment plant	AC	10	\$8,000.00	\$80,000.00
Glabview Acres treatment plant upgrade	LS	1	\$20,000.00	\$20,000.00
Subtotal				\$600,000.00
Contingency(+/-10%)				\$60,000.00
Estimated Construction Cost				\$660,000.00
Estimated Design Cost(+/-20%)				\$135,000.00
Estimated Total Project Cost				\$795,000.00
Estimated Total Project Cost for Collection System and WWTP				\$2,795,000.00

Table 11 - Estimated Project Costs

Alternative # 3 - Collection Areas 1 & 2

Flow to Hamilton Township Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$35,000.00	\$35,000.00
Maintenance and Protection of Traffic	LS	1	\$16,000.00	\$16,000.00
Clearing and Grubbing	LS	1	\$4,000.00	\$4,000.00
Boring and jacking 24" dia. casing pipe	LF	80	\$400.00	\$32,000.00
Select Material Stone Backfill	TON	7,700	\$10.00	\$77,000.00
Soil Erosion & Sedimentation Control	LS	1	\$13,000.00	\$13,000.00
Finish Grading and Seeding	LS	1	\$16,000.00	\$16,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	1,455	\$26.00	\$37,830.00
6" Dia. PVC Pipe(boring)	LF	880	\$75.00	\$66,000.00
8" Dia. PVC Pipe	LF	15,800	\$34.00	\$537,200.00
8" x 6" wyes	EA	95	\$40.00	\$3,800.00
1/8" bends	EA	95	\$10.00	\$950.00
4" Dia. PVC pressure pipe	LF	6,400	\$18.00	\$115,200.00
4" Dia. PVC pressure pipe(boring)	LF	40	\$75.00	\$3,000.00
Manholes	EA	56	\$900.00	\$50,400.00
Standard Frame and Cover	EA	56	\$200.00	\$11,200.00
Cleanouts	EA	95	\$75.00	\$7,125.00
Pump Stations	EA	3	\$100,000.00	\$300,000.00
Trench Resoration Payment Items				
Trench Paving	SY	3,420	\$15.00	\$51,300.00
Trench Paving (Driveway)	SY	700	\$12.00	\$8,400.00
Subtotal				\$1,385,405.00
Contingency(+/-10%)				\$138,595.00
Estimated Construction Cost				\$1,524,000.00
Estimated Design Cost(+/-15%)				\$229,000.00
Estimated Total Project Cost				\$1,753,000.00
Wastewater Treatment Plant Items				
100,000 gallons per day plant	GPD	100,000	\$5.00	\$500,000.00
Land for Treatment plant	AC	10	\$8,000.00	\$80,000.00
Glabview Acres treatment plant upgrade	LS	1	\$20,000.00	\$20,000.00
Subtotal				\$600,000.00
Contingency(+/-10%)				\$60,000.00
Estimated Construction Cost				\$660,000.00
Estimated Design Cost(+/-20%)				\$135,000.00
Estimated Total Project Cost				\$795,000.00
Estimated Total Project Cost for Collection System and WWTP				\$2,548,000.00

