EXHIBIT P1
LIMERICK TOWNSHIP ACT 537 SEWAGE FACILITIES
PLAN REVISION JULY 2000

98-74

LIMERICK TOWNSHIP
MONTGOMERY COUNTY, PENNSYLVANIA

ACT 537 SEWAGE FACILITIES PLAN REVISION

JULY 2000

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LIMERICK TOWNSHIP 537 PLAN REVISION

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1.0 PLAN REVISION SUMMARY

The Limerick Township Municipal Authority (LTMA) has been in existence since 1986, and owns and operates the existing municipal sanitary sewerage system in Limerick Township. All planned sewerage facilities will be the responsibility of the LTMA to implement including design, funding, construction and operation. Generally the central and southeastern portions of the Township have public sewer facilities which include an Authority owned and operated 1.6 MGD sewage treatment plant located along the Schuylkill River in the southeastern corner of the Township.

In May 1992, the Limerick Township Board of Supervisors adopted an Act 537 Sewage Facilities Management Plan Update (Plan) prepared by PSC, Inc. Subsequent revisions were made to this Plan in 1993 and again in 1997. This Plan revision is concerned primarily with the future size of the existing treatment plant, the existing Act 537 Plan area is not being revised. Concern is focused on those areas of the Study Area which are currently undeveloped.

Limerick Township is currently experiencing tremendous growth. This is evidenced by the increase in equivalent dwelling units (EDUs) and hydraulic flows as documented in the Chapter 94 Wasteload Management Reports over the past few years. Since January of 1998, the Limerick Township Municipal Authority has documented an average increase in sanitary sewer connections of approximately 500 new EDUs per year. As of December of 1999, approximately 4,500 EDUs were connected to the sanitary sewer system.

Under the current LTMA policy, an applicant may purchase EDUs upon receipt of preliminary plan approval from Limerick Township. With an allocated flow capacity of 250 gallons per day per EDU as established in the Authority's regulations and the Township's approved Act 537 Plan, the existing treatment plant is capable of handling a total of 6,400 EDUs. At this time, essentially all of the capacity of the wastewater treatment plant is allotted to various projects. At present additional development can not occur. Furthermore, should additional capacity be required due to failing on-lot systems, the connection of these systems could potentially overload the treatment plant.

The Township will never realize a population denser than that allowed by maximum buildout. The total number of *new* EDUs which could be connected to the sanitary sewer system, given the development projects known to date and the current density restrictions imposed by the Limerick Township Zoning Ordinance would be approximately 2,486. Based on the current growth rates documented in the Township, this maximum buildout could be reached in under ten (10) years. Prudent planning dictates that the ten year growth projection be used for sizing of future treatment facilities.

Based on the growth predictions, an additional 522,000 gallons per day of sewage flow would be generated from *new* developments. An additional 502,000 gallons per day of sewage flow would be generated from developments which have already received approvals and purchased EDUs. In December 1999 the average daily flow was 624,000 gallons per day. Calculations detailed in subsequent sections of this report reveal a total of approximately 1.86 million gallons per day of

sewage flow to the LTMA Treatment Plant, including the flow from the Upper Brooke Evans Drainage Area. The sewage flow per day to the LTMA Treatment Plant would be 1.7 million gallons with the diversion of the Upper Brooke Evans Drainage Area to the planned Possum Hollow sewerage system.

As part of this Plan revision, the pump station capacities and anticipated future flows were calculated. These projections indicate that should total buildout occur, five (5) pump stations may require upgrading or expansion. However, at this time it is recommended that no action be taken towards the upgrade or expansion of any of the pump stations, since the some of the LTMA's proposed projects make the need for these expansions unlikely.

Another portion of this Plan revision evaluated the existing sewage conveyance system and the effects new construction will impose on this system. The construction of a regional pump station for the Upper Study Area and the Upper Brooke Evans Drainage Area diversion, have already been adopted by Limerick Township via the 1997 Act 537 Plan Revision and the 2000 Special Study for the Possum Hollow Drainage Area, respectively. Both projects remain key components of the Township's long range sewage management plan and no changes are proposed herein. Finally, the upgrade of the Landis Creek Interceptor, a remnant from the 1992 Act 537 Plan Revision, remains necessary since the hydraulic load on this pipeline will not be reduced by any other proposed activities.

In order to provide required treatment capacity, a number of wastewater treatment plant process options, including a no action option, were developed and reviewed in following sections of this report. Option 2 has been chosen which involves modification of the existing wastewater treatment facilities to provide for a sequencing batch reactor (SBR) process. The SBR process is accomplished within a single tank and does not require separate clarifiers or a sludge recycle pump station. The existing treatment tanks would be converted to four (4) parallel SBR units. New facilities would include headworks, effluent equalization, aerobic sludge digestion, sludge dewatering, utility water system and an outfall directly to the Schuylkill River. Related site work would involve yard piping, yard pump station, electrical, paving, fencing and landscaping.

Option 2 is economically favorable with respect to operation and maintenance costs and overall present worth. The SBR process offers excellent performance reliability relative to achieving compliance with current effluent limitations and possible future requirements for nutrient removal. Finally, this option would allow for an expanded capacity beyond 1.7 mgd with relatively low additional cost should the EDU contribution reach 250 gallons per day or the number of EDUs exceed projections.

The project cost for Option 2 is $7,000,000 while the annual operation and maintenance cost is $790,000. The project cost for upgrade and expansion of the King Road Wastewater Treatment Plant will come from the Delaware Valley Regional Finance Authority via the sale of tax free revenue bonds.

The implementation schedule includes projected dates of January 2001 for PaDEP Act 537 Plan approval, January 2002 for completion of design and securing of PaDEP permits and September 2003 for project completion and start-up.

A connection management plan, with various milestones associated, has been developed to allow for connection of up to 1200 additional EDUs until implementation of the Possum Hollow Sewerage System and the King Road Wastewater Treatment Plant expansion and upgrade project.

2.0 INTRODUCTION

Limerick Township is a municipality of approximately 10,500 people located near the western corner of Montgomery County. The Township is approximately twenty-two (22) square miles in area. Generally the central and southeastern portions of the Township have public sewer facilities, with service provided by the Limerick Township Municipal Authority (LTMA). The Authority owns and operates a 1.6 MGD sewage treatment plant located along the Schuylkill River in the southeastern corner of the Township.

On behalf of the Township, and along with a representative from the LTMA, Gilmore & Associates, Inc. met with representatives of PADEP during April 1998. This meeting was held to discuss the development trend within the Township and to assess what the requirements would be to amend the current Plan such that provisions for the expansion of the treatment plant could be made. The options discussed included formatting two study areas so as to include a re-evaluation of sewerage needs for the eastern portion of the Township and a re-evaluation of the sewerage needs for the western portion of the Township. Figure 1 shows the Township and overall boundary of the currently approved Plan Sewer Service Area including the areas encompassed by each study area. It is important to note that the overall Act 537 Plan area is not being changed from the boundary approved via the 1997 Revision. The study area highlighted in gray shall be addressed by a separate special study titled "Possum Hollow Special Study".

This Revision contains seven (7) sections including this Introduction. It is consistent with the Guide for Preparing Act 537 Update Revisions as published by the PADEP in February 1998. The subsequent sections of this Revision include the following:

Section 3: Previous Wastewater Planning

This section provides information identifying and analyzing all existing wastewater planing previously undertaken by the Township under the Sewage Facilities Act (Act 537). Additionally, information is provided regarding Township and county planning documents utilized in the generation of this Act 537 Plan Revision for Limerick Township.

Section 4: Description of Study Area

This section provides information regarding the physical setting, zoning and current land use within the Study Area. This section defines development projects exerting growth pressures within the Study Area and existing and future population projections including EDU projections. Sewage planning needs for the future are described relating to both five and ten year planning periods. Illustrative figures that depict the current Act 537 boundary and future development projects are also presented.

Section 5: Existing Sewerage Facilities in the Planning Area

This section details the existing sewerage systems in the planning area. This section also discusses problems with the existing facilities and describes any current upgrades or expansions. A brief description of the Township's current Sewage Management Plan (SMP) for on-lot systems is also included.

Section 6: Identification/Evaluation of Alternatives

This section identifies the alternatives available for providing new or improved wastewater disposal facilities to meet the Township's growth needs. The alternatives identified include the extension of new sanitary sewer lines, the diversion of a portion of the existing flow to a new wastewater treatment facility and the expansion of the existing treatment plant. This section also contains a detailed analysis of alternatives evaluated for the Study Area. The evaluation of each alternative is based on technical feasibility, cost, environmental soundness and ease of implementation.

Section 7: Institutional Evaluation

This section includes a discussion of the organization responsible for implementation of the selected alternative.

Section 8: Justification of Selected Alternative

This section concludes the Revision, and provides a discussion of the selected alternative which best meets the sewage management needs of the Study Area. This selection is based on the evaluation of the alternatives in Sections 6 and 7.

Appendix 'A' includes the current Limerick Township Zoning Map. Appendix 'B' includes the Projections of Future Sewage Flows prepared by Gilmore & Associates, Inc. Appendix 'C' includes documentation with regard to Opinions of Probable Cost for each of the sewage management alternatives. Appendix 'D' includes the map outlining the long term selected alternative detailed in the 1997 Act 537 Revision. Appendix 'E' includes the map outlining the Benner Road Interceptor alternative detailed in the 1992 Comprehensive Sewage Facilities Planning Study prepared by PSC Engineers and Consultants. Appendix 'F' includes the 1999 Chapter 94 Wasteload Management Report. Appendix 'G' includes correspondence with regard to Township and Montgomery County Planning Commission, and Montgomery County Health Department reviews. Appendix 'H' contains proof of publication of Public Notice of the proposed 537 Plan Revision adoption and the establishment of a thirty (30) day public comment period. Appendix 'I' includes copies of all written public comments received and the municipal responses thereto. Appendix 'J' includes the signed and sealed resolution of adoption by the Limerick Township Board of Supervisors. Appendix 'K' includes the Department of Environmental Protection Instructions for Completing Act 537 Plan Content and Environmental Assessment Checklist.

3.0 PREVIOUS WASTEWATER PLANNING

The Limerick Township Board of Supervisors adopted an Act 537 Sewage Facilities Management Plan Update (Plan) prepared by PSC, Inc., in May, 1992. Subsequent to that action, the Pennsylvania Department of Environmental Resources (PADER) raised several questions regarding the Plan.

During 1993, Gilmore and Associates, Inc., prepared and submitted an addendum to the Plan addressing PADER's comments. In September 1993, the Plan was approved by PADER. This Plan was not intended to provide the entire Township with public sewers. Specifically, one of the goals of the Township was to restrict public sewer service to designated growth areas. The Plan provided for sewers throughout the most densely populated areas of the Township which included the central most portion extending furthermost south, east and west to the Township line. The northern portion of the Township was not included in the Plan Sewer Service Area in efforts to maintain the open space areas and the rural atmosphere.

This Plan provided for:

1. The re-rating of the Limerick Township Municipal Authority (LTMA) sewage treatment plant from 1.0 mgd to 1.6 mgd

2. Revisions to the five (5) year projected sewer service area

3. A program for additional related studies

4. The implementation of an on-lot management program for both proposed and existing on-lot sewage disposal systems

In 1997, Gilmore & Associates, Inc. prepared and submitted a Revision to the Act 537 Plan. This Plan Revision proposed public sewer service to the northeastern portion of the Township. These portions of the Township, referred to as the Upper and Lower Study Areas, are located on each side of the Ridge Pike corridor and contain approximately 2,400 acres. The major issue addressed through the revision was meeting intense demand for public sewers from new developments.

Specifically, the 1997 Plan Revision provided for:

1. The construction of a regional pump station in the Upper Study Area.

2. Construction of gravity sewers throughout the Upper Study Area and in a portion of the Lower Study Area, including the Mingo Creek Interceptor.

3. Expansion of the Southeast Pump Station.

On March 7, 2000, the Limerick Township Board of Supervisors adopted the Act 537 Special Study – Possum Hollow Area, Limerick Township, Montgomery County, Pennsylvania dated March 2000 by Resolution #2000-11. This resolution specifies the alternative selected based on the results of the Study, to provide sewer service to the Possum Hollow Study Area.

Per the resolution, this option provides initially for the construction of a 450,000 (minimum) gallon per day wastewater treatment plant along Longview Road near the confluence of Possum Hollow Run and the Schuylkill River and two (2) pump stations serving a portion of the study area. Ultimately, this option provides for extension of sewer service to the remainder of the Study Area and the construction of three (3) additional pump stations. The Possum Hollow Area Study option also provides collection and conveyance of sewage for the existing development and proposed new development within the Upper Brooke Evans Drainage Area.

In 1999 the Limerick Township Board of Supervisors hired Urban Research and Development Corporation (URDC) to project how many new homes and businesses will be built in the Township over the next decade and where this new growth would be focused. The Impact Fee Land Use Assumptions final draft, dated October 1999 was reviewed to determine if the calculations for projected sewage need included in this report were consistent with URDC's findings. The comparison of these documents shall be discussed in Section 4.5, Sewage Planning, Five and Ten Year Planning Period.

Additionally, the zoning of the planning area is a key factor in sewage facilities planning. The intensity of the land use dictates the types of disposal methods available. Limerick Township has adopted a land use plan which specifies the location, intensity and general characteristics of land use throughout the Township. The Township also adopted a revised Zoning Ordinance in September of 1992. This Ordinance has been amended in numerous locations in the years following it's adoption, most recently in June 1999. The "Limerick Township Zoning Map" included in Appendix A shows the current zoning districts.

4.0 DESCRIPTION OF STUDY AREA

4.1 Introduction

Limerick Township is a municipality of approximately 10,500 people located near the western corner of Montgomery County. The Township is approximately twenty-two (22) square miles in area. Figure 2, entitled "537 Plan Revision Drainage Area Boundaries", divides the Study Area into six (6) sub-areas and includes approximately 6,600 acres of land which drain primarily towards the Schuylkill River. These sub-areas are broken down as follows:

Landis Creek	1,030 acres
Pump Station #5	1,138 acres
Southeast Pump Station	1,465 acres
Upper Brooke Evans Creek	330 acres
Upper Study Area	1,340 acres
Lower Study Area	1,096 acres

6400

As this Plan revision is concerned primarily with the future size of the existing treatment plant, concern is focused on those areas of the Study Area which are currently undeveloped. Presently the undeveloped/open areas of the Study Area are broken down as follows:

R-1, Residential-Agricultural District	1,086 acres
R-2, Low Density District	404 acres
R-3, Medium Density District	256 acres
R-4, Medium-High Density District	95 acres
R-5, Village Residential District	18 acres
RB, Retail Business District	55 acres
O/LI, Office/Limited Industrial District	141 acres
LLI, Limited Light Industrial	20 acres

2075

Limerick Township is currently experiencing tremendous growth. This is evidenced by the increase in equivalent dwelling units (EDUs) and hydraulic flows as documented in the Chapter 94 Wasteload Management Reports over the past few years. Since January of 1998, the Limerick Township Municipal Authority has documented an average increase in sanitary sewer connections of approximately 500 new EDUs per year. As of December of 1999, approximately 4,500 EDUs were connected to the sanitary sewer system.

Under the current LTMA policy, an applicant may purchase EDUs upon receipt of preliminary plan approval from Limerick Township. With an allocated flow capacity per EDU as established in the Authority's regulations and the Township's approved Act 537 Plan of 250 gallons per day, the existing treatment plant is capable of handling a total of 6,400 EDUs. In December of 1999, the last of the existing 6,400 EDUs was purchased.

Therefore, all of the "paper" capacity of the wastewater treatment plant is allotted to various projects.

Land developers are continuously submitting development proposals for projects in the Township. These developers have expressed a desire for public sewer service as the majority of the soils in Limerick Township are not suitable for on-lot disposal. At present additional development can not occur. Furthermore, should additional capacity be required due to failing on-lot systems, the connection of these systems could potentially overload the treatment plant either hydraulically or organically.

4.2 Identified Future Growth and Development

At the time of the data analysis associated with this revision (December 1999) there were at least nine (9) development projects proposed within the Study Area which would require capacity beyond the 6,400 available at the existing treatment plant utilizing the current 250 gallons per day per EDU allotment. It is important to note that while all of the treatment plant's capacity is allocated, not all of the existing 6,400 EDUs are "live" connections. Some of the connections are assigned to projects currently under construction, in which case the lateral connection may be installed and inspection completed, but at present there is no flow from the lateral. Other EDUs are allocated to projects which have received at least preliminary plan approval and are therefore expected to be built and connected within the next three (3) years.

There are currently nine (9) projects of which the Township is aware for which developers have begun the approval process and are desirous of public sanitary service. These projects range from apartment complexes to restaurants to commercial and business centers. These development projects are consistent with the Township's Zoning Ordinance and are outlined on Figure 3 titled "Newly Proposed Land Development Plans". These projects are described as follows:

Fox Ridge Apartments

This project is located on the west side of Kugler Road, just north of the intersection of Kugler Road and Ridge Pike. It is in the Landis Creek Drainage Area within the R-5, Village Residential District. This project will contribute an additional sixty-four (64) EDUs to the system.

Lakeview Commercial Center

This project is located to the southeast of the intersection of Buckwalter and Royersford Roads. It is located in the Interchange Office District in the Southeast Pump Station Drainage Area. This proposed commercial center will contribute an additional forty (40) EDUs to the system.

McDonald's Restaurant

This project is located on Lewis Road near the intersection of Royersford Road. At present, ten (10) EDUs are associated with this project.

Burger King Restaurant

This project is located on Lewis Road near the junction of Route 422. At present, five (5) EDUs are associated with this project.

Pinecrest Estates (Single Family Homes)

This proposed project is located to the northwest of the intersection of Benner and Major Roads within the R-4, Medium-High Residential Zoning District. Five (5) EDUs are proposed from this project.

Limerick Center Road (Single Family Homes)

Upon construction of the Limerick Center Road Sanitary Sewer Extension a number of existing homes along Limerick Center Road will obtain public sewer service. At present approximately ten (10) homes along this area will have public sewer available upon completion of this project.

Elliot Town Center (Single Family Homes)

This project, located in the Upper Study Area Drainage Area falls in both the R-1, Residential-Agricultural District and the R-2, Low Density District. An additional fifty-three (53) connections to the sanitary sewer system are proposed.

Brunk Subdivision (Single Family Homes)

The Brunk subdivision is bisected by Royersford Road slightly north of Linfield Road in the Lower Study Area Drainage Area. At present, sixty-nine (69) residential connections are proposed within this subdivision.

YMCA

The proposed YMCA is located to the southwest of the intersection of Linfield Road and Township Line Road within the Lower Study Drainage Area. The YMCA project includes ~~forty-eight~~ (48) EDUs.

30

4.3 Future Growth Projections

Deducting the known development projects discussed above, golf courses and agricultural tracts which have sold their development rights (see Figure 3) there are approximately 2,075 acres of developable ground remaining in the Study Area. Reducing this total by 20% to allow for roads, wetlands, open space requirements, etc., leaves 1,660 acres. Using this information and a comparison of dimensional standards per zoning district for all of the buildable areas, the number of additional EDUs that could be contributed from the Study Area would be 2,486 assuming full buildout, as shown in Table 1, exclusive of any existing homes or development.

The total number of EDUs contributed from residential development, being zoning districts R-1, R-2, R-3, R-4 and R-5, would be 1,506. The remaining 980 EDU connections would come from business, office, or industrial users (RB, O/LI and LLI) based on an EDU equivalency of 500 gallons per day per acre for business, commercial or industrial areas as outlined in the approved Act 537 Plan.

Table 1
New EDU Projections at Full Buildout

Drainage Area	Projected New EDUs
Landis Creek	412
Pump Station #5	704
Southeast	570
Upper Brooke Evans Creek	86
Upper Study Area	374
Lower Study Area	340
Total:	**2,486** ✓

The Projections of Future Sewage Flows, included in Appendix B, presents the calculations and other pertinent information utilized to determine the projected number of EDUs and sewage flow associated with the Study Area.

4.4 Sewage Planning - Five and Ten Year Planning Periods

Under the current LTMA policy, the allocated flow capacity per EDU is 250 gallons per day. However, the actual flow per EDU is hard to determine. In order to obtain the most accurate flow projections for future planning, however, the flow contribution per EDU was re-evaluated.

As of December of 1999, 4,478 EDUs were connected to the sanitary sewer system. However, a large number of these EDUs are "dry", in the process of being connected, and were not contributing flow to the LTMA treatment plant. Due to the time delay from when a lateral connection permit is issued to the time flow is contributed a six month "shift" was done to get a better idea of the total number of EDUs contributing flow to the treatment plant. This "shift" was accomplished by taking the known number of total lateral connections to the treatment plant at the end of a given month and moving this total six months forward. Table 2 illustrates the EDU shift and the corresponding flows and connections per month for 1999.

Table 2
Gallons/EDU Calculations
(EDUs Shifted Six Months Forward)

Month (1999)	Raw Sewage Flow (gpd)	Connected EDUs	Gallons/EDU per Day
JANUARY	621,800	3,534	176
FEBRUARY	577,000	3,577	161
MARCH	602,000	3,590	168
APRIL	581,000	3,602	161
MAY	547,000	3,616	151
JUNE	522,000	3,656	143
JULY	501,000	3,710	135
AUGUST	522,000	3,751	139
SEPTEMBER	**636,000**	3,775	168
OCTOBER	630,000	3,872	163
NOVEMBER	598,000	3,924	152
DECEMBER	624,000	4,007	156

Notes:
1. Sewage flow figures from 1999 Monthly Monitoring Reports
2. Connected EDUs from Manager's monthly reports.
   Figures represent totals as of beginning of month.

Maximum three months
BOLD Maximum month value

Based on this shift there were 4,007 "live" EDU connections to the LTMA treatment plant in December 1999.

Other factors which required consideration were that the LTMA treatment plant experiences a significant increase in flow during the weekend, typical of a bedroom community, and shows some increase in flow during light to moderate storm events. A thirteen (13) percent safety factor for increased weekend flow and a five (5) percent safety factor for moderate rain events were added to the total EDU contribution calculated above to compensate for these increases in flow. Using the maximum gallons per EDU

per day experienced for the 1999 year (January) and adding the aforementioned safety factors results in a total per EDU contribution of 210 gallons per day.

Looked at from a different perspective, the flow contribution from a typical EDU could be higher, at least on a maximum month basis, than 210 gallons per day. Last year (1999) was, with the exception of Hurricane Floyd, a dry year with a ratio of the maximum month flow to the annual average of only 110 percent; therefore, a review of water consumption records, rather than sewage generation, for selected single family, twin and apartment dwellings was performed which indicated a typical range for all uses of 150 to 200 gallons per day. Using the higher end of the range for projection purposes, and applying a factor of 25% to reflect the maximum month/annual average ratio for sewage flow typical of the last five (5) years, results in a maximum month flow contribution per EDU of approximately 250 gallons per day. Although the lower (210) figure will be used for design purposes, the potential for higher flows should be accounted for in the design of any treatment facilities.

In the preceding section it was established that, assuming total buildout, 2,486 additional EDUs could be added from the Study Area. As previously stated, in December of 1999 approximately 4,007 EDUs were connected to the LTMA treatment plant. However, as of that date, an additional 2,393 EDUs had been purchased for future projects.

The Projections of Future Sewage Flows (Appendix B) shows calculations for 50% and 100% buildout. At 50% buildout 1,553 new EDUs will be introduced to the sanitary sewer system. This number is consistent with a five (5) year growth prediction in which a higher initial annual growth pace, similar to historical figures, is gradually replaced with a slower pace as available ground is consumed.

The Township will never see a population denser than that allowed by maximum buildout (100%). The total number of *new* EDUs which could be connected to the sanitary sewer system, given the development projects known to date and the current density restrictions imposed by the Limerick Township Zoning Ordinance would be approximately 2,486. Based on the current growth rates documented in the Township, this maximum buildout could be reached in under ten (10) years. Prudent planning dictates that the ten year growth projection be used for sizing of future treatment facilities.

The 1999 Chapter 94 Wasteload Management Report (Chapter 94 Report), included in Appendix F, details all known and projected development within Limerick Township's Act 537 Plan Area through the year 2004. These projections were compared to those outlined in the Impact Fee Land Use Assumptions final draft (Impact Fee) generated by URDC. The Impact Fee report predicts that a total of 1,129 dwelling units will be approved in Limerick Township from 2000 to 2009 for an annual average of 122 new residential units per year. The Chapter 94 Report indicates a total of 1,148 new EDUs from 2000 to 2004. Subtracting all the known non-residential connections yields 613 new residential connections in this five (5) year period for an annual average of 123 new residential connections per year.

Unfortunately it was not possible to make a comparison of non-residential connections as the Impact Fee report calculated non-residential growth in square feet of industrial and commercial space. The Chapter 94 Report calculates new EDU connections based on property acreage.

Based on the growth predictions of the above referenced reports, an additional 522,000 gallons per day of sewage flow (at 210 gallons per day per EDU) would be generated from *new* developments. An additional 502,000 gallons per day of sewage flow, again at 210 gallons per day per EDU, would be generated from developments which have already received approvals and purchased EDUs. In December 1999 the average daily flow was 624,000 gallons per day. Adding the known flow to the projected flows and including an additional 13% safety factor for maximum month flow rates in a more typical year, would result in a total of approximately 1.86 million gallons per day of sewage flow to the LTMA Treatment Plant, including the flow from the Upper Brooke Evans Drainage Area. The sewage flow per day to the LTMA Treatment Plant would be 1.7 million gallons with the diversion of the Upper Brooke Evans Drainage Area.

5.0 EXISTING SEWAGE FACILITIES IN THE PLANNING AREA

5.1 Description of Existing Public Sewage Conveyance Systems

5.1.1 General

The sewer system consists of multiple collectors and interceptors ranging in size from eight (8) to thirty-six (36) inches and eleven (11) sewage pump stations whose locations can be seen in Figure 3.

5.1.2 Interceptors

There are four (4) major interceptors within Limerick Township; the Landis Creek Interceptor, Mingo Creek Interceptor, Lewis Road Interceptor and the Pump Station #5 Interceptor. A description of each interceptor is included below.

Landis Creek Interceptor
The Landis Creek Interceptor ranges from eight (8) to twelve (12) inches in size and conveys sewage from the Pump Station #9 tributary area and developments in the far northwest corner of the Study Area. This interceptor starts near Limerick Center Road, just south of the intersection with Laurel Drive and heads in an easterly direction through the Limerick Golf Course and discharges to Pump Station #3.

Mingo Creek Interceptor
The Mingo Creek Interceptor ranges from twelve (12) to fifteen (15) inches in size. The interceptor starts in Township Line Road, south of the intersection of Graterford Road. This interceptor collects sewage from the Bradford Woods Development and nearby properties, and proceeds south along Township Line Road to Ridge Pike. The interceptor runs west along Ridge Pike for a short distance where it turns south through the Lower Study Area Drainage Area. The interceptor runs generally parallel to Royersford Road and discharges to the Lewis Road Interceptor just upgradient of Pump Station #6A (Southeast Pump Station). The interceptor was designed to accept flows from a portion of the Upper Study Area Drainage Area, the homes and businesses along Township Line Road and Ridge Pike and the majority of the potentially developable land in the Lower Study Area. The Mingo Creek Interceptor was put into full service in January 2000 and is the only interceptor that is not part of the original sewer construction.

Lewis Road Interceptor
The Lewis Road interceptor collects sewage pumped from Pump Stations #4 and #5 and runs east along Lewis Road to the Royersford Post Office, where it turns northeastward to join with the Mingo Creek Interceptor before discharging to Pump Station #6A. This interceptor ranges in size from eighteen (18) to thirty-six (36) inches.

Pump Station #5 Interceptor
The Pump Station #5 interceptor ranges from fifteen (15) to eighteen (18) inches in size. The interceptor begins on East Cherry Lane at the end of the Pump Station #3 force main, and conveys sewage pumped from Pump Stations #2, #9, #10 and #11 into the Pump Station #3 drainage area as well as the Pump Station #3 tributary area sewage. This interceptor collects additional flow as it continues south on Lewis Road, including flow from Pump Stations #1 and #8 and two (2) privately owned pump stations. The interceptor heads generally westerly at Linfield Road and eventually discharges to Pump Station #5.

5.1.3 Pump Stations

As of January 2000, the LTMA operated ten (10) pump stations and monitors the Wayside Pump Station (#11) prior to its dedication. Three (3) additional pump stations are under construction in the Bradford Woods subdivision in the Upper Study Area Drainage Area. Ultimately, these pump stations will be dedicated to the LTMA.

All sewage from the Study Area is pumped directly to the wastewater treatment plant, mostly from Pump Station 6A, with a small portion directly from Pump Station No. 7. Figure 4 illustrates the flow configuration within the Study Area.

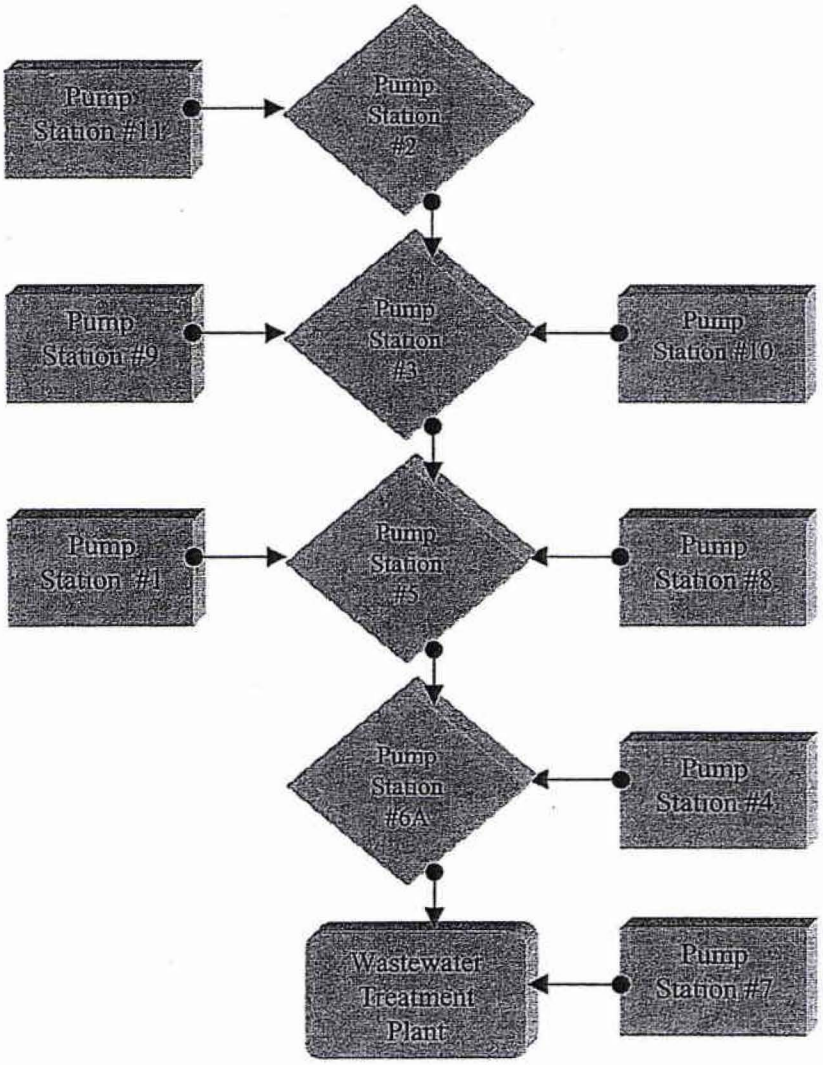
A description of each pump station is included below.

Pump Station #1
This pump station is located near Jones Boulevard in the Limerick Airport Business Center and is equipped with two (2) submersible pumps, each with a rated capacity of 142 gpm. Wastewater is discharged through a six (6) inch force main which ties into the sewer at Manhole A109.

Pump Station #2
This pump station is located on North Limerick Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 100 gpm. Wastewater is discharged through a four (4) inch force main which ties into the sewer at Manhole 229. At the time of this revision this pump station was undergoing expansion and will have a capacity of approximately 130 gpm upon completion.

Pump Station #3
This pump station is located on South Limerick Road and is equipped with two (2) submersible pumps, each with a rated capacity of 1,150 gpm. Wastewater is discharged through a twelve (12) inch force main which ties into the sewer at Manhole A107.

Figure 4
Pump Station Flow Diagram



Pump Station #4
This pump station is located on Major Hollow Road and is equipped with two (2) submersible pumps, each with a rated capacity of 80 gpm. Wastewater is discharged through a four (4) inch force main which is manifolded into an eighteen (18) inch force main from Pump Station #5.

Pump Station #5
This pump station is located near Trinley Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 1,900 gpm. Wastewater is discharged through an eighteen (18) inch force main which ties into the sewer system at Manhole A16.

Pump Station #6A
This pump station, which was upgraded in 1999, is located northeast of Route 422 and Royersford Road. The station is equipped with two (2) dry pit non-clog sewage pumps, each with a rated capacity of 2,225 gpm. Wastewater is discharged through a sixteen (16) inch force main to the LTMA wastewater treatment plant.

Pump Station #7
This pump station is located on King Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 260 gpm. Wastewater is discharged through a four (4) inch force main which is manifolded into the sixteen (16) inch force main to the LTMA wastewater treatment plant.

Pump Station #8
This pump station is located near the intersection of Reed Road and West Cherry Lane. This pump station was upgraded during 1998. The station is currently equipped with two (2) suction lift pumps, each with a rated capacity of 205 gpm. Wastewater is discharged to a four (4) inch force main that conveys the sewage to Manhole A113 in West Cherry Lane.

Pump Station #9
This pump station is located on Neiffer Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 200 gpm. Wastewater is discharged through a four (4) inch force main which ties into the gravity sewer system servicing the Fox Ridge Development.

Pump Station #10
This pump station is located on Ridge Pike and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 180 gpm. This pump station became operational in October 1998. Wastewater is discharged to a six (6) inch force main which connects to an eight (8) inch gravity sewer at Manhole A206, approximately ¼ mile east of the intersection of Limerick Road and Ridge Pike.

Pump Station #11

This pump station is located in the Wayside Development and is equipped with two (2) submersible pumps, each with a rated capacity of 90 gpm. This pump station became operational in December 1998. Wastewater is discharged through a four (4) inch force main which ties into The Fields subdivision.

5.2 Description of LTMA Treatment Plant

The LTMA's treatment plant is located at the most southeastern corner of the Township off of King Road, immediately north of the Royersford Borough line. The treatment plant consists of four (4) identical pre-engineered treatment units positioned above ground, which are independently operated in parallel service. Each unit is theoretically capable of hydraulically handling 0.40 mgd. Currently, two (2) or three (3) of the above units operate at any given time. Sludge generated at the treatment plant is removed as liquid and primarily disposed of at the East Norriton - Plymouth Joint Sewer Authority via incineration. Effluent from the treatment plant is discharged to a small unnamed tributary of the Schuylkill River.

The Limerick Township Municipal Authority wastewater treatment plant currently has a hydraulic capacity of 1.6 mgd (6,400 EDUs at 250 gallons per day per EDU) and an organic capacity of 2,720 lbs. BOD_5 per day. The wastewater treatment plant operates under NPDES Permit No. PA 0051934. A schematic diagram of the treatment plant is shown as Figure 5.

The treatment process involves an activated sludge process for biological treatment of the wastewater. Specifically, the sewage receives preliminary treatment by comminution, followed by a flow distribution box which splits the flow to the various treatment units in service. Wastewater enters the flow equalization compartment, which is aerated for purposes of hydraulic and organic equalization, from which it is pumped at a regulated rate to the aeration tank which incorporates a fine bubble diffused aeration system. Following clarification, the effluent is disinfected utilizing chlorine. The effluent from the treatment tanks is combined prior to flow metering and discharge. Waste activated sludge from the biological treatment process is discharged to the aerobic digester/sludge holding tanks where it is aerated and concentrated to approximately 2.5% prior to off-site disposal by a contract hauler.

5.3 Performance of LTMA Treatment Plant

The LTMA's NPDES Permit sets standards for conventional pollutants only. The permit also sets monitoring requirements for total residual chlorine and dissolved oxygen. As outlined in the Chapter 94 report for 1999, the treatment plant operated satisfactorily and within all permit effluent limits, with the exception of one (1) fecal coliform violation in April, one (1) ammonia violation in May and one (1) suspended solids violation in October. The annual NPDES compliance inspection completed by PADEP revealed that the treatment plant was operating satisfactorily.