Table 12 - Estimated Project Costs

Alternative # 3 - Collection Area 2

Flow to Hamilton Township Wastewater Treatment Plant

Description	Unit	Quantity	Unit Price	Total Price
Miscellaneous/Site Work Payment Items				
Mobilization	LS	1	\$30,000.00	\$30,000.00
Maintenance and Protection of Traffic	LS	1	\$15,000.00	\$15,000.00
Clearing and Grubbing	LS	1	\$3,500.00	\$3,500.00
Boring and jacking 24" dia. casing pipe	LF	80	\$400.00	\$32,000.00
Select Material Stone Backfill	TON	4,510	\$10.00	\$45,100.00
Soil Erosion & Sedimentation Control	LS	1	\$11,000.00	\$11,000.00
Finish Grading and Seeding	LS	1	\$15,000.00	\$15,000.00
Sanitary Sewer Payment Items				
6" Dia. PVC Pipe(open cut)	LF	955	\$26.00	\$24,830.00
6" Dia. PVC Pipe(boring)	LF	800	\$75.00	\$60,000.00
8" Dia. PVC Pipe	LF	13,700	\$34.00	\$465,800.00
8" x 6" wyes	EA	71	\$40.00	\$2,840.00
1/8" bends	EA	71	\$10.00	\$710.00
4" Dia. PVC pressure pipe	LF	6,400	\$18.00	\$115,200.00
4" Dia. PVC pressure pipe(boring)	LF	40	\$75.00	\$3,000.00
Manholes	EA	48	\$900.00	\$43,200.00
Standard Fame and Cover	EA	48	\$200.00	\$9,600.00
Cleanouts	EA	71	\$75.00	\$5,325.00
Pump Stations	EA	3	\$100,000.00	\$300,000.00
Trench Resoration Payment Items				
Trench Paving	SY	2,020	\$15.00	\$30,300.00
Trench Paving (Driveway)	SY	700	\$12.00	\$8,400.00
Subtotal				\$1,220,805.00
Contingency(+/-10%)				\$122,195.00
Estimated Construction Cost				\$1,343,000.00
Estimated Design Cost(+/-15%)				\$202,000.00
Estimated Total Project Cost				\$1,545,000.00
Wastewater Treatment Plant Items				
100,000 gallons per day plant	GPD	100,000	\$5.00	\$500,000.00
Land for Treatment plant	AC	10	\$8,000.00	\$80,000.00
Glabview Acres treatment plant upgrade	LS	1	\$20,000.00	\$20,000.00
Subtotal				\$600,000.00
Contingency(+/-10%)				\$60,000.00
Estimated Construction Cost				\$660,000.00
Estimated Design Cost(+/-20%)				\$135,000.00
Estimated Total Project Cost				\$795,000.00
Estimated Total Project Cost for Collection System and WWTP				\$2,340,000.00

VII. FINANCIAL ANALYSES

VII. Financial Analyses

The selection of a proposed alternative must not be based alone on construction cost, but on costs per users based on different funding scenarios which include design and operation and maintenance costs. The following three funding sources were considered:

- A. PENNVEST: 2.638% interest rate, 20 year loan repayment.

- B. Rural Utility Service: 5.5% interest rate, 40 year loan repayment.

- C. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment.

The Alternatives were evaluated utilizing present worth methodology for each of the above sources assuming a tapping fee being assessed by the Township. Each alternative and combination of collection areas was evaluated based on tapping fee of \$2,500.

Alternative No. 1 involves the purchasing capacity from the NOMA Wastewater Treatment Plant. The cost of 90,000 gpd would be \$450,000. In addition NOMA would charge an operation and maintenance fee of \$62 bi-monthly and Oxford Township would charge an operation and maintenance fee of \$0.50 per 1,000 gallons per day.

Alternative No. 2 involves the purchasing capacity from the proposed Berwick Township Wastewater Treatment Plant. The cost of 100,000 gpd would be \$536,000 which includes engineering and construction costs to increase the capacity of the plant and collection system. In addition, Berwick Township would charge \$30 per month per EDU for operation and maintenance and we have estimated approximately \$5 per month per EDU for debt service.

Alternative No. 3 involves the building of a wastewater treatment plant. The estimated project cost of the treatment plant is \$795,000 which includes alterations to the Gladview Acres

Treatment Plant. Operation and maintenance for the treatment plant is estimated at \$75,000 per year.

Estimated costs per EDU for each of the alternatives based on the above funding sources are shown on Tables 13 through 21 on the following pages.

Table 13 - Estimated Cost per EDU per Year

Alternative #1 - Collection Areas 1, 2 & 3 (124.5 EDU's)

Flow to Oxford Twp. Collection System and NOMA Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,028	\$986	\$1,212
Oxford O&M	\$47	\$47	\$47
NOMA O&M	\$372	\$372	\$372
System O&M	\$25	\$25	\$25
Total	\$1,472	\$1,430	\$1,656

Tapping Fee

- A. Based on capacity from NOMA costing \$450,000
- B. Based on a tapping fee of \$2,500
- C. Remaining capacity costs not covered by tapping fees included in debt service

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

- A. Oxford Township: Based on a charge of \$0.50 per 1,000 gallons per day
- B. NOMA: Based on a \$62 bi-monthly charge per EDU

Table 14 - Estimated Cost per EDU per Year

Alternative #1 - Collection Areas 1 & 2 (103 EDU's)

Flow to Oxford Twp. Collection System and NOMA Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,121	\$1,075	\$1,321
Oxford O&M	\$47	\$47	\$47
NOMA O&M	\$372	\$372	\$372
System O&M	\$30	\$30	\$30
Total	\$1,570	\$1,524	\$1,770

Tapping Fee

- A. Based on capacity from NOMA costing \$450,000
- B. Based on a tapping fee of \$2,500
- C. Remaining capacity costs not covered by tapping fees included in debt service