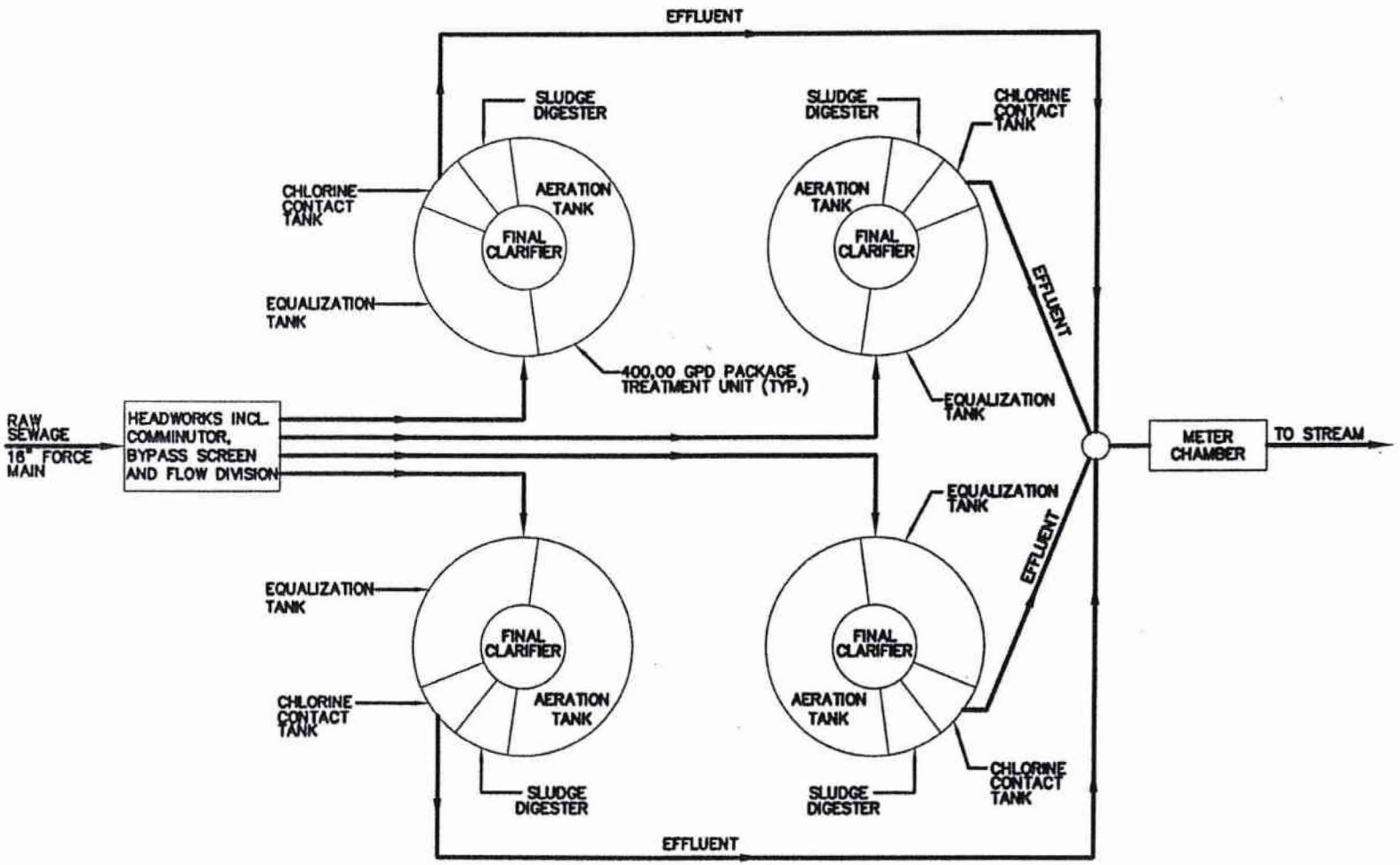


FIGURE 5

LIMERICK TOWNSHIP ACT 537 PLAN REVISION

SCHEMATIC FLOW DIAGRAM
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
WASTEWATER TREATMENT PLANT

GILMORE & ASSOCIATES INC.
CONSULTING ENGINEERS & LAND SURVEYORS
331 BUTLER AVENUE, NEW BRITAIN, PA. 18901

The 1999 Chapter 94 Report includes projections for sewage flows through the year 2004. It is projected that by December 2004 the treatment plant will experience a hydraulic loading of approximately 1.4 million gallons per day and an organic loading of 1783 lbs/day. As discussed in Section 6.4.2 the existing wastewater treatment facility will be limited by its organic capacity rather than its hydraulic capacity.

5.4 Recent Treatment Plant Upgrades

In October 1999, the LTMA awarded a contract for the replacement of the air diffusion equipment in Treatment Tanks #1 and #2. Within each treatment tank there are several compartments which are aerated; specifically, the equalization compartment, the aeration compartment and the aerobic digestion/sludge holding compartment. The existing air headers and membrane tube diffusers were replaced with a new system of air headers and membrane tube diffuser assemblies. This work was completed in May 2000.

The Authority also plans to replace the air diffusion equipment in Treatment Tanks #3 and #4 in 2001, assuming that they remain in service as part of any wastewater treatment plant improvements.

5.5 On-Lot Disposal Systems

The Montgomery County Health Department (MCHD) currently administers an on-lot sewage disposal program throughout Limerick Township. This program became effective in 1991 and includes permitting, inspection, complaint response and enforcement.

The Township provides the general public and/or owners of on-lot disposal systems with guidelines as to how to maintain their systems and what preventive measures can be taken to minimize the chance of a system malfunction or failure.

Additionally, no types of industrial waste, automotive oil, other non-domestic waste, toxic or hazardous substances or surface water or groundwater is permitted to be discharged into an on-lot system.

The Township intends to continue educational programs for residents with on-lot disposal systems. Problem areas will be addressed by the extension of sanitary sewers where economically feasible within the sewer growth area.

5.6 Description of Existing Private Sewage Treatment Systems

5.6.1 Western Center for Technical Studies

An educational facility identified as the Western Center for Technical Studies (VoTech School) is located on the northwest side of the intersection of Sunset and Graterford Roads within the Upper Study Area Drainage Area. The school owns

and operates a private wastewater treatment plant. According to information supplied by the VoTech School's Building school administrator, the treatment plant has been operational with minor upgrades since 1966 and is designed to handle flows up to 11,700 gpd. The average daily flow for 1996 was approximately 4,900 gpd. This treatment plant discharges to Lodal Creek under NPDES Permit No. PA 0040126. Due to performance problems and costly operations and maintenance, primarily due to the age of the facilities and the fact that significantly lower average daily flows are experienced during the summer months, the Maintenance Manager has expressed interest in being able to discontinue operation of the treatment plant and tie into a public system. It is expected that the VoTech School will connect to the LTMA system, pending availability of capacity, in 2001.

5.6.2 Ridge View Trailer Park

The Ridge View Trailer Park is located in the Ridge Pike Corridor near Country Club Road. Sewage treatment for the trailer park is provided by a private on-site sewage treatment plant. The plant is designed to handle 16,000 gpd and discharges to Landis Creek under NPDES Permit No. PA 0050962. The average daily flow for 1999 was approximately 10,000 gallons per day.

An Administrative Order imposed by PADEP during April 1997 orders that the plant be phased out with connection to the public sewer system. It is anticipated that connection of the trailer park sewer system to the LTMA sewer system will occur in 2000. The Ridge Pike sewage system has been designed to accommodate the additional flow which would be generated by this connection.

5.6.3 Limerick Airport Industrial Park

There is a thirty-six (36) acre industrial park located on Windsor Road and Airport Road in the Upper Brooke Evans Creek Drainage Area. Sewage treatment for the industrial park is provided by a private on-site treatment and spray irrigation system. No further information is available on this system.

6.0 IDENTIFICATION AND EVALUATION OF ALTERNATIVES

6.1 Introduction

The previous sections of this report established the background and framework necessary for the identification and evaluation of alternative sewage management approaches. As discussed in previous sections, development pressure, on-lot system failures and the lack of suitable soils for on-lot disposal have contributed to the need for expanded public sewer service and capacity within the Study Area.

6.2 Basis of Alternative Analysis

The intent of the alternative analysis is to evaluate options to provide sewer service for all areas of existing and/or proposed development within the Study Area; which is also the previously defined sewer service area. In the evaluation of the alternatives several factors were considered as follows:

- Flow Projections
- Collection System Sizing
- Implementability
- Environmental/Growth Impacts
- Administrative Issues
- Projected Costs

Flow Projections - In order to adequately size sewage conveyance systems and the wastewater treatment facility to accommodate sewage handling needs, existing and projected EDUs were calculated and used to determine potential sewage flows within the Study Area based upon an expected contribution of 210 gallons per EDU per day and a potential contribution of 250 gallons per EDU per day (see Appendix B).

Collection System Sizing - Based upon flow projections, sewers and pump stations must be sized for the maximum reasonable capacity for each drainage area or development contributing to the sanitary sewer system.

Implementability - An important part of any sewage management alternative is its ability to be implemented. Each alternative's level of construction, administration and operating complexity must be assessed. The ease of operation/implementability of an alternative will play a major role in the selection of a final alternative.

Environmental/ Growth Impacts - The ability to eliminate existing adverse environmental impacts, prevent future adverse conditions and strategically locate sewage collection/conveyance facilities so that identified or planned development projects are served by public sewers while growth impacts are controlled are all factors that must be assessed.

Administrative Issues - Each alternative must consider administrative issues such as land acquisition, permitting, ownership of facilities, etc. required for implementation.

Projected Costs - Upon determining the sewage management alternatives, various cost elements will be developed. Opinions of probable costs are based upon unit prices contained in actual bid data received for similar projects and various other data sources. Construction costs have been divided into the following major elements:

- Interceptors
- Upgrades to Pump Stations/New Pump Stations
- Expansion/Upgrade of the Existing LTMA Wastewater Treatment Facility

Other capital cost elements include easement acquisition, engineering and survey, construction observation, legal and contingencies. The detailed opinions of probable costs for construction for each alternative are included in Appendix C.

An additional item of concern is the ongoing annual operation and maintenance (O & M) costs associated with each treatment option. These costs include elements such as labor, power, chemicals, insurance, equipment, etc. For the purposes of this analysis, all O & M costs are calculated for operation at full capacity.

6.3 Conveyance and Pumping Alternatives

6.3.1 No Action

It is assumed in this analysis that the current pump station configuration constitutes the starting point for alternative evaluation and that the Upper Brooke Evans Drainage Area will be diverted as per the Act 537 Special Study – Possum Hollow Area recently adopted by the Limerick Township Board of Supervisors.

Based upon flow calculations for anticipated flow to each pump station, as presented in Table 3, it appears that the expansion of existing pump stations and associated conveyance systems will not be necessary in the near future.

It is important to note, however, that the LTMA is not abandoning the long range plan for a regional pump station in the Upper Study Area, as outlined in the 1997 Act 537 Revision, included as Appendix D. However, as there are currently no development projects large enough to warrant the construction of a new pump station or the abandonment of the interim pump stations (#10 and #11), the existing collection and conveyance system was analyzed in it's current configuration.

The following sections explain the basis for recommending a No Action approach to the pump stations at this time.

Flow Projections

In calculating the anticipated flow to each of the existing pump stations, future development was assumed to connect to the public sewer system at the most feasible, cost effective point based on local topography and the locations of existing sanitary sewer mains and pump stations as outlined in Figure 3.

The anticipated contributions to each pump station were calculated based on average daily flow data from the LTMA Superintendent's 1999 Pump Station Monthly Reports and the additional flow anticipated at full development. These results were analyzed to determine the potential for overload at each pump station. These calculations are included in Table 3.

Sizing Issues

Based on the data in Table 3 it appears that Pump Stations #1, #2, #5, #6A, and #11 will become overloaded should total buildout occur. However, it is important to note that these numbers do not indicate imminent overloads and/or problems with the pump stations. These pump stations were originally designed to older DEP criteria and overloads are now being calculated due to the change in peaking factors required for pump stations as per the PADEP Draft Sewage Pumping Station Guidance (revision dated March 24, 1999). Furthermore, Pump Station #11 is an interim pump station only, and as such was designed to handle only a specific area. This was in keeping with the LTMA's long range plan, for a regional pump station in the Upper Study Area, as outlined in the 1997 Act 537 Revision.

The projected overloads from Pump Stations #5 and #6A are not significant (<12%) based upon the accuracy of the projections which may not be realized.

Additionally, and perhaps most importantly, these calculations assume the inclusion of sewage flow from the Upper Brooke Evans Drainage Area. Presently the sewage generated in this area is conveyed either to Pump Station #1 or to Pump Station #8. When the diversion of the Upper Brooke Evans Drainage Area occurs, Pump Stations #1 and #8 will be abandoned. Approximately 165,000 gallons of sewage (average daily flow), will ultimately be removed from the conveyance and pump station system and would probably eliminate the need to upgrade Pump Station #5 or #6A.

When Pump Station #11 is abandoned, upon completion of the regional pump station in the Upper Study Area, the flow to Pump Station #2 will be significantly reduced.

Table 3
Pump Station Capacities and Anticipated Future Flows

Pump Station #	Current Average Daily Flow (gpd)	Anticipated Additional Future Flow (gpd)	New Flows from Upstream Pump Stations (gpd)	Projected Average Daily Total Flow (gpd)	Peaking Factor	Total Pump Station Capacity Required (gpd)	Current Pump Station Capacity (gpm/gpd)	
1	71,000	10,500	0	81,500	3.85	**313,775**	142	204,480
2	24,000	2,100	44,490	70,590	3.875	**273,536**	130	187,200
3	189,000	148,420	46,590	384,010	3.44	1,320,994	1,150	1,656,000
4	17,000	8,730	0	25,730	4	102,920	80	115,200
5	425,000	268,100	216,850	909,950	3.07	**2,793,547**	1,900	2,736,000
6A	521,000	233,180	493,680	1,247,860	2.87	**3,581,358**	2,225	3,204,000
7	30,000	210	0	30,210	4	120,840	260	374,400
8	45,000	11,340	0	56,340	3.9	219,726	205	295,200
9	10,000	24,450	0	34,450	3.95	136,078	200	288,000
10	3,000	34,990	0	37,990	3.95	150,061	180	259,200
11	N/A	44,490	0	44,490	3.9	**173,511**	90	129,600

1. Current Average Daily Flow represents the average of flows reported for each month in 1999 as per the Pump Station Monthly Reports.
2. Anticipated Additional Future Flow was estimated using the data projected in Appendix B for total buildout of the Study Area.
3. Peaking Factors were calculated per the PADEP Draft Sewage Pumping Station Guidance (revision dated March 24, 1999).
4. Numbers in **bold** indicate the potential for future buildout to exceed the current rated pump station capacity.
5. All calculations assume the inclusion of the Upper Brooke Evans Drainage Area so as to generate a "worst-case" situation.

Implementation

At present no further action is recommended with regard to the upgrade of the existing pump stations. All of the pump stations within the Township have been operating as anticipated with no signs of overload, and projections indicate that this should continue, provided other 537 Plan construction activities proceed as planned.

At present, all of the pump stations should continue to be monitored for any substantial change in activity, particularly when new land developments are connected to the sanitary sewer system.

6.3.2 Abandonment of Interim Pump Stations and Construction of Upper Study Area Regional Pump Station and Sewers

General

Pump Station #8 on West Cherry Lane, Pump Station #10 along the Ridge Pike Corridor and Pump Station #11 located in the Wayside subdivision were designed to be interim pump stations for limited service areas. In accordance with the 1997 Act 537 Revision, Pump Stations #10 and #11 are scheduled to be phased out as the Upper Study Area continues to develop. Pump Station #8 will be phased out upon diversion of the Upper Brooke Evans Drainage Area.

Implementation

This alternative has not been modified from the selected plan presented in the 1997 Act 537 Revision. All flow originating in the Upper Study Area Drainage Area will be conveyed to a pump station located near Lodal Creek and Township Line Road. Flow from this station will be pumped via a force main to the existing twelve (12) inch gravity main along Township Line Road to the Ridge Pike Corridor and subsequently through the Mingo Creek Interceptor to Pump Station #6A (see Appendix D).

Costs

The costs associated with this alternative are outlined in Appendix C, Opinion of Probable Cost Table #1 and include the construction of collection and pumping facilities for the Upper Study Area and existing system abandonment. The opinion of probable project cost for this alternative is approximately $2,390,000.

6.3.3 Benner Road Interceptor

General

As previously stated, should total buildout occur, Pump Station #6A may require upgrading. In the Comprehensive Sewage Facilities Planning Study (revision dated May 1992), prepared by PSC Engineers and Consultants, this eventuality was considered in Alternative No. 1. This alternative details the construction of a thirty-six (36) inch interceptor along Benner Road. The plan for this alternative is included as Appendix E and is the currently adopted sewage management plan for this part of the Township.

Description of Current Plan

This interceptor would collect flows from Pump Stations #4 and #5. Presently flows from Pump Stations #4 and #5 are pumped to Pump Station #6A. With this flow removed the potential upgrade of Pump Station #6A would be averted.

In accordance with the study prepared by PSC Engineers and Consultants, a ten (10) inch gravity line would replace Pump Station #4. This gravity sewer would connect along with a sixteen (16) inch force main from Pump Station #5 at the terminal manhole of the thirty-six (36) inch interceptor. The sewage from these areas would be conveyed through a thirty-six (36) inch interceptor generally following Benner Road to the wastewater treatment plant.

Implementation

The original alternative described by PSC Engineers indicates the abandonment of Pump Station #7. However, sewage cannot flow by gravity from the Pump Station #7 location to the treatment plant. In order to implement this alternative the construction of a new pump station in this general area would be necessary, to accommodate the new flows from the areas served by Pump Stations #4 and #5. Additionally, the use of a thirty-six (36) inch interceptor may be excessive given the current and predicted flows for this area. Prior to implementation of this alternative it would be necessary to resize the proposed interceptor.

As a further suggested revision to the plan outlined by PSC Engineers this alternative could be modified so that a new pump station would not be required. Instead of connecting Pump Stations #4 and #5, a force main from Pump Station #5 only could be constructed in the same location as proposed by PSC Engineers for the Benner Road Interceptor and run directly to the LTMA treatment plant, thereby by-passing Pump Station #6A.

Costs

The opinion of probable project cost associated with the Benner Road Interceptor alternative, including a new pump station in the King Road vicinity, is estimated at $2,790,000. The costs associated with this alternative are outlined in Appendix C, Opinion of Probable Cost Table #2.

6.3.4 Diversion of Upper Brooke Evans Drainage Area to Possum Hollow

General

This sewage management alternative will provide collection and conveyance of sewage for the existing development and proposed new development within the Upper Brooke Evans Drainage Area via the proposed Possum Hollow Run Sewerage System. The plan was recommended in the Act 537 Special Study for the Possum Hollow Study Area, by Gilmore & Associates, Inc., dated March 2000, which was adopted by the Limerick Township Board of Supervisors on March 17, 2000.

This alternative includes the construction of a new pump station to connect the Upper Brooke Evans Drainage Area to the Possum Hollow Run Interceptor. The Act 537 Special Study for the Possum Hollow Study Area report discusses this alternative and related items in greater detail (Figure 6).

Flow Projections and Collection System Sizing

The projected flow to be transferred from the Upper Brooke Evans Creek Drainage Area to the Possum Hollow Sewerage System is 165,000 gpd.

Environmental / Growth Impacts

Diversion of the Upper Brooke Evans Drainage Area would be beneficial for many reasons. As previously mentioned, sewage generated in this area is conveyed either to Pump Station #1 or to Pump Station #8, and subsequently to Pump Stations #5 and #6A. As shown in Table 3, at total buildout Pump Stations #1 and #6A could possibly require upgrading. Diversion of the sewage flow now entering Pump Stations #1 and #8 to the Possum Hollow Run Sewerage System would allow for the phase out of Pump Station #1 and probably eliminate the need to upgrade Pump Station #6A.

Diversion will also encourage immediate commercial development in the unsewered western portion of the Lower Brooke Evans Drainage Area above Sanatoga Road, where the new pump station would be built. This would be consistent with the Township's expressed desire to encourage commercial development in the western portion of the Township.

Costs

The opinion of probable project cost associated with the diversion of the Upper Brooke Evans Drainage Area sewage is $1,530,000, exclusive of the cost of treatment capacity. The costs associated with this alternative are outlined in Appendix C, Opinion of Probable Cost Table #3. Regardless of where the Upper Brooke Evans flow is treated, new capacity must be constructed as the existing LTMA treatment plant is at capacity and must be expanded to meet projected growth demands. It is expected that the cost for providing incremental capacity at the existing treatment plant would be similar to the cost for constructing treatment capacity at the proposed Possum Hollow Run Wastewater Treatment Plant. Additionally, incremental operation and maintenance costs should be roughly equivalent regardless of where the flow is treated.

6.3.5 Landis Creek Interceptor

General

A portion of the Landis Creek Interceptor is an eight (8) inch asbestos cement sewer main beginning at Manhole #201 just off of Limerick Center Road and running in an easterly direction to Manhole #254 near Lewis Road.

In 1988 and 1993 video inspection of this portion of the interceptor showed several sags and offset joints in the pipe and many of the manholes appeared to have leaks. The pipe was grouted in 1988 and interim repairs were made to many of the manholes. However, this area has been a constant source of concern for the LTMA.

The 1992 Comprehensive Sewage Facilities Planning Study prepared by PSC Engineers addressed this issue. At that time the area tributary to the Landis Creek Interceptor was relatively undeveloped and based on potential development in that area PSC Engineers predicted that a twenty-four (24) inch interceptor would be required to replace the existing eight (8) inch main. As this area has experienced almost total buildout, it is now possible to more accurately determine the sizing requirements of this interceptor.

In November 1997 a review of the capacity of this interceptor was undertaken by Gilmore & Associates, Inc. At that time it was noted that approximately 1,320 linear feet of this interceptor is at a slope of less than 0.5% with approximately 400 linear feet at a marginally acceptable slope of 0.52%. In February of 1998 actual flow data was collected over a six (6) day period. The data collected indicates an actual peak flow rate of approximately 108 gallons per minute. Using the Manning Flow Tables for Circular Pipes, the total capacity of this pipe was calculated to be approximately 340 gallons per minute.

Flow Projections and Collection System Sizing

It should be noted that the aforementioned measurements were taken during a period when groundwater was low and very little rainfall was received, as indicated by the flow data. Therefore, the peak flow did not show any significant changes due to the effects of inflow and infiltration. In order to conservatively account for flow rate increases due to inflow and infiltration, given the age, sewer main material (asbestos cement) and known condition of this portion of the interceptor, it would be reasonable to assume a 100% increase during a significant storm event. Additionally, this data was collected prior to the connection of a large portion of the Deer Run Development, the Betty/Roberta Lane neighborhood, the Lakeside Development, and the William Penn Villas.

Based on the information collected the potential flow through this interceptor was calculated as follows:

Measured Flow Data			= 108 gpm (peak)
Flow Due to I & I			= 108 gpm (peak)
Betty/Roberta Lanes	= 32 EDUs	= 6 gpm (average)	= 13 gpm (peak)
Deer Run*	= 45 EDUs	= 7 gpm (average)	= 18 gpm (peak)
William Penn Villas	= 87 EDUs	= 13 gpm (average)	= 33 gpm (peak)
Lakeside	= 64 EDUs	= 10 gpm (average)	= 25 gpm (peak)
	Total Gallons per Day (peak)		305 gpm

* At the time the data was gathered approximately 50% of the sewer connections at Deer Run were operational, therefore only 50% of the total connections were added in these calculations.

Based on this information the existing eight (8) inch diameter asbestos cement pipe is theoretically at approximately 90% capacity. Please note that this is **theoretical** capacity as the interceptor capacity calculations were based on a designation of 210 gallons per day per EDU and assumptions of inflow and infiltration contributions.

The capacity of this main may be exceeded with the future development of this area. Portions of this interceptor may require expansion to prevent conveyance

problems in this area. Replacement of the existing main with ten (10) inch PVC will almost double the theoretical capacity and adequately handle future demands.

Costs

The construction costs associated with upgrading portions of the Landis Creek Interceptor to ten (10) inch PVC are estimated at $165,000. The costs associated with this alternative are outlined in Appendix C, Opinion of Probable Cost Table #8.

6.4 Evaluation of Conveyance and Pumping Options

In Section 6.3.1, Table 3, the pump station capacities and anticipated future flows were calculated. These projections indicate that should total buildout occur, five (5) pump stations may require upgrading or expansion. However, at this time it is recommended that no action be taken towards the upgrade or expansion of any of the pump stations, since the following proposed projects will probably make the need for these expansions unlikely.

Specifically, the remaining conveyance/pumping options under consideration are summarized in Table 4. Two of these projects, the construction of the regional pump station for the Upper Study Area and the Upper Brooke Evans Drainage Area diversion, have already been adopted by Limerick Township via the 1997 Act 537 Plan Revision and the 2000 Special Study for the Possum Hollow Drainage Area, respectively. Both projects remain key components of the Township's long range sewage management plan and no changes are proposed herein.

The Benner Road Interceptor was originally proposed in 1992 principally as a means of reducing the hydraulic load on Pump Station #6A and eliminating the need for major expansion of that facility. Since then Pump Station #6A has been expanded in accordance with the 1997 Act 537 Plan Revision. The planned diversion of the Upper Brooke Evans Creek watershed to the Possum Hollow Treatment Plant will reduce the projected hydraulic load to Pump Station #6A to a level probably manageable by the current facility. The benefits to be gained by building the Benner Road Interceptor now appear negligible compared to the $2,640,000 cost. Its continued inclusion in the Act 537 Plan is not recommended.

Finally, the Landis Creek Interceptor is also a remnant from the 1992 Act 537 Plan Revision. This project remains necessary however, since the hydraulic load on this pipeline will not be reduced by any other proposed activities. Replacement of this line is also relatively inexpensive at $165,000 and easily implemented since all construction will be through golf course open space.

Table 4
Summary of Opinions of Probable Cost
For Conveyance/Pumping Options

	Option	Project Cost
1.	Abandon Interim Pump Stations/ Construct Regional Pump Station	$2,390,000
2.	Benner Road Interceptor	$2,790,000
3.	Upper Brooke Evans Diversion	$1,530,000
4.	Landis Creek Interceptor	$165,000

6.5 Wastewater Treatment Alternatives

6.5.1 General

The existing wastewater treatment plant is located on a site of about seven (7) acres between King Road and the Norfolk Southern Railroad which parallels the Schuylkill River. The site includes an open area of about two (2) acres which was acquired by the Authority in 1997 for future expansion purposes.

It should be noted that developed residential areas are located to the east and north of the wastewater treatment plant.

6.5.2 Current Wastewater Treatment Plant Capacity

The existing wastewater treatment plant presently has a rated hydraulic capacity of 1.6 mgd and a rated organic capacity of 2720 pound BOD_5/day.The organic capacity is equal to a BOD_5 concentration of 204 mg/l at the rated hydraulic capacity of 1.6 mgd. Actual raw waste BOD_5 concentration averaged 255 mg/l during calendar years 1998-1999 because of the Township's required usage of water conservation plumbing fixtures for new construction. This BOD_5 concentration results in the organic capacity of the wastewater treatment plant being reached at a flow of 1.3 mgd. Therefore, existing wastewater treatment is limited by the rated organic capacity rather than the rated hydraulic capacity.

The organic loading evaluation presented in the 1999 Chapter 94 Report (Section 5.3) was developed differently (i.e. based on an EDU allowance). The BOD_5 concentration based upon the five (5) year projection for organic loading (1783 pounds/day) and hydraulic loading (1.4 mgd) calculates to 153 mg/l. This apparently low concentration is primarily the result of using an allowance of 210 gpd/EDU which include adjustments for weekend flows and storm events. Based

upon the 1998-99 sampling information for BOD_5 concentration, it is felt that the Chapter 94 projection may not be representative of what the organic loading could be; therefore, a more conservative approach with regard to BOD_5 concentration is warranted for facilities design.

Further, there are operational concerns associated with processing a hydraulic loading which is 60% greater than the original permitted capacity of 1.0 mgd. It should be noted that the wastewater treatment facilities as originally designed involved the use of a true extended aeration process (24 hour detention time). With the re-rating of the wastewater treatment plant to 1.6 mgd in 1994, the aeration time was reduced to 15 hours. This reduced detention time coupled with the strength of the wastewater results in a decreased ability to biologically stabilize the organic loading and minimize waste activated sludge production by endogenous respiration. This results in production of a greater amount of waste activated sludge which decreases the solids residence time in the aerobic digestion process. This in turn reduces the volatile suspended solids reduction of the sludge and the available time to decant supernatant and thicken the waste sludge for disposal. Consequently, there is a greater amount of sludge for off-site disposal along with greater odor problems during the decanting process (i.e. no aeration) as a result of higher volatile suspended solids concentration in the sludge.

In addition, since the service area is essentially residential with significant employment outside of Limerick Township, the weekend sewage flows are higher than workday sewage flows which is currently stressing the operation of the equalization tanks preceding the treatment process.

Finally, there is growing concern as to the ability of the wastewater treatment plant to consistently meet the effluent limits of the NPDES permit at the rated hydraulic capacity of 1.6 mgd, based on stress tests performed on individual treatment units.

Improvements are required at the existing treatment plant, regardless of the final sizing, in order to allow for a true capacity of 1.6 mgd in light of the aforementioned operational issues and associated expenses, and to better insure compliance with NPDES permit requirements.

6.5.3 Flow Projections and Treatment Plant Sizing

The design flow projection for the wastewater treatment plant is estimated to be 1.7 mgd assuming the Upper Brooke Evans Drainage Area is diverted to the Possum Hollow sewerage system in accordance with the Act 537 Special Study for the Possum Hollow Area, as adopted by the Limerick Township Board of Supervisors. Inclusion of the Upper Brooke Evans Drainage Area would result in a design flow projection of 1.85 mgd. The basis for these flow projections are presented in Appendix B.

Upon review of the aforementioned calculations, it is important to note that although the required treatment plant expansion is only 0.1-0.25 mgd on paper, the actual expansion would be 0.4-0.55 mgd in light of the current organic capacity constraint.

Finally, it is also important to note that the 1.7 mgd design sizing is based upon 210 gallons per EDU per day, as discussed in Section 4.4. Since it is recognized that maximum month flows from individual connections could reach 250 gallons per EDU, a potential for approximately 2.0 mgd of flow exists during those times of the year.

6.5.4 Wastewater Treatment Plant Process Options

In order to provide required treatment capacity, a number of wastewater treatment plant process options, including a no action option, have been developed.

The process options are based upon the following considerations:

1. Maximizing the use of existing tankage and equipment since the facilities are fairly new, having been constructed in the late 1980s. The existing steel tankage and piping, if properly maintained and coated, will provide adequate service for decades to come; mechanical equipment (i.e. pumps, blowers, motors, etc.) will need to be periodically replaced.

2. Avoiding the need to acquire additional property, if possible.

3. Continuing use of a long term activated sludge process to minimize waste sludge production.

4. Providing new headworks facilities to allow for removal of screenings and grit from the wastewater flow.

5. Providing effluent disinfection by ultraviolet light to minimize the use of chlorine and its related issues of chlorine toxicity, formation of chlorinated compounds and safety/reporting matters.

6. Providing sludge dewatering facilities to allow for disposal/utilization options and reduce the cost for off-site disposal/utilization. Sludge dewatering capacity shall also be provided for the anticipated waste sludge from the Possum Hollow Wastewater Treatment Plant.

7. Providing an outfall to allow for direct discharge to the Schuylkill River in light of current and potential future effluent limits in the NPDES permit.

The specific process options, along with the no action option, are as follows:

No Action

No action, or the continuation of operation of the wastewater treatment system at its current capacity, is not a viable option for the Study Area. As noted in Section 6.5.3, the flow projection for the wastewater treatment plant is estimated to be 1.7 mgd assuming diversion of the Upper Brooke Evans Drainage Area and 1.86 mgd without the diversion.

Furthermore, should any additional on-lot disposal systems in the Study Area experience problems or failures, these locations could be required to connect to the public sewer system. The addition of numerous connections, without expansion of the treatment facility, would eventually result in the organic and/or hydraulic overload of the LTMA wastewater treatment plant and/or performance problems with violations of the NPDES permit requirements.

Option 1:

This option involves the modification of the existing wastewater treatment facilities to provide for a "true" extended aeration process which will involve conversion of the existing treatment tanks to aeration basins along with new clarifiers and a new recycle sludge pump station.

Other new facilities would include headworks, raw waste equalization, ultraviolet light disinfection, aerobic sludge digestion, sludge dewatering, utility water system and outfall directly to the Schuylkill River. Related site work would involve yard piping, yard pump station, electrical, paving fencing and landscaping.

The preliminary layout of Option 1 is presented in Figure 7.

Option 2:

This option involves modification of the existing wastewater treatment facilities to provide for a sequencing batch reactor (SBR) process. The SBR process is accomplished within a single tank and does not require separate clarifiers or a sludge recycle pump station. The existing treatment tanks would be converted to four (4) parallel SBR units. New facilities would include headworks, effluent equalization, aerobic sludge digestion, sludge dewatering, utility water system and

an outfall directly to the Schuylkill River. Related site work would involve yard piping, yard pump station, electrical, paving, fencing and landscaping.

The preliminary layout of Option 2 is presented in Figure 8.

Option 3:

This option also involves use of an SBR process but within new treatment tankage. The existing treatment tanks would be converted to raw waste equalization/storage, aerobic digesters, and possibly a septage pretreatment system. New facilities would also include headworks, effluent equalization, ultraviolet light disinfection, sludge dewatering, utility water system and an outfall directly to the Schuylkill River. Related site work would involve yard piping, yard pump station, electrical, paving, fencing and landscaping.

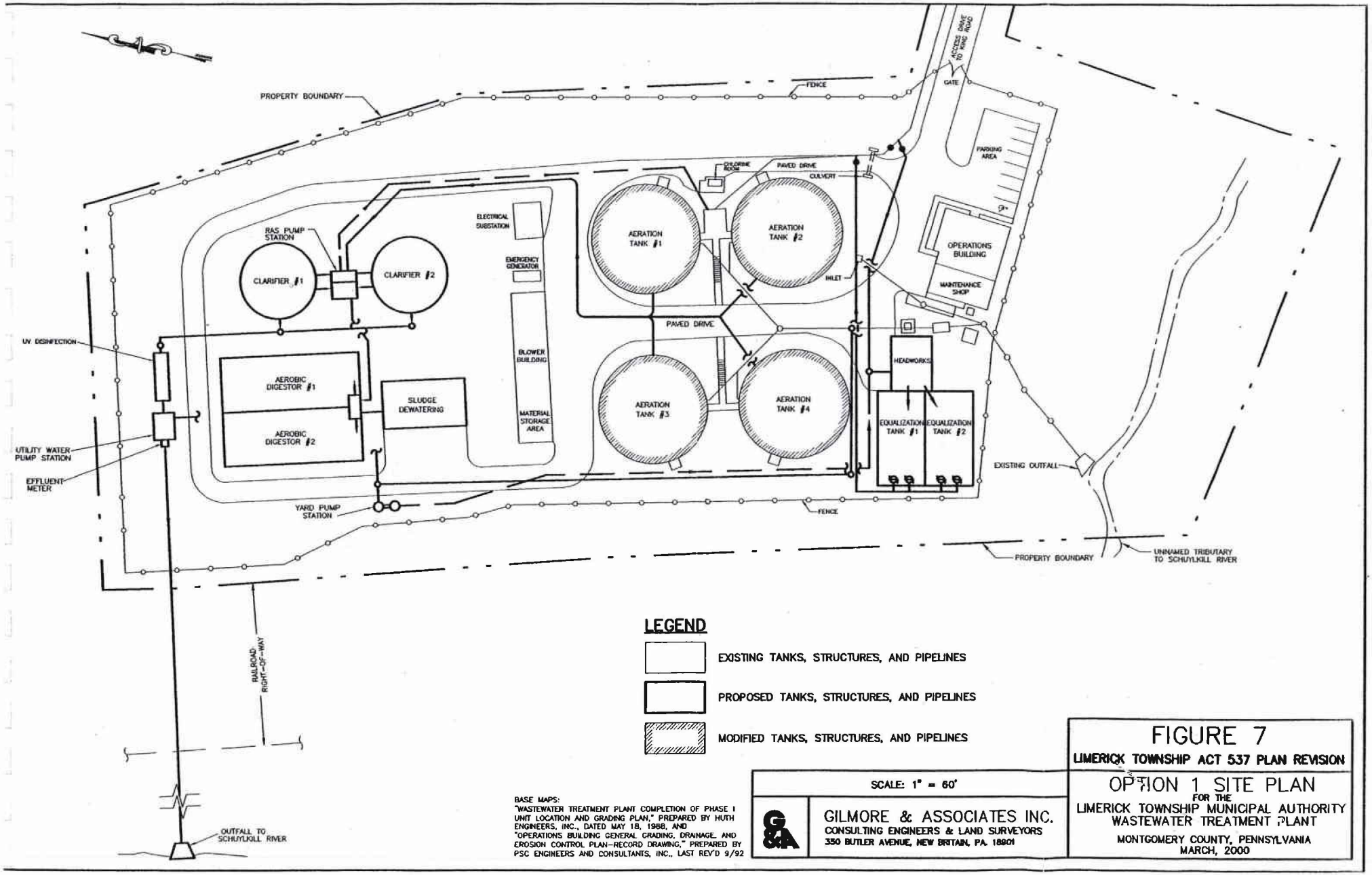
The preliminary layout of Option 3 is presented in Figure 9.

Option 4:

This option also involves modification of existing wastewater treatment facilities to provide for a "true" extended aeration process. Unlike Option 1, however, the existing treatment tanks would be modified to convert the digester compartments to additional aeration capacity.

New facilities would include one or more new treatment tanks, ultraviolet light disinfection, aerobic sludge digestion, sludge dewatering, utility water system and an outfall directly to the Schuylkill River. Related site work would involve yard piping, yard pump station, electrical, paving, fencing and landscaping.

The preliminary layout of Option 4 is presented in Figure 10.