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

- A. Oxford Township: Based on a charge of \$0.50 per 1,000 gallons per day
- B. NOMA: Based on a \$62 bi-monthly charge per EDU

Table 15 - Estimated Cost per EDU per Year

Alternative #1 - Collection Area 2 (85 EDU's)

Flow to Oxford Twp. Collection System and NOMA Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,097	\$1,051	\$1,293
Oxford O&M	\$47	\$47	\$47
NOMA O&M	\$372	\$372	\$372
System O&M	\$25	\$25	\$25
Total	\$1,541	\$1,495	\$1,737

Tapping Fee

- A. Based on capacity from NOMA costing \$450,000
- B. Based on a tapping fee of \$2,500
- C. Remaining capacity costs not covered by tapping fees included in debt service

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

- A. Oxford Township: Based on a charge of \$0.50 per 1,000 gallons per day
- B. NOMA: Based on a \$62 bi-monthly charge per EDU

Table 16 - Estimated Cost per EDU per Year

Alternative # 2 - Collection Areas 1, 2 & 3 (124.5 EDU's)

Flow to Berwick Township Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,138	\$1,091	\$1,341
Berwick O&M	\$420	\$420	\$420
System O&M	\$25	\$25	\$25
Total	\$1,583	\$1,536	\$1,786

Tapping Fee

- A. Based on capacity from Berwick Township costing \$536,500
- B. Based on a tapping fee of \$2,500
- C. Remaining capacity costs not covered by tapping fees included in debt service

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

- A. Berwick Township: Based on \$30 per month per EDU plus \$5 per month per EDU debt service

Table 17 - Estimated Cost per EDU per Year

Alternative # 2 - Collection Areas 1 & 2 (103 EDU's)

Flow to Berwick Township Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,253	\$1,201	\$1,476
Berwick O&M	\$420	\$420	\$420
System O&M	\$30	\$30	\$30
Total	\$1,703	\$1,651	\$1,926

Tapping Fee

- A. Based on capacity from Berwick Township costing \$536,500
- B. Based on a tapping fee of \$2,500
- C. Remaining capacity costs not covered by tapping fees included in debt service

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

- A. Berwick Township: Based on \$30 per month per EDU plus \$5 per month per EDU debt service

Table 18 - Estimated Cost per EDU per Year

Alternative # 2 - Collection Area 2 (85 EDU's)

Flow to Berwick Township Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,259	\$1,205	\$1,482
Berwick O&M	\$420	\$420	\$420
System O&M	\$25	\$25	\$25
Total	\$1,704	\$1,650	\$1,927

Tapping Fee

- A. Based on capacity from Berwick Township costing \$536,500
- B. Based on a tapping fee of \$2,500
- C. Remaining capacity costs not covered by tapping fees included in debt service

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

- A. Berwick Township: Based on \$30 per month per EDU plus \$5 per month per EDU debt service

Table 19 - Estimated Cost per EDU per Year

Alternative # 3 - Collection Areas 1, 2 & 3 (124.5 EDU's)

Flow to Hamilton Township Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,297	\$1,243	\$1,528
System O&M	\$25	\$25	\$25
WWTP O&M	\$600	\$600	\$600
Total	\$1,922	\$1,868	\$2,153

Tapping Fee

A. Based on a tapping fee of \$2,500

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

A. WWTP O&M: based on \$75,000 per year

Table 20 - Estimated Cost per EDU per Year

Alternative # 3 - Collection Areas 1 & 2 (103 EDU's)

Flow to Hamilton Township Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,445	\$1,385	\$1,703
System O&M	\$30	\$30	\$30
WWTP O&M	\$750	\$750	\$750
Total	\$2,225	\$2,165	\$2,483

Tapping Fee

A. Based on a tapping fee of \$2,500

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

A. WWTP O&M: based on \$75,000 per year

Table 21 - Estimated Cost per EDU per Year

Alternative # 3 - Collection Area 2 (85 EDU's)

Flow to Hamilton Township Wastewater Treatment Plant

Estimated Cost per EDU per Year			
	PENNVEST	RUS	BOND ISSUE
Debt Service	\$1,627	\$1,559	\$1,917
System O&M	\$25	\$25	\$25
WWTP O&M	\$985	\$985	\$985
Total	\$2,637	\$2,569	\$2,927