LEGEND

- EXISTING TANKS, STRUCTURES, AND PIPELINES
- PROPOSED TANKS, STRUCTURES, AND PIPELINES
- MODIFIED TANKS, STRUCTURES, AND PIPELINES

BASE MAPS:
"WASTEWATER TREATMENT PLANT COMPLETION OF PHASE I UNIT LOCATION AND GRADING PLAN," PREPARED BY HUTH ENGINEERS, INC., DATED MAY 18, 1988, AND "OPERATIONS BUILDING GENERAL GRADING, DRAINAGE, AND EROSION CONTROL PLAN–RECORD DRAWING," PREPARED BY PSC ENGINEERS AND CONSULTANTS, INC., LAST REV'D 9/92

SCALE: 1" = 60'

GILMORE & ASSOCIATES INC.
CONSULTING ENGINEERS & LAND SURVEYORS
350 BUTLER AVENUE, NEW BRITAIN, PA. 18901

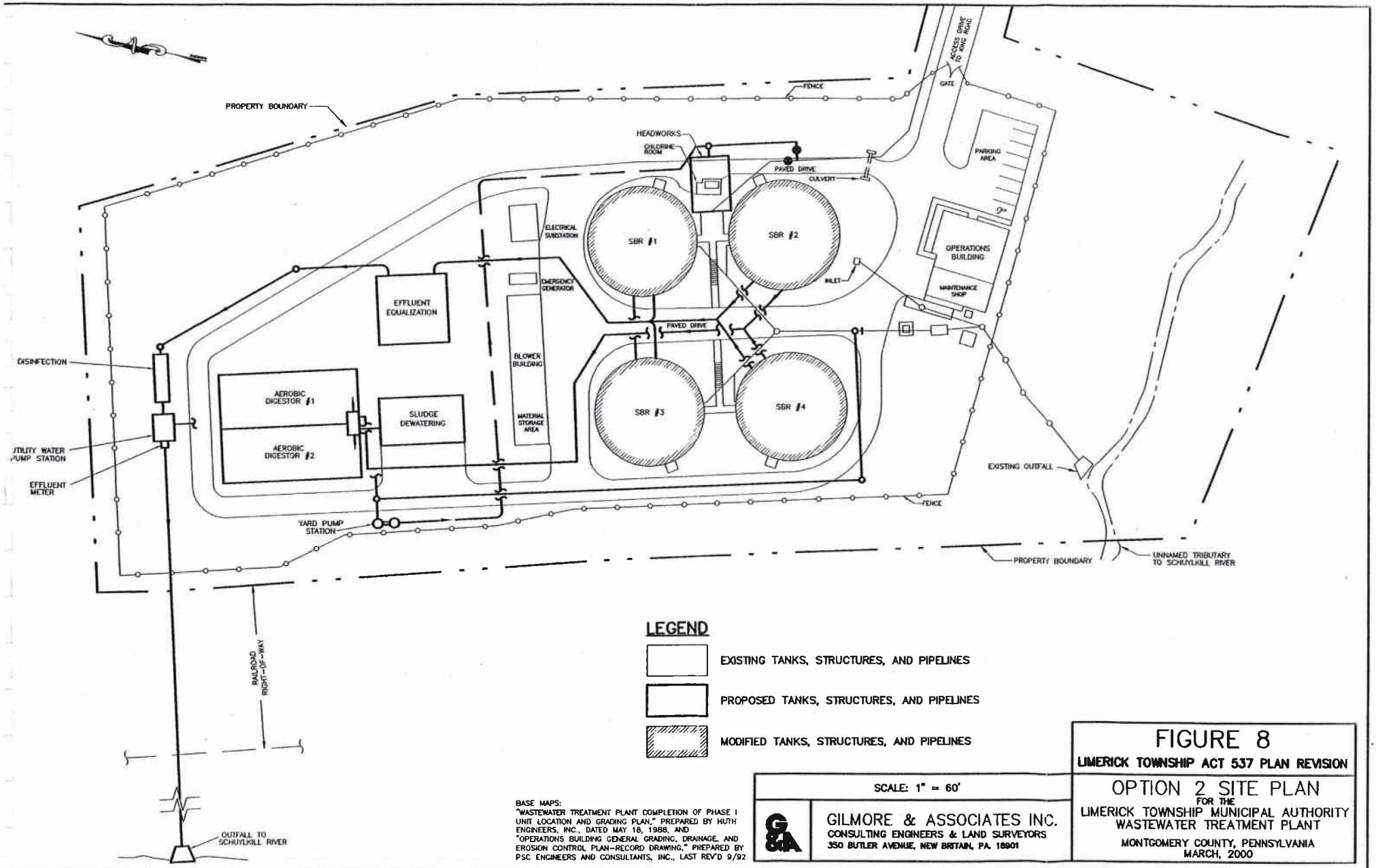
FIGURE 7

LIMERICK TOWNSHIP ACT 537 PLAN REVISION

OPTION 1 SITE PLAN

FOR THE
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
WASTEWATER TREATMENT PLANT

MONTGOMERY COUNTY, PENNSYLVANIA
MARCH, 2000



BASE MAPS:
"WASTEWATER TREATMENT PLANT COMPLETION OF PHASE I UNIT LOCATION AND GRADING PLAN," PREPARED BY HUTH ENGINEERS, INC., DATED MAY 18, 1988, AND "OPERATIONS BUILDING GENERAL GRADING, DRAINAGE, AND EROSION CONTROL PLAN-RECORD DRAWING," PREPARED BY PSC ENGINEERS AND CONSULTANTS, INC., LAST REV'D 9/92

SCALE: 1" = 60'

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CONSULTING ENGINEERS & LAND SURVEYORS
350 BUTLER AVENUE, NEW BRITAIN, PA. 18901

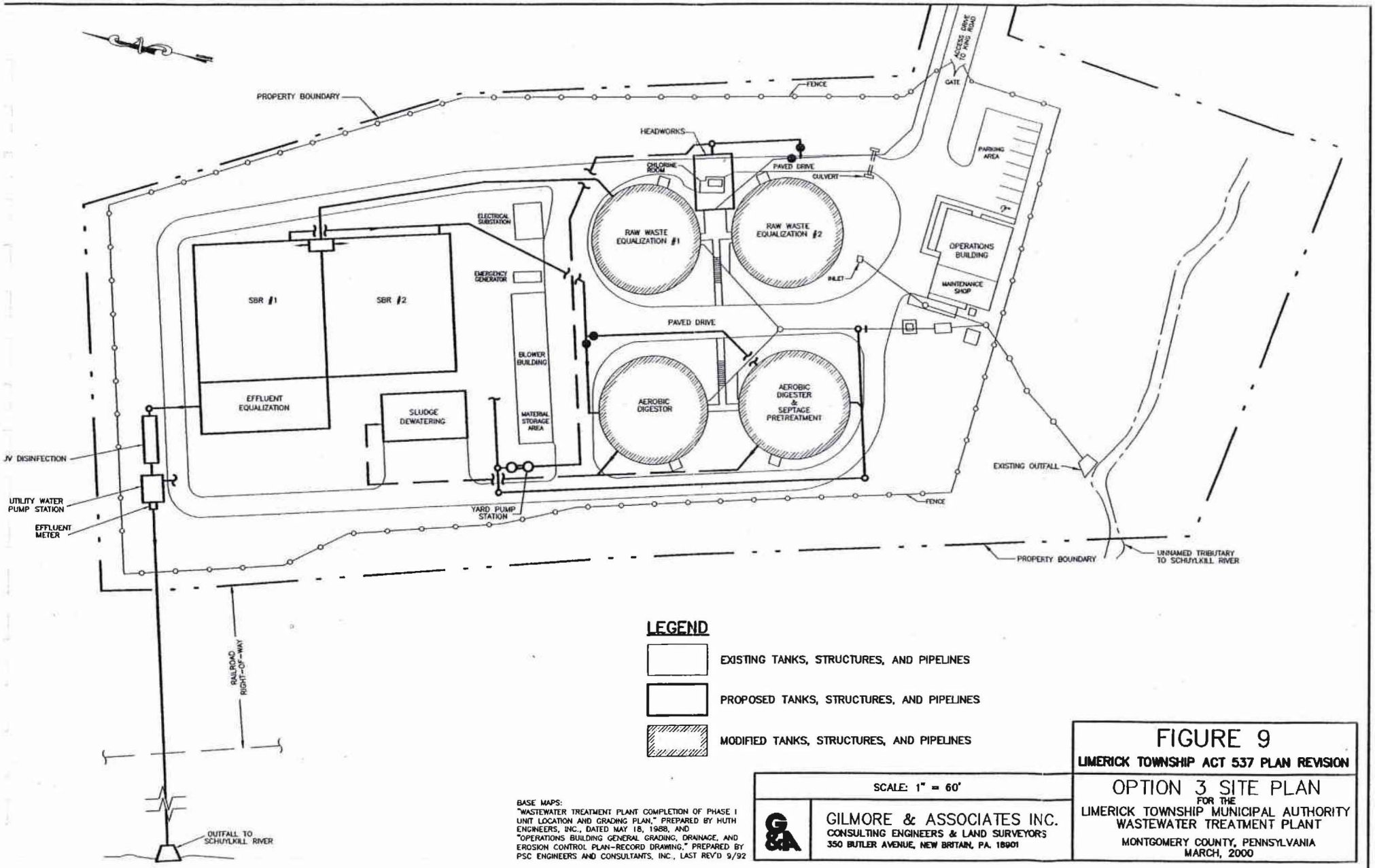
FIGURE 8

LIMERICK TOWNSHIP ACT 537 PLAN REVISION

OPTION 2 SITE PLAN

FOR THE
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
WASTEWATER TREATMENT PLANT

MONTGOMERY COUNTY, PENNSYLVANIA
MARCH, 2000



LEGEND

- EXISTING TANKS, STRUCTURES, AND PIPELINES
- PROPOSED TANKS, STRUCTURES, AND PIPELINES
- MODIFIED TANKS, STRUCTURES, AND PIPELINES

BASE MAPS:
"WASTEWATER TREATMENT PLANT COMPLETION OF PHASE I UNIT LOCATION AND GRADING PLAN," PREPARED BY HUTH ENGINEERS, INC., DATED MAY 18, 1988, AND "OPERATIONS BUILDING GENERAL GRADING, DRAINAGE, AND EROSION CONTROL PLAN-RECORD DRAWING," PREPARED BY PSC ENGINEERS AND CONSULTANTS, INC., LAST REV'D 9/92

SCALE: 1" = 60'

GILMORE & ASSOCIATES INC.
CONSULTING ENGINEERS & LAND SURVEYORS
350 BUTLER AVENUE, NEW BRITAIN, PA. 18901

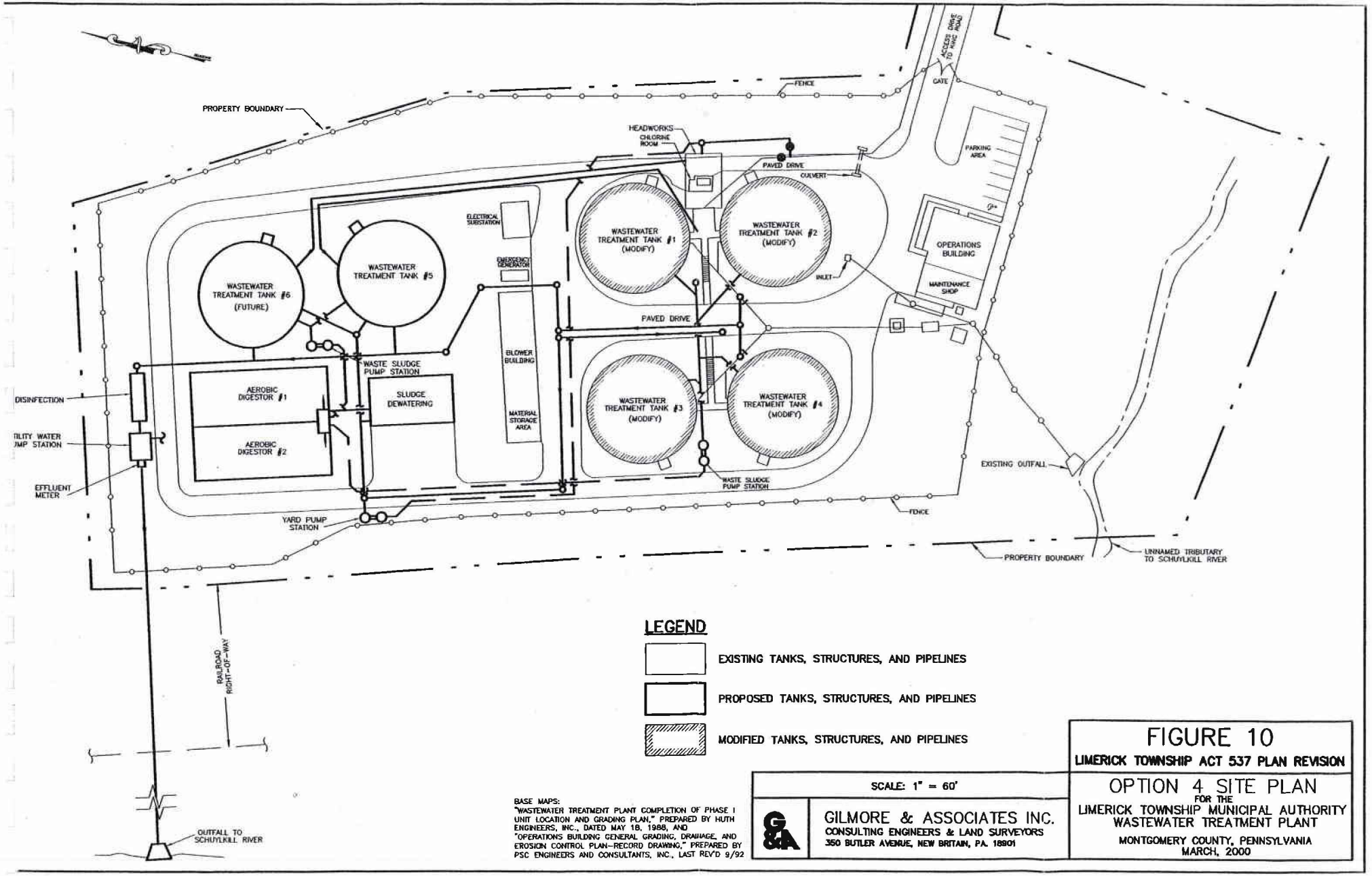
FIGURE 9

LIMERICK TOWNSHIP ACT 537 PLAN REVISION

OPTION 3 SITE PLAN

FOR THE
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
WASTEWATER TREATMENT PLANT

MONTGOMERY COUNTY, PENNSYLVANIA
MARCH, 2000



LEGEND

- EXISTING TANKS, STRUCTURES, AND PIPELINES
- PROPOSED TANKS, STRUCTURES, AND PIPELINES
- MODIFIED TANKS, STRUCTURES, AND PIPELINES

BASE MAPS:
"WASTEWATER TREATMENT PLANT COMPLETION OF PHASE I UNIT LOCATION AND GRADING PLAN," PREPARED BY HUTH ENGINEERS, INC., DATED MAY 18, 1988, AND
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SCALE: 1" = 60'

GILMORE & ASSOCIATES INC.
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350 BUTLER AVENUE, NEW BRITAIN, PA. 18901

FIGURE 10

LIMERICK TOWNSHIP ACT 537 PLAN REVISION

OPTION 4 SITE PLAN

FOR THE
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
WASTEWATER TREATMENT PLANT

MONTGOMERY COUNTY, PENNSYLVANIA
MARCH, 2000

6.6 Evaluation of Wastewater Treatment Process Options

In the evaluation of the options, several factors were considered as follows:

- Process Reliability and Performance
- Site and Treatment Tank Usage
- Constructability Aspects
- Ease of Operation
- Residuals
- Costs
- Other Factors

Process Reliability and Performance – This factor refers to the ability to consistently achieve compliance with the current effluent limitations with consideration for possible future effluent limitations.

Site and Treatment Tank Usage – This factor deals with the need to acquire additional land along with site restraints for planned and possible future capacity, process layout arrangement, continued usage of treatment tanks and ability to handle flows beyond 1.7 mgd should the EDU contribution reach 250 gallons per day or the number of EDUs exceed projections.

Constructability Aspects – This factor involves a preliminary evaluation relative to the ease or difficulty of maintaining performance during the construction period while modifying existing facilities.

Ease of Operation – This factor involves operator familiarity with the treatment process, extent of operator involvement with the proposed facilities, process selection, number of units and loss of capacity with the key unit out of operation.

Residuals – This factor concerns the issue of waste activated sludge, grit and screenings which require processing and off-site disposal.

Cost – This factor involves evaluation of construction and project costs along with operation and maintenance cost.

Other Factors – This factor involves other aspects of importance not covered in the above factors.

6.6.1 Process Reliability and Performance

The extended aeration process of Options 1 and 4 is a widely used, well established treatment process which will achieve significant nitrification (i.e. removal of ammonia-nitrogen). This process is presently utilized at the LTMA

wastewater treatment plant and is quite familiar to the operators. Continued use of the extended aeration process will not necessarily preclude conversion to a SBR process in the future.

The SBR process of Options 2 and 3 has been in use at a growing number of wastewater treatment facilities during the past fifteen (15) years or so. The process has excellent flexibility relative to biological nutrient (phosphorous, nitrogen) removal in addition to nitrification, which would be important should effluent requirements limit the discharge of such nutrients in future years. For example, the process can provide for nitrogen removal by denitrification which allows for recovery of oxygen along with significant reduction of nitrate-nitrogen in the effluent. Nitrate-nitrogen is an important parameter relative to drinking water, which is a significant water use downstream on the Schuylkill River.

Either of the processes will provide a reliable effluent quality which meets current NPDES requirements for a discharge to the Schuylkill River.

6.6.2 Site and Treatment Tank Usage

All of the options can be constructed within the site currently owned by LTMA although easements will be required for the outfall to the Schuylkill River.

Option 1 will result in a congested area in the vicinity of the existing operations building which will require that parking for operators be relocated. All options will essentially utilize most, if not all of the available land.

Options 1 and 2 would allow for a capacity of approximately 2.0 mgd with minimal additional construction, although certain units/piping would need to be sized for 2.0 mgd as part of the planned expansion/upgrade. Option 3 would require an enlargement of the new SBR to accommodate a flow of 2.0 mgd. Option 4 would require the addition of a sixth treatment tank in order to handle 2.0 mgd.

Options 1, 2 and 4 will utilize all four (4) of the existing treatment tanks while Option 3 will utilize two (2) of the treatment tanks.

6.6.3 Constructability Aspects

It is anticipated that three (3) of the treatment tanks can remain in service at any time during the construction period regardless of the option selected. Option 2 is the most problematic in this regard. Option 4 involves the least renovation work associated with the existing treatment tanks. A detailed sequence of construction will be required such that the existing treatment facilities remain in service to the maximum practicable extent during the construction period.

6.6.4 Ease of Operation

All of the options are capable of being operated without difficulty or an excessive amount of operator attention. The current operations staff is familiar with the extended aeration process of Options 1 and 4. Operator familiarity with the SBR process of Options 2 and 3 is low; consequently operator training will be required. Option 1 involves locating the headworks and flow equalization tanks adjacent to the operations building which is not desirable because of congestion and site constraints. Option 4 involves the independent operation of at least five (5) treatment tanks which is more operator intensive than the other options.

Options 2 and 4 offer an advantage relative to having a relatively small loss of overall treatment capacity should one of the treatment tanks need to be removed from service for maintenance purposes.

6.6.5 Residuals

All of the options involve use of a long term aeration process which should result in a similar quantity of waste activated sludge to process. The sludge stabilization (aerobic digestion) and dewatering operation is similar for all options which will allow for removal as either liquid aerobically digested sludge or an aerobically digested sludge cake for off site disposal by a contract hauler.

Sludge from the Possum Hollow Wastewater Treatment Plant can be trucked to the sludge processing facilities for dewatering.

All of the options will also include new headwork facilities which will provide grit and screenings for off site disposal.

6.6.6 Costs

The detailed cost estimates associated with the four (4) options are presented in Appendix C, Opinion of Probable Cost Tables #4 through #7. Costs include an Opinion of Probable Construction Cost (based on year 2000), an Opinion of Probable Project Cost (based on year 2000) and Opinion of Probable Operations and Maintenance cost (based on design capacity). The operation and maintenance costs are only those costs associated with wastewater treatment and do not include those costs associated with the sewage collection and pumping facilities, general LTMA administration or debt service.

A summary of the costs is presented in Table 5 including the 20 year present worth for a plant capacity of 1.7 mgd, which assumes diversion of the Upper Brooke Evans Drainage Area to the Possum Hollow Sewerage System.

Table 5
Summary of Opinions of Probable Cost
Wastewater Treatment Plant Capacity of 1.7 MGD

Option	Construction Cost	Project Cost	Operations and Maintenance Cost	Present Worth (20 year, 6%)
1	$6,100,000	$8,080,000	$830,000	$17,600,000
2	$5,200,000	$7,000,000	$790,000	$16,100,000
3	$5,500,000	$7,300,000	$830,000	$16,800,000
4	$4,500,000	$6,000,000	$860,000	$15,900,000

6.6.7 Other Factors

Option 3 can allow for conversion of one of the treatment tanks to a septage pretreatment facility which is a feature not included in the other options.

Table 6 presents a comparative analysis of the four (4) wastewater treatment plant options.

TABLE 6
COMPARATIVE ANALYSIS OF WASTEWATER TREATMENT PLANT OPTIONS

Evaluation Factor	Option 1 Extended Aeration with Conversion of Existing Tankage to Aeration Tanks	Option 2 SBR with Conversion of Existing Tankage to SBR Units	Option 3 SBR with New Tankage, Conversion of Existing Tankage to Various Uses	Option 4 Extended Aeration with Additional Tankage
1.0 Treatment Process				
1.1 Type (see Note 1)	Extended aeration with pre-equalization	Sequencing batch reactor with post-equalization	Sequencing batch reactor with post-equalization	Extended aeration with pre-equalization
1.2 Ammonia removal (i.e. nitrification) capability (see Note 3)	Excellent	Good to Excellent	Good to Excellent	Excellent
1.3 Nutrient (nitrogen, phosphorous) removal capability (see Note 2)	Very limited; phosphorous removal by chemical addition possible	Excellent nutrient removal possible biologically; would require addition of mixers	Excellent nutrient removal possible biologically	Very limited; phosphorous removal by chemical addition possible
1.4 Performance reliability	Excellent	Excellent	Excellent	Excellent
2.0 Site/Treatment Tank Usage				
2.1 Layout arrangement (see Note 5)	Potential congestion in area of	Satisfactory	Satisfactory	Satisfactory
2.2 Potential for expansion beyond 1.7 mgd at current effluent requirements	Good as aeration capacity is available for 2 mgd (see Note 4); medium cost implementation	Good as SBR capacity is available for 2 mgd; low cost implementation	Fair at best (see Note 4); medium cost implementation	Excellent; additional (6th) treatment tank allows for 2 mgd capacity; high cost implementation
2.3 Continued usage of treatment tanks	Yes, all four	Yes, all four	Yes, but only two	Yes, all four
3.0 Constructability				
3.1 Impacts during construction	Medium	Significant	Medium	Minor
4.0 Ease of Operations				
4.1 Operator familiarity	High	Low	Low	High
4.2 Operator involvement	Medium	Medium	Medium	High
4.3 Loss of capacity with key unit out of service	50%	25%	50%	20%
5.0 Other Factors				
5.1 Miscellanous Factor #1			Septage pretreatment possible	
6.0 Costs				
6.1 Project Cost	$8.1 million	$7.0 million	$7.3 million	$6.0 million
6.2 Operation and Maintenance Cost	$0.83 million	$0.79 million	$0.83 million	$0.86 million
6.3 Present Worth (20 Year, 6%)	$17.6 million	$16.1 million	$16.8 million	$15.9 million

Table 6
Comparative Analysis of Wastewater Treatment Plant

Notes:

1. All options will have new headworks facilities (screening and grit removal), ultraviolet light disinfection, sludge dewatering facilities and outfall to the Schuylkill River.

2. No nutrient removal requirements currently exist in the NPDES Permit nor are foreseen for a direct discharge to the Schuylkill River.

3. Current ammonia-nitrogen limit is 20 mg/l for a direct discharge to the Schuylkill River. While no stringent ammonia-nitrogen limit is foreseen in the near future, a gradual lowering of the effluent limitation is a reasonable expectation in future years.

4. Future capacity beyond 1.7 mgd would require larger facilities to be initially constructed (i.e. Option 1 – larger clarifiers, Option 3 – larger SBRs) which are not included in the project cost.

5. It would be prudent for any of the options to acquire additional property towards King Road for possible future use and to serve as a buffer against residential encroachment.

7.0 INSTITUTIONAL EVALUATION

7.1 General

The LTMA has been in existence since 1986, and owns and operates the existing municipal sanitary sewerage system in Limerick Township. All planned sewerage facilities will be the responsibility of the LTMA to implement including design, funding, construction and operation. No further evaluation of institutional approaches is necessary.

8.0 SELECTED ALTERNATIVE AND IMPLEMENTATION PLAN

8.1 General

This section discusses the alternative selected for implementation within the Study Area. Figure 8 illustrates the proposed collection, conveyance and treatment facilities associated with the chosen alternative. This selection was based on the information provided in Section 6. Also discussed is the funding approach being pursued and the proposed implementation program/management plan for release of new connection permits (EDUs).

As noted throughout the Act 537 Plan Revision, the major problem to be addressed by the selected alternative is the provision of sewage treatment capacity for connection of existing and future development within the Study Area.

8.2 Existing Wastewater Disposal Needs

The existing wastewater disposal needs in Limerick Township were addressed in Section 4 of this report. The existing need for wastewater treatment capacity was a key factor in the selection of an alternative as discussed in Section 6.

8.3 Future Wastewater Disposal Needs

The future wastewater disposal needs for Limerick Township were addressed in Section 4 of this report. The anticipated future demand for wastewater collection, conveyance and treatment systems was a key factor in the evaluation and final selection of an alternative as discussed in Section 6.

8.4 Selected Plan

With respect to expansion/upgrade of the King Road wastewater treatment plant the selected plan is Option 2, which involves an SBR process utilizing the four (4) existing treatment tanks.

This option is economically favorable with respect to operation and maintenance costs and overall present worth. The SBR process offers excellent performance reliability relative to achieving compliance with current effluent limitations and possible future requirements for nutrient removal. Finally, Option 2 would allow for an expanded capacity beyond 1.7 mgd with relatively low additional cost.

8.5 Funding of Selected Alternative

Several funding methods for the construction of the selected alternative are available. These methods include developer financing, tapping fees, and public financing through the LTMA. It is anticipated that a combination of these alternatives will be employed.

8.5.1 Developer Financing

The opinions of probable cost included in Appendix C do not include funding contributions which may be made by prospective project developers. All of the new developer financed projects are expected to include the construction of conveyance and pump stations as necessary to connect to existing LTMA facilities. Developer financing is not anticipated with regard to the upgrade and expansion of the treatment plant.

8.5.2 Tapping Fees

Anyone connecting to the LTMA sewage conveyance and treatment system is required to pay for the portion of the facilities they will be using via a tapping fee. Advance sales of EDUs lowers the amount of additional financing the LTMA is required to provide to fund selected projects. Accumulated tapping fees will be applied to the cost of new facilities, specifically pump stations and interceptors, to the extent recommended by the LTMA's financial advisors.

8.5.3 Revenue Bonds

Municipal bonds are often used to finance construction of public works projects. Municipal bonds include General Obligation and Revenue Bonds. Revenue Bonds are paid off from monies collected from the use of the sewer system. The advantages of these bonds are that the interest rates are low and they are tax exempt.

8.5.4 Selected Funding Method

The proposed funding for construction of the selected alternative will combine the available funding methods. The primary sources of funding for sewage collection and conveyance facilities will be through developer financing and the collection of tapping fees for the connection of residences and businesses to the LTMA system. Funding for the upgrade and expansion of the treatment facilities will come from the Delaware Valley Regional Finance Authority via the sale of tax free revenue bonds.

8.6 Implementation

Table 7 outlines the proposed implementation schedule.

Table 7
Implementation Schedule

Activity	Projected Date
Issue Draft Act 537 Plan	July 2000
Township Act 537 Plan Adoption	September 2000
PADEP Act 537 Plan Approval	January 2001
Submit Part 1 NPDES Application	January 2001
PADEP Part 1 Approval	May 2001
Submit Part 2 Water Quality Management Application	October 2001
PADEP Part 2 Approval	January 2002
Issue Bid Documents	February 2002
Award Construction Contracts	April 2002
Completion / Start Up	September 2003

8.7 Connection Management Plan

As of June 2000 all of the available EDU connections relative to King Road Wastewater Treatment Plant capacity had been purchased. The additional capacity associated with the expansion and upgrade of the King Road Wastewater Treatment Plant and the new Possum Hollow Sewerage System will not be available until September 2003 and December 2002, respectively.

A connection management plan has been developed to allow for limited growth, which is tied to achieving compliance with certain milestones. Since the availability of capacity at the King Road Wastewater Treatment Plant is also related to the construction of the Possum Hollow Sewerage System, milestones have been selected from both project schedules. The implementation schedule for the Possum Hollow sewerage system can be found in the Act 537 Special Study – Possum Hollow Study Area.

Table 8
Connection Management Plan Schedule
for the King Road Service Area

	Milestone	Anticipated Date	Additional EDUs Available
1.	PaDEP Approval of Act 537 Plan Revision	January 2001	300
2.	King Road Part 1 – NPDES Approval	May 2001	200
3.	Award Construction Contracts – Possum Hollow	October 2001	200
4.	Award Construction Contracts – King Road	April 2002	200
5.	Complete Construction – Possum Hollow	December 2002	300
6.	Complete Construction – King Road	September 2003	End Management Plan

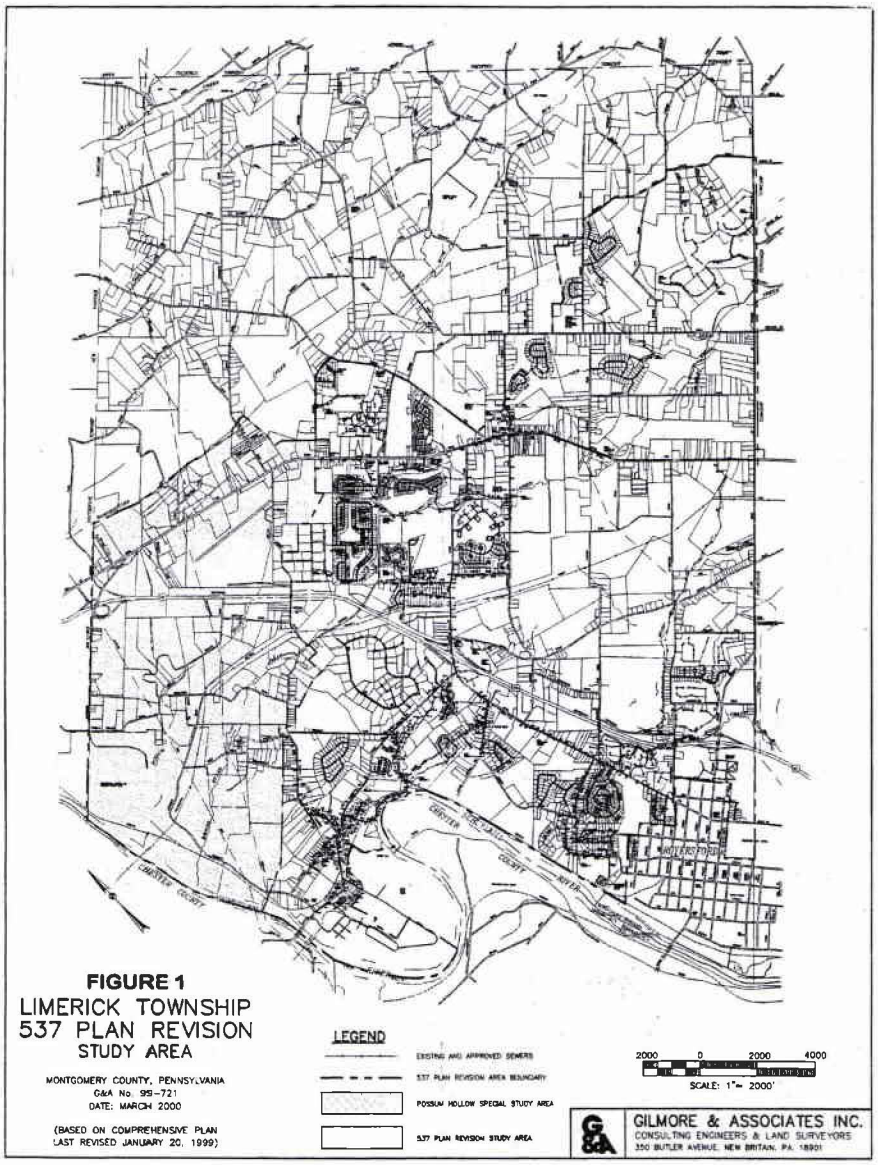


FIGURE 1
LIMERICK TOWNSHIP
537 PLAN REVISION
STUDY AREA

MONTGOMERY COUNTY, PENNSYLVANIA
G&A No. 95-721
DATE: MARCH 2000

(BASED ON COMPREHENSIVE PLAN
LAST REVISED JANUARY 20, 1999)

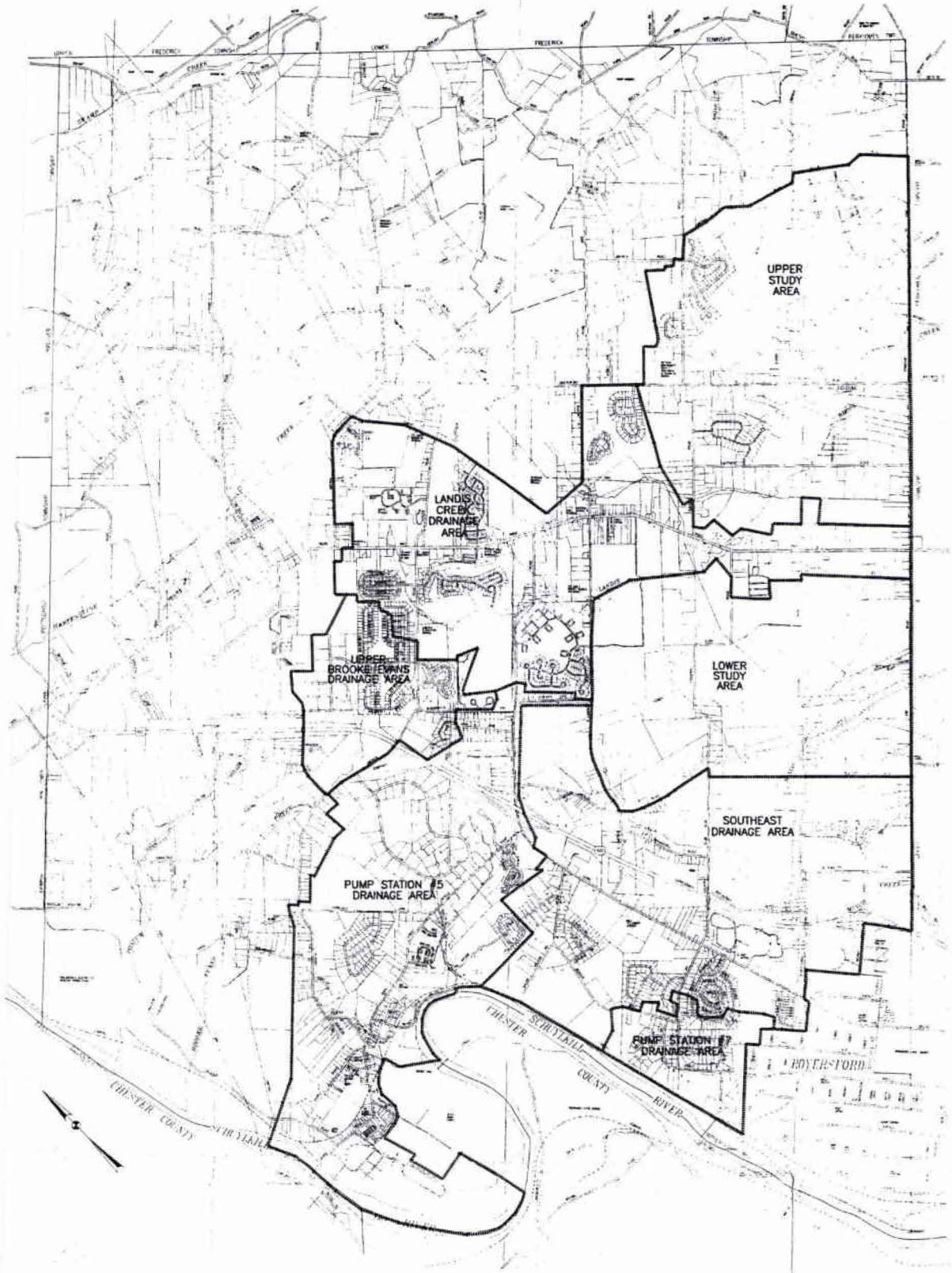


FIGURE 2

LIMERICK TOWNSHIP

537 PLAN REVISION DRAINAGE AREA BOUNDARIES

MONTGOMERY COUNTY, PENNSYLVANIA

G&A No. 99-721

DATE: MARCH 2000

1200 0 1200 2400

SCALE: 1" = 1200'

(BASED ON COMPREHENSIVE PLAN LAST REVISED JANUARY 20, 1999)

GILMORE & ASSOCIATES INC.