Tapping Fee

- A. Based on a tapping fee of \$2,500

Finance Options

- A. Debt Service: based on interest compounded annually
- B. PENNVEST: 2.638% interest rate, 20 year loan repayment
- C. Rural Utility Service (RUS): 5.5% interest rate, 40 year loan repayment
- D. Conventional Bond Issue: 6.5% interest rate, 30 year loan repayment

Operation and Maintenance (O&M)

- A. WWTP O&M: based on \$75,000 per year

VIII. ALTERNATIVE EVALUATION

VIII. Alternative Evaluation

The financial analysis shows that, of the three funding sources, the rural utility service loan offers the most affordable rates per EDU for the three different combinations of Collection Areas evaluated. The three least expensive options, based on cost per EDU per year, are as follows:

- | | |
|---|---------|
| 1. Alternative No. 1 (Entire Collection Area) | \$1,430 |
| 2. Alternative No. 1 (Collection Area 2) | \$1,495 |
| 3. Alternative No. 1 (Collection Area 1 & 2) | \$1,524 |
| 4. Alternative No. 2 (Entire collection area) | \$1,536 |

Based on costs and the various alternatives for sewage treatment, it would appear that the most beneficial alternative for the Township to choose if it were to undertake a sewer project would be Alternative No. 2 (Entire Collection Area). Although it is more expensive per year than Alternative No. 1 (Entire Collection Area), Alternative No. 1 requires the purchasing of capacity from NOMA. It appears that future growth in the collection area will require greater capacity than is available from NOMA. Purchasing capacity from Berwick Township (Alternative No. 2) would allow for future expansions and increase in future capacity.

The issue of cost per year per user is of importance. Charging users \$1,536 per year, or \$384 per quarter, is high by any standard, but especially when the rates are compared to recently constructed systems in the area. Forest Drive/Cherry Lane customers currently pay \$208 per quarter, while Homestead Acres (Paradise Township) customers pay \$165 per quarter.

If the maximum grant available from PENNVEST is received (\$250,000) and a PENNVEST loan is available at an interest rate of 1% over 30 years, the least expensive options, based on cost per EDU per year, become:

- | | |
|---|----------|
| 1. Alternative No. 1 (Entire Collection Area) | \$ 979 |
| 2. Alternate No. 1 (Collection Area 2) | \$ 983 |
| 3. Alternate No. 1 (Collection Area 1 & 2) | \$ 1,023 |
| 4. Alternate No. 2 (Entire Collection Area) | \$ 1,045 |

Under the best case scenario, the rates for Alternative No. 2 (entire collection area) would be in the \$261 per quarter range; still higher than surrounding areas, but comparable to the rates charged to the Township's Gladview Acres WWTP users. Only through commitment of development by landowners within the service areas, and their funds, can the Township bring their rates to a comparable amount to that of the surrounding areas.

If there is insufficient commitment by landowners within the service areas, Hamilton Township should promote proper wastewater disposal through the following activities:

1. Create a sewage management program to assure long-term operation and maintenance of individual and community on-lot sewage facilities by adopting one Ordinance for governing municipal management of on-lot subsurface sewage disposal facilities (See Appendix C).

2. Adopt a Well Drillers Ordinance (See Appendix D).
3. The Township shall continue to permit the use of holding tanks in compliance with the existing Holding Tank Ordinance (See Appendix E) and applicable DEP regulations.
4. The following Planning Module requirements will apply through the Township:
 - a. Component 1 Planning Modules (exceptions) and Module exemptions will be prohibited for subdivisions which propose on-lot sewage disposal within one quarter mile of any well which has a documented nitrate-nitrogen level in excess of 5 milligrams per liter.
 - b. A preliminary hydrogeologic analysis or the use of denitrification systems will be required for all Planning Modules which propose on-lot sewage disposal within one quarter mile of any well which has a documented nitrate-nitrogen level in excess of 5 milligrams per liter.
 - c. The Township will require all lot owners in a proposed subdivision using denitrification systems to sign an operation and maintenance agreement requiring a contractor to perform a maintenance on the denitrification.
 - d. The Township will require the testing and reservation of a replacement absorption area for each lot for all future subdivisions.
5. The Township shall provide a public education program to educate the Township residents on proper maintenance of an on-lot system. This program shall also inform new and existing residents of their responsibilities under the newly created Sewage

Management Program. The education program should include information on water conservation measures and proper operation which would help prolong the life of on-lot systems.

This alternative will be financed using the Township's general fund. The implementation of this plan will not require any changed in the Township's institutional, administrative or legal activities.

IX. APPENDICES