CONSULTING ENGINEERS & LAND SURVEYORS

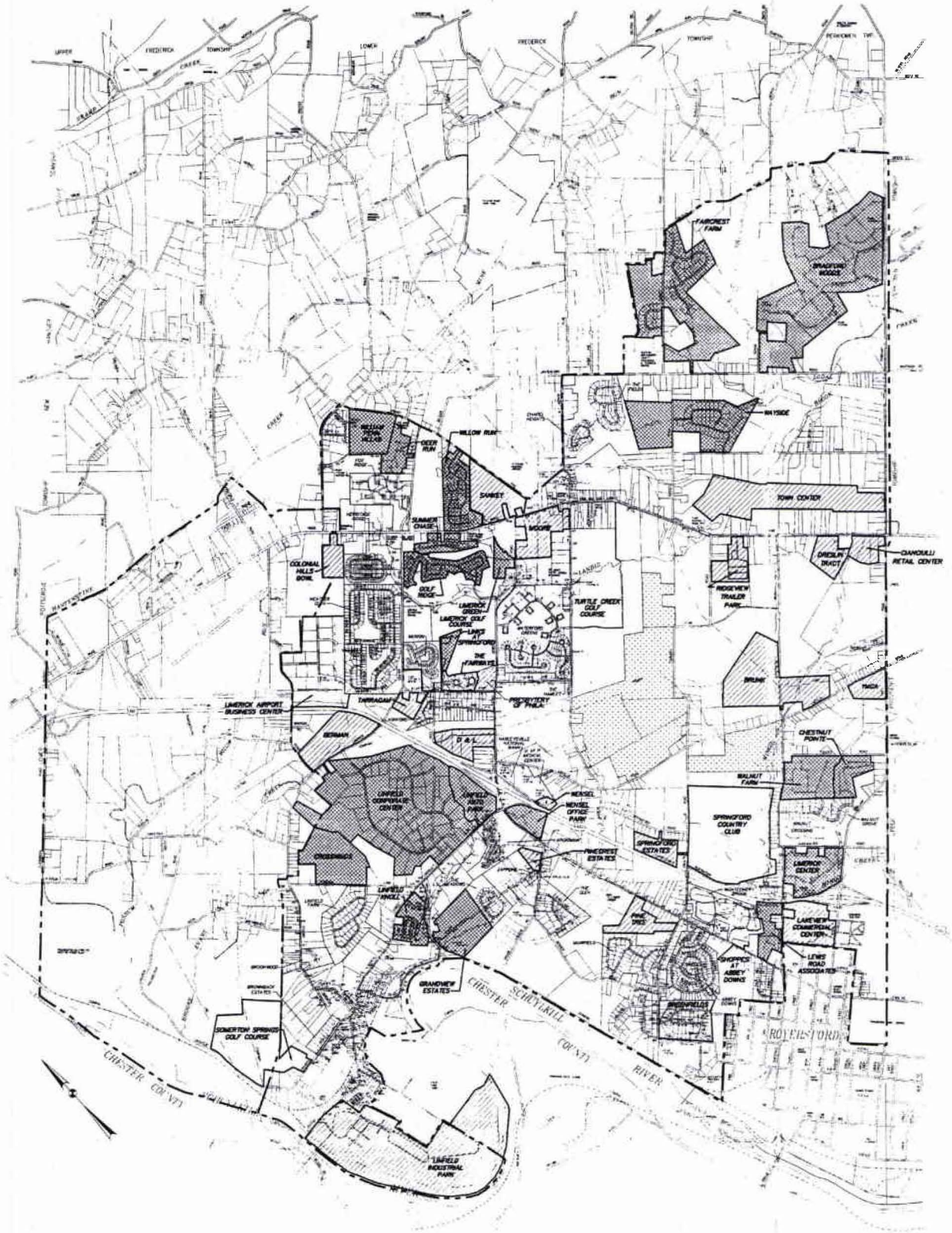


FIGURE 3

LIMERICK TOWNSHIP
537 PLAN REVISION
LAND DEVELOPMENT PLAN

MONTGOMERY COUNTY, PENNSYLVANIA
G&A No. 99-721
DATE: MARCH 2000

1200 0 1200 2400
SCALE: 1" = 1200'

LEGEND

- EXISTING AND APPROVED SEWERS
- 537 PLAN SEWER SERVICE AREA BOUNDARY
- PROJECTED LAND DEVELOPMENTS
- OPEN SPACE (GOLF COURSES)
- AGRICULTURAL PRESERVATION AREAS
- DEVELOPMENTS UNDER CONSTRUCTION (LESS THAN 80% COMPLETE) AS OF MARCH, 2000

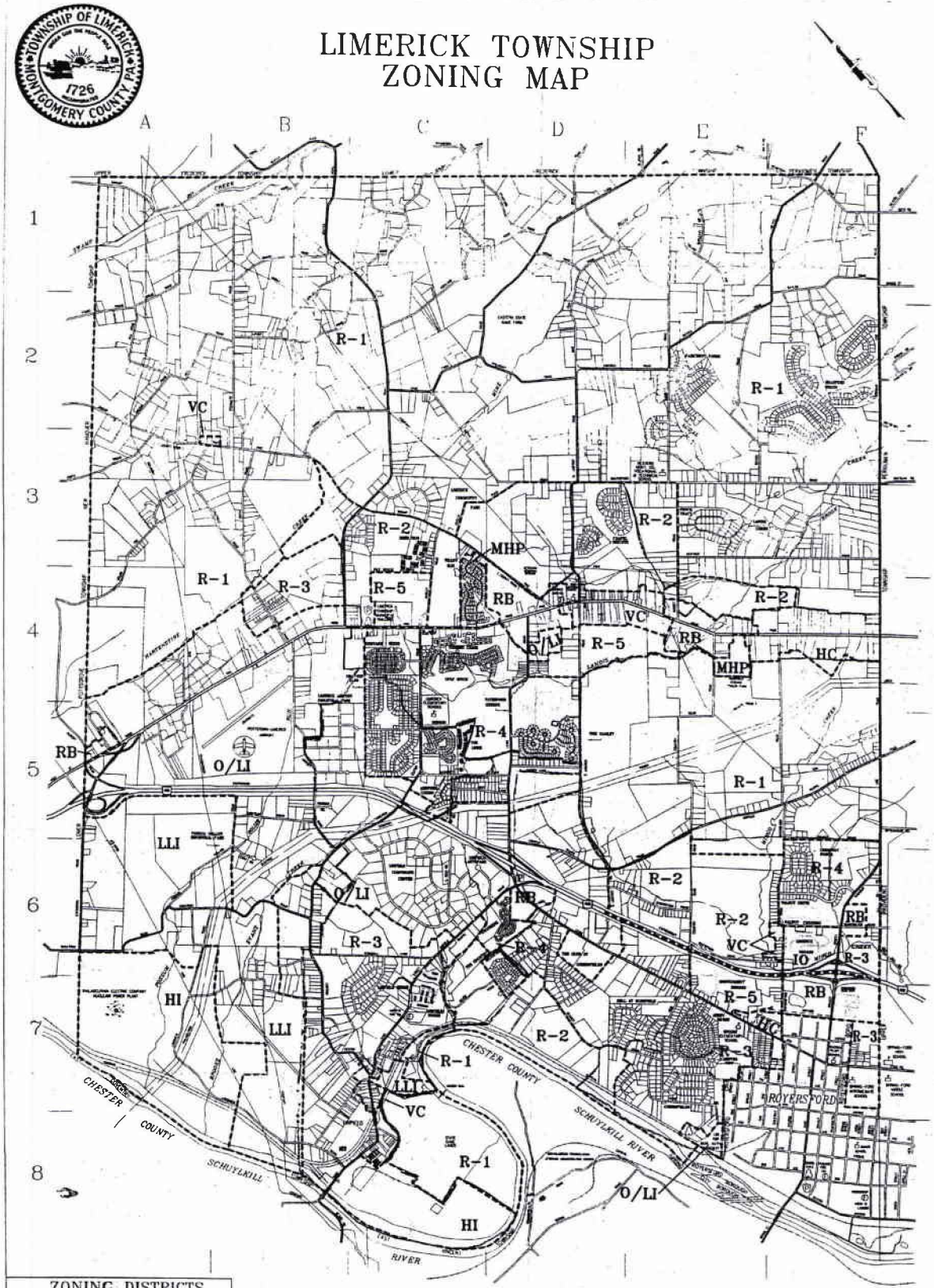
(BASED ON COMPREHENSIVE PLAN LAST REVISED JANUARY 20, 1999)

GILMORE & ASSOCIATES INC.
CONSULTING ENGINEERS & LAND SURVEYORS
331 BUTLER AVENUE, NEW BRITAIN, PA 18901

APPENDIX A

LIMERICK TOWNSHIP
ZONING MAP

LIMERICK TOWNSHIP
ZONING MAP



ROAD INDEX

ZONING DISTRICTS

R-1	RESIDENTIAL-AGRICULTURAL
R-2	LOW DENSITY DISTRICT
R-3	MEDIUM DENSITY
R-4	MEDIUM-HIGH DENSITY
R-5	VILLAGE RESIDENTIAL
MHP	MOBILE HOME PARK
VC	VILLAGE COMMERCIAL
HC	HIGHWAY COMMERCIAL
IO	INTERCHANGE OFFICE
O/LI	OFFICE/LIMITED INDUSTRIAL
LLI	LIMITED LIGHT INDUSTRIAL
HI	HEAVY INDUSTRIAL
RB	RETAIL BUSINESS

GRAPHIC SCALE

(IN FEET)
1 inch = 1320 ft.
(ONE INCH EQUALS ONE QUARTER MILE)

CZOP/SPECTER, INC.
Consulting Engineers & Surveyors

APPENDIX B

PROJECTIONS OF FUTURE SEWAGE FLOWS

LIMERICK TOWNSHIP ACT 537 PLAN REVISION
PROJECTIONS OF FUTURE SEWAGE FLOWS
(REFER TO ATTACHED FIGURE)

A. LANDIS CREEK DRAINAGE AREA

1. **Total Acreage of Drainage Area within 537 Plan Area = 1,030**

2. **Undeveloped Land Per Zoning District**

Zoning District	Acreage	Available Undeveloped Buildable Land *
R-2	123	98.4
R-5	18	14.4
RB (Retail Business)	55	44
O/LI (Office/Light Industrial)	12 / 208	9.6 / 166.4

* Zoning Area less 20% to account for wetlands, easements, etc.

3. **Density per Zoning Area**
(Allowable dwelling units per net buildable acre as per the Limerick Township Zoning Ordinance, June 1999)

Zoning District	Dwelling Units (EDUs)
R-2	0.7
R-5	8.0
RB	N/A
O/LI	N/A

4. **Projected Average Daily Flow From Undeveloped Buildable Land**
(Projected flow calculated based on 210 gallons per day per EDU for residential usage. 500 gallons per day per acre for business, commercial or industrial areas as outlined in the approved Act 537 Plan)

Zoning District	EDUs	Flow at 100% Buildout (GPD)	Flow at 50% Buildout (GPD)
R-2	68	14,280	7,140
R-5	115	24,150	12,075
RB	N/A	22,000	11,000
O/LI	N/A	4,800	2,400
Subtotal		**65,230**	**32,615**

5. **Projected Average Daily Flow from Identified Proposed Development**

Development Project	EDUs	Flow (GPD)
Fox Ridge Apartments	64	13,440
Subtotal	**64**	**13,440**

6. **Projected New EDUs and Flow**
(Totals from Sections 4 and 5)

Gambone residential (116 ≈)

	100% Buildout	50% Buildout	
Projected Average Daily Flow	78,670	46,055	GPD
+ 10% Contingency	7,867	4,606	GPD
Total Projected Flow	**86,537**	**50,661**	**GPD**

B. PUMP STATION #5 DRAINAGE AREA

1. **Total Acreage of Drainage Area within 537 Plan Area = 1,138**

2. **Undeveloped Land Per Zoning District**

Zoning District	Acreage	Available Undeveloped Buildable Land *
R-3	236	188.8
LLI (Limited Light Industrial)	20 / 256	16 / 204.8

* Zoning Area less 20% to account for wetlands, easements, etc.

3. **Density per Zoning Area**
(Allowable dwelling units per net buildable acre as per the Limerick Township Zoning Ordinance, June 1999)

Zoning District	Dwelling Units (EDUs)
R-3	2.0
LLI	N/A

4. **Projected Average Daily Flow From Undeveloped Buildable Land**
(Projected flow calculated based on 210 gallons per day per EDU for residential usage. 500 gallons per day per acre for business, commercial or industrial areas as outlined in the approved Act 537 Plan)

Zoning District	EDUs	Flow at 100% Buildout (GPD)	Flow at 50% Buildout (GPD)
R-3	377	79,170	39,585
LLI	N/A	8,000	4,000
Subtotal		**87,170**	**43,585**

5. **Projected Average Daily Flow from Identified Proposed Development**

Development Project	EDUs	Flow (GPD)
Linfield Industrial Park	225	47,250
Subtotal	**225**	**47,250**

6. **Projected New EDUs and Flow**
(Totals from Sections 4 and 5)

	100% Buildout	50% Buildout	
Projected Average Daily Flow	134,420	90,835	GPD
+ 10% Contingency	13,442	9,084	GPD
Total Projected Flow	**147,862**	**99,919**	**GPD**

C. **SOUTHEAST PUMP STATION DRAINAGE AREA**

1. **Total Acreage of Drainage Area within 537 Plan Area = 1465**

2. **Undeveloped Land Per Zoning District**

Zoning District	Acreage	Available Undeveloped Buildable Land *
R-2	218	174.4
R-3	20	16
R-4	95	76

* Zoning Area less 20% to account for wetlands, easements, etc.

3. **Density per Zoning Area**
(Allowable dwelling units per net buildable acre as per the Limerick Township Zoning Ordinance, June 1999)

Zoning District	Dwelling Units (EDUs)
R-2	0.7
R-3	2.0
R-4	4.0

4. **Projected Average Daily Flow From Undeveloped Buildable Land**
(Projected flow calculated based on 210 gallons per day per EDU for residential usage. 500 gallons per day per acre for business, commercial or industrial areas as outlined in the approved Act 537 Plan)

Zoning District	EDUs	Flow at 100% Buildout (GPD)	Flow at 50% Buildout (GPD)
R-2	122	25,620	12,810
R-3	32	6,720	3,360
R-4	304	63,840	31,920
Subtotal		**96,180**	**48,090**

5. **Projected Average Daily Flow from Identified Proposed Development**

Poleo - J
Other

Development Project	EDUs	Flow (GPD)
Lakeview Commercial Center	40	8,400
McDonald's	5	1,050
Wensel (Burger King)	10	2,100
Pinecrest Estates	5	1,050
Subtotal	**60**	**12,600**

6 **Projected New EDUs and Flow**
(Totals from Sections 4, 5 and 6)

	100% Buildout	50% Buildout	
Projected Average Daily Flow	108,780	60,690	GPD
+ 10% Contingency	10,878	6,069	GPD
Total Projected Flow	**119,658**	**66,759**	**GPD**

D. UPPER BROOKE EVANS CREEK DRAINAGE AREA

1. **Total Acreage of Drainage Area within 537 Plan Area = 330**

2. **Undeveloped Land Per Zoning District**

Zoning District	Acreage	Available Undeveloped Buildable Land *
O/LI	36	28.8

* Zoning Area less 20% to account for wetlands, easements, etc.

3. **Density per Zoning Area**
(Allowable dwelling units per net buildable acre as per the Limerick Township Zoning Ordinance, June 1999)

Zoning District	Dwelling Units (EDUs)
O/LI	N/A

4. **Projected Average Daily Flow From Undeveloped Buildable Land**
(Projected flow calculated based on 210 gallons per day per EDU for residential usage. 500 gallons per day per acre for business, commercial or industrial areas as outlined in the approved Act 537 Plan)

Zoning District	EDUs	Flow at 100% Buildout (GPD)	Flow at 50% Buildout (GPD)
O/LI	N/A	14,400	7,200
Subtotal		**14,400**	**7,200**

5. **Projected Average Daily Flow from Identified Proposed Development**

Boesler Apts

Development Project	EDUs	Flow (GPD)
Limerick Center Road	10	2,100
Subtotal	**10**	**2,100**

6. **Projected New EDUs and Flow**
(Totals from Sections 4 and 5)

	100% Buildout	50% Buildout	
Projected Average Daily Flow	16,500	8,250	GPD
+ 10% Contingency	1,650	4,125	GPD
Total Projected Flow	**18,150**	**12,375**	**GPD**

E. "UPPER STUDY AREA" DRAINAGE AREA (1997 537 Plan Revision)

1. **Total Acreage of Drainage Area within 537 Plan Area = 1,340**

2. **Undeveloped Land Per Zoning District**

Zoning District	Acreage	Available Undeveloped Buildable Land *
R-1	624	499.2
R-2	63	50.4

* Zoning Area less 20% to account for wetlands, easements, etc.

3. **Density per Zoning Area**
(Allowable dwelling units per net buildable acre as per the Limerick Township Zoning Ordinance, June 1999)

Zoning District	Dwelling Units (EDUs)
R-1	0.45
R-2	0.7

4. **Projected Average Daily Flow From Undeveloped Buildable Land**
(Projected flow calculated based on 210 gallons per day per EDU for residential usage. 500 gallons per day per acre for business, commercial or industrial areas as outlined in the approved Act 537 Plan)

Zoning District	EDUs	Flow at 100% Buildout (GPD)	Flow at 50% Buildout (GPD)
R-1	224	47,040	23,520
R-2	35	7,350	3,675
Subtotal	**259**	**54,390**	**27,195**

5. **Projected Average Daily Flow from Identified Proposed Development**

Toll Bros Colonia-E

Development Project	EDUs	Flow (GPD)
Town Center	53	11,130
Subtotal	**53**	**11,130**

6. **Projected New EDUs and Flow**
(Totals from Sections 4 and 5)

	100% Buildout	50% Buildout	
Projected Average Daily Flow	65,520	38,325	GPD
+ 20% Contingency	13,104	7,665	GPD
Total Projected Flow	**78,624**	**45,990**	**GPD**

* A contingency of twenty (20) percent was added to flows from the Upper Study and Lower Study Areas as both these areas are relatively undeveloped. Each area not only has potential for future development but also contain existing developments which may connect into the sewer system at a future date.

F. **"LOWER STUDY AREA" DRAINAGE AREA (1997 537 Plan Revision)**

1. **Total Acreage of Drainage Area within 537 Plan Area = 1,096**

2. **Undeveloped Land Per Zoning District**

Zoning District	Acreage	Available Undeveloped Buildable Land *
R-1	462	369.6

* Zoning Area less 20% to account for wetlands, easements, etc.

3. **Density per Zoning Area**
(Allowable dwelling units per net buildable acre as per the Limerick Township Zoning Ordinance, June 1999)

Zoning District	Dwelling Units (EDUs)
R-1	0.45

4. **Projected Average Daily Flow From Undeveloped Buildable Land**
(Projected flow calculated based on 210 gallons per day per EDU for residential usage. 500 gallons per day per acre for business, commercial or industrial areas as outlined in the approved Act 537 Plan)

Zoning District	EDUs	Flow at 100% Buildout (GPD)	Flow at 50% Buildout (GPD)
R-1	166	34,860	17,430
Subtotal	**166**	**34,860**	**17,430**

5. **Projected Average Daily Flow from Identified Proposed Development**

Development Project	EDUs	Flow (GPD)
Brunk Subdivision	69	14,490
YMCA	48	10,080
Subtotal	**117**	**24,570**

6. **Projected New EDUs and Flow**
(Totals from Sections 4 and 5)

	100% Buildout	50% Buildout	
Projected Average Daily Flow	59,430	42,000	GPD
+ 20% Contingency	11,886	8,400	GPD
Total Projected Flow	**71,316**	**50,400**	**GPD**

* A contingency of twenty (20) percent was added to flows from the Upper Study and Lower Study Areas as both these areas are relatively undeveloped. Each area not only has potential for future development but also contain existing developments which may connect into the sewer system at a future date.

G. SUMMARY - ASSUMING TOTAL (100%) BUILDOUT

Drainage Area	Projected New EDUs	Projected New Flow
Landis Creek	412	86,537
Pump Station #5	704	147,862
Southeast	570	119,658
Upper Brooke Evans Creek	86	18,150
Upper Study Area	374	78,624
Lower Study Area	340	71,316
Subtotal:	**2,486**	**522,147**
Unconnected EDUs:	**2,393**	**502,530**
TOTAL:	**4,879**	**1,024,667**

H. SUMMARY - ASSUMING 50% BUILDOUT

Drainage Area	Projected New EDUs	Projected New Flow
Landis Creek	241	50,661
Pump Station #5	476	99,919
Southeast	318	66,759
Upper Brooke Evans Creek	59	12,375
Upper Study Area	219	45,990
Lower Study Area	240	50,400
Subtotal:	**1,553**	**326,104**
Unconnected EDUs:	**2,393**	**502,530**
TOTAL:	~~3,951~~ 3946	**828,634**

APPENDIX C

OPINIONS OF PROBABLE COST

OPINION OF PROBABLE COST #1

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

Abandonment of Interim Pump Stations

Item	Description	Units	Quantity	Unit Price	Total Amount
1	8" PVC Gravity Sewer (Open Land)	LF	5,800	$35.00	$203,000.00
2	8" PVC Gravity Sewer (Road)	LF	12,800	$85.00	$1,088,000.00
3	8" DIP	LF	1,860	$10.00	$18,600.00
4	10" PVC Gravity Sewer (Open Land)	LF	1,600	$40.00	$64,000.00
5	10" DIP	LF	160	$25.00	$4,000.00
6	4' Precast Manhole (@250')	UN	81	$2,100.00	$170,100.00
7	440 GPM Pump Station	LS	1	$350,000.00	$350,000.00
8	6" DIP Force Main	LF	250	$81.00	$20,250.00
9	Abandonment of Interim Pump Stations	UN	2	$10,000.00	$20,000.00
				Construction Cost Total:	**$1,937,950.00**
	Easements	LF	7,650	$10.00	$76,500.00
	Land	AC	0.25	$25,000.00	$6,250.00
	Contingency (10%)				$193,795.00
	Survey				$75,000.00
	Engineering (10%)				$193,795.00
	Observation (10%)				$193,795.00
	Legal/Administrative				$50,000.00
				Total Project Cost:	**$2,727,085.00**

Notes:

1. *Prices based on recent bid results.*
2. *Prices do not include rock excavation.*
3. *Prices do not include bypass pumping allowance.*
4. *No allowance was included for salvage value of pump station equipment.*

OPINION OF PROBABLE COST #2

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

Benner Road Interceptor

Item	Description	Units	Quantity	Unit Price	Total Amount
1	10" PVC Gravity Sewer (Open Land)	LF	1,000	$40.00	$40,000.00
2	36" PVC Gravity Sewer (Road)	LF	2,600	$120.00	$312,000.00
3	36" DIP	LF	260	$146.00	$37,960.00
4	4' Precast Manhole (@250')	UN	4	$2,100.00	$8,400.00
5	6' Precast Manhole (@250')	UN	10	$3,200.00	$32,000.00
6	Upgrade Pump Station #7 to 2,000 gpd	LS	1	$1,300,000.00	$1,300,000.00
7	16" DIP Force Main (Open Land)	LF	3,100	$87.00	$269,700.00
8	16" DIP Force Main (Road)	LF	2	$102.00	$204.00
9	Abandonment of Pump Station #4	UN	1	$10,000.00	$10,000.00
				Construction Cost Total:	**$2,010,264.00**
	Easements	LF	4,100	$10.00	$41,000.00
	Land	AC	0.25	$25,000.00	$6,250.00
	Contingency (10%)				$201,026.40
	Survey				$75,000.00
	Engineering (10%)				$201,026.40
	Observation (10%)				$201,026.40
	Legal/Administrative				$50,000.00
				Total Project Cost:	**$2,785,593.20**

Notes:

1. *Prices based on recent bid results.*
2. *Prices do not include rock excavation.*
3. *Prices do not include bypass pumping allowance.*
4. *No allowance was included for salvage value of pump station equipment.*

OPINION OF PROBABLE COST #3

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

Diversion of Upper Brooke Evans Drainage Area to Possum Hollow

Item	Description	Units	Quantity	Unit Price	Total Amount
1	8" PVC Gravity Sewer (Open Land)	LF	2,900	$35.00	$101,500.00
2	8" DIP	LF	290	$10.00	$2,900.00
3	10" PVC Gravity Sewer (Open Land)	LF	5,206	$40.00	$208,240.00
4	10" DIP	LF	521	$25.00	$13,025.00
5	4' Precast Manhole (@250')	UN	22	$2,100.00	$46,200.00
6	Brooke Evans Creek Pump Station	LS	1	$400,000.00	$400,000.00
7	6" DIP Force Main	LF	3,100	$81.00	$251,100.00
8	Abandonment of Pump Stations #1 and #8	UN	2	$10,000.00	$20,000.00
				Construction Cost Total:	**$1,042,965.00**
	Easements	LF	7,256	$10.00	$72,560.00
	Land	AC	0.25	$25,000.00	$6,250.00
	Contingency (10%)				$104,296.50
	Survey				$50,000.00
	Engineering (10%)				$104,296.50
	Observation (10%)				$104,296.50
	Legal/Administrative				$50,000.00
				Total Project Cost:	**$1,534,664.50**

Notes:

1. *Prices based on recent bid results.*
2. *Prices do not include rock excavation.*
3. *Assumes land and easement costs will be reduced due to granting of ground by PECO Energy and Providence Properties.*
4. *No allowance was included for salvage value of pump station equipment.*

OPINION OF PROBABLE COST #4

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

Extended Aeration Process with Conversion of Existing Treatment Tanks to Aeration Basins (Option 1)

Item	Description	Total Amount
1	Wastewater Treatment Plant	
	A. Headworks	$455,000.00
	B. Equalization Tanks	$844,000.00
	C. Aeration Tanks*	$420,000.00
	D. Clarifiers	$870,000.00
	E. Sludge Return Pump Station	$132,000.00
	F. Aerobic Sludge Digesters	$824,000.00
	G. Sludge Dewatering Building	$765,000.00
	H. UV Disinfection	$226,000.00
	I. Utility Water Pump Station	$70,000.00
	J. Effluent Metering	$78,000.00
	K. Yard Pump Station	$163,000.00
2	Outfall	$125,000.00
3	Sitework	$170,000.00
4	Yard Piping	$364,000.00
5	Electrical	$291,000.00
6	HVAC	$39,000.00
7	Plumbing	$24,000.00
8	Instrumentation	$48,000.00
9	Mobilization/Demobilization/Supervision	$150,000.00
	Construction Cost Total:	**$6,058,000.00**
	Easements	$10,000.00
	Survey	$25,000.00
	Engineering Design	$666,000.00
	Observation	$666,000.00
	Contingency (10%)	$605,800.00
	Legal/Administrative	$50,000.00
	Total Project Cost:	**$8,080,800.00**

* Convert From Existing WWT Tanks

Notes:

1. Prices do not include rock excavation

OPINION OF PROBABLE COST #4A

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

Extended Aeration Process with Conversion of Existing Treatment Tanks to Aeration Basins (Option 1) - O & M

Item	Description	Total Amount
1	Personnel Costs	
	A. Operators	$134,000.00
	B. Manager	$30,000.00
	C. Office Staff	$46,000.00
	D. Overtime/On-Call	$9,000.00
2	Fringe Benefits	$76,000.00
3	General and Administration Costs	$121,000.00
4	Citizens Readings	$5,000.00
5	Bank Fees	$2,000.00
6	Electric Expenses	
	A. Office Staff	$6,000.00
	B. STP	$139,000.00
7	Processing Expenses	
	A. Water	$2,000.00
	B. Sludge, Grit and Screening Disposal	$156,000.00
	C. Refuse/Trash	$700.00
	D. Tank Cleaning	$9,000.00
	E. Chlorine	$200.00
	F. Polymer/Sludge	$7,700.00
	G. Odor Control/Sludge Building	$9,000.00
8	Laboratory Expenses	
	A. Lab Supplies	$1,400.00
	B. Outside Laboratory Analysis	$6,000.00
9	System Maintenance Expenses	
	A. Plant Maintenance	$18,000.00
	B. Equipment Maintenance	$500.00
	C. Materials and Small Tools	$5,500.00
	D. Equipment Rental	$1,000.00
	E. Major Maintenance	$4,500.00
	F. Outside Contractor Services	$2,500.00
	G. Private Meter Repair	$4,500.00

	H. UV Lamps	$3,000.00
10	Other Plant Overhead	
	A. Insurance	$23,000.00
	B. Dues	$200.00
	C. Training	$2,000.00
	D. Uniform Rental	$3,000.00
	E. Lawn Maintenance	$2,000.00
	F. Immunizations	$300.00
	Operations and Maintenance Cost:	**$830,000.00**

OPINION OF PROBABLE COST #5

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

SBR Process Using Existing Treatment Tanks (Option 2)

Item	Description	Total Amount
1	Wastewater Treatment Plant	
	A. Headworks	$455,000.00
	B. SBR Treatment Tanks *	$1,253,000.00
	C. Effluent Equalization Tank	$234,000.00
	D. Aerobic Sludge Digesters	$824,000.00
	E. Sludge Dewatering Building	$765,000.00
	F. UV Disinfection	$168,000.00
	G. Utility Water Pump Station	$70,000.00
	H. Effluent Metering	$78,000.00
	I. Yard Pump Station	$163,000.00
2	Outfall	$125,000.00
3	Sitework	$180,000.00
4	Yard Piping	$401,000.00
5	Electrical	$261,000.00
6	HVAC	$32,000.00
7	Plumbing	$20,000.00
8	Instrumentation	$52,000.00
9	Mobilization/Demobilization/Supervision	$150,000.00
	Construction Cost Total:	**$5,231,000.00**
	Easements	$10,000.00
	Survey	$25,000.00
	Engineering Design	$575,000.00
	Observation	$575,000.00
	Contingency (10%)	$523,100.00
	Legal/Administrative	$50,000.00
	Total Project Cost:	**$6,989,100.00**

* Convert From Existing WWT Tanks

Notes:

1. Prices do not include rock excavation

OPINION OF PROBABLE COST #5A

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

SBR Process Using Existing Treatment Tanks (Option 2) - O & M

Item	Description	Total Amount
1	Personnel Costs	
	A. Operators	$134,000.00
	B. Manager	$30,000.00
	C. Office Staff	$46,000.00
	D. Overtime/On-Call	$9,000.00
2	Fringe Benefits	$76,000.00
3	General and Administration Costs	$121,000.00
4	Citizens Readings	$5,000.00
5	Bank Fees	$2,000.00
6	Electric Expenses	
	A. Office Staff	$6,000.00
	B. STP	$98,000.00
7	Processing Expenses	
	A. Water	$2,000.00
	B. Sludge, Grit and Screening Disposal	$156,000.00
	C. Refuse/Trash	$700.00
	D. Tank Cleaning	$9,000.00
	E. Chlorine	$0.00
	F. Polymer/Sludge	$7,700.00
	G. Odor Control/Sludge Building	$9,000.00
8	Laboratory Expenses	
	A. Lab Supplies	$1,400.00
	B. Outside Laboratory Analysis	$6,000.00
9	System Maintenance Expenses	
	A. Plant Maintenance	$18,000.00
	B. Equipment Maintenance	$500.00
	C. Materials and Small Tools	$5,500.00
	D. Equipment Rental	$1,000.00
	E. Major Maintenance	$4,500.00
	F. Outside Contractor Services	$2,500.00
	G. Private Meter Repair	$4,500.00

	H. UV Lamps	$2,000.00
10	Other Plant Overhead	
	A. Insurance	$23,000.00
	B. Dues	$200.00
	C. Training	$2,000.00
	D. Uniform Rental	$3,000.00
	E. Lawn Maintenance	$2,000.00
	F. Immunizations	$300.00
	Operations and Maintenance Cost:	**$787,800.00**

OPINION OF PROBABLE COST #6

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

SBR Process Using New Treatment Tanks (Option 3)

Item	Description	Total Amount
1	Wastewater Treatment Plant	
	A. Headworks	$455,000.00
	B. Equalization Tanks *	$200,000.00
	C. Aerobic Digester Tank *	$133,000.00
	D. Septage Pretreatment Tank *	$198,000.00
	E. SBR Treatment & Effluent Equalization Tanks	$2,330,000.00
	F. Sludge Dewatering Building	$765,000.00
	G. UV Disinfection	$168,000.00
	H. Utility Water Pump Station	$70,000.00
	I. Effluent Metering	$78,000.00
	J. Yard Pump Station	$163,000.00
2	Outfall	$125,000.00
3	Sitework	$182,000.00
4	Yard Piping	$456,000.00
5	Electrical	$319,000.00
6	HVAC	$37,000.00
7	Plumbing	$23,000.00
8	Instrumentation	$91,000.00
9	Mobilization/Demobilization/Supervision	$150,000.00
	Construction Cost Total:	**$5,943,000.00**
	Easements	$10,000.00
	Survey	$25,000.00
	Engineering Design	$654,000.00
	Observation	$654,000.00
	Contingency (10%)	$594,300.00
	Legal/Administrative	$50,000.00
	Total Project Cost:	**$7,930,300.00**

* Convert From Existing WWT Tanks

Notes:

1. Prices do not include rock excavation
2. Construction costs include a septage pretreatment tank with an estimated value of $246,000

OPINION OF PROBABLE COST #6A

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

SBR Process Using New Treatment Tanks (Option 3) - O & M

Item	Description	Total Amount
1	Personnel Costs	
	A. Operators	$134,000.00
	B. Manager	$30,000.00
	C. Office Staff	$46,000.00
	D. Overtime/On-Call	$9,000.00
2	Fringe Benefits	$76,000.00
3	General and Administration Costs	$121,000.00
4	Citizens Readings	$5,000.00
5	Bank Fees	$2,000.00
6	Electric Expenses	
	A. Office Staff	$6,000.00
	B. STP	$172,000.00
7	Processing Expenses	
	A. Water	$2,000.00
	B. Sludge, Grit and Screening Disposal	$156,000.00
	C. Refuse/Trash	$700.00
	D. Tank Cleaning	$9,000.00
	E. Chlorine	$0.00
	F. Polymer/Sludge	$7,700.00
	G. Odor Control/Sludge Building	$9,000.00
8	Laboratory Expenses	
	A. Lab Supplies	$1,400.00
	B. Outside Laboratory Analysis	$6,000.00
9	System Maintenance Expenses	
	A. Plant Maintenance	$18,000.00
	B. Equipment Maintenance	$500.00
	C. Materials and Small Tools	$5,500.00
	D. Equipment Rental	$1,000.00
	E. Major Maintenance	$4,500.00
	F. Outside Contractor Services	$2,500.00
	G. Private Meter Repair	$4,500.00

	H. UV Lamps	$2,000.00
10	Other Plant Overhead	
	A. Insurance	$23,000.00
	B. Dues	$200.00
	C. Training	$2,000.00
	D. Uniform Rental	$3,000.00
	E. Lawn Maintenance	$2,000.00
	F. Immunizations	$300.00
	Operations and Maintenance Cost:	**$861,800.00**

OPINION OF PROBABLE COST #7

GILMORE & ASSOCIATES, INC.	**Client:** Limerick Township Municipal Authority
350 BUTLER AVENUE	**Project Name:** Act 537 Plan Revision
NEW BRITAIN, PA 18901	**Project Number:** 99-721

Existing Aeration Process with Additional Tankage (Option 4)

Item	Description	Total Amount
1	Wastewater Treatment Plant	
	A. Headworks	$455,000.00
	B. Package Wastewater Treatment Plants	$761,000.00
	C. Modify Aeration, Existng WWT Tanks	$111,000.00
	D. Aerobic Sludge Digesters	$824,000.00
	E. Sludge Dewatering Building	$765,000.00
	F. UV Disinfection	$226,000.00
	G. Utility Water Pump Station	$70,000.00
	H. Effluent Metering	$78,000.00
	I. Yard Pump Station	$163,000.00
2	Outfall	$125,000.00
3	Sitework	$173,000.00
4	Yard Piping	$276,000.00
5	Electrical	$207,000.00
6	HVAC	$28,000.00
7	Plumbing	$17,000.00
8	Instrumentation	$34,000.00
9	Mobilization/Demobilization/Supervision	$150,000.00
	Construction Cost Total:	**$4,463,000.00**
	Easements	$10,000.00
	Survey	$25,000.00
	Engineering Design	$491,000.00
	Observation	$491,000.00
	Contingency (10%)	$446,300.00
	Legal/Administrative	$50,000.00
	Total Project Cost:	**$5,976,300.00**

* Convert From Existing WWT Tanks

Notes:

1. Prices do not include rock excavation

OPINION OF PROBABLE COST #7A

GILMORE & ASSOCIATES, INC.
350 BUTLER AVENUE
NEW BRITAIN, PA 18901

Client: Limerick Township Municipal Authority
Project Name: Act 537 Plan Revision
Project Number: 99-721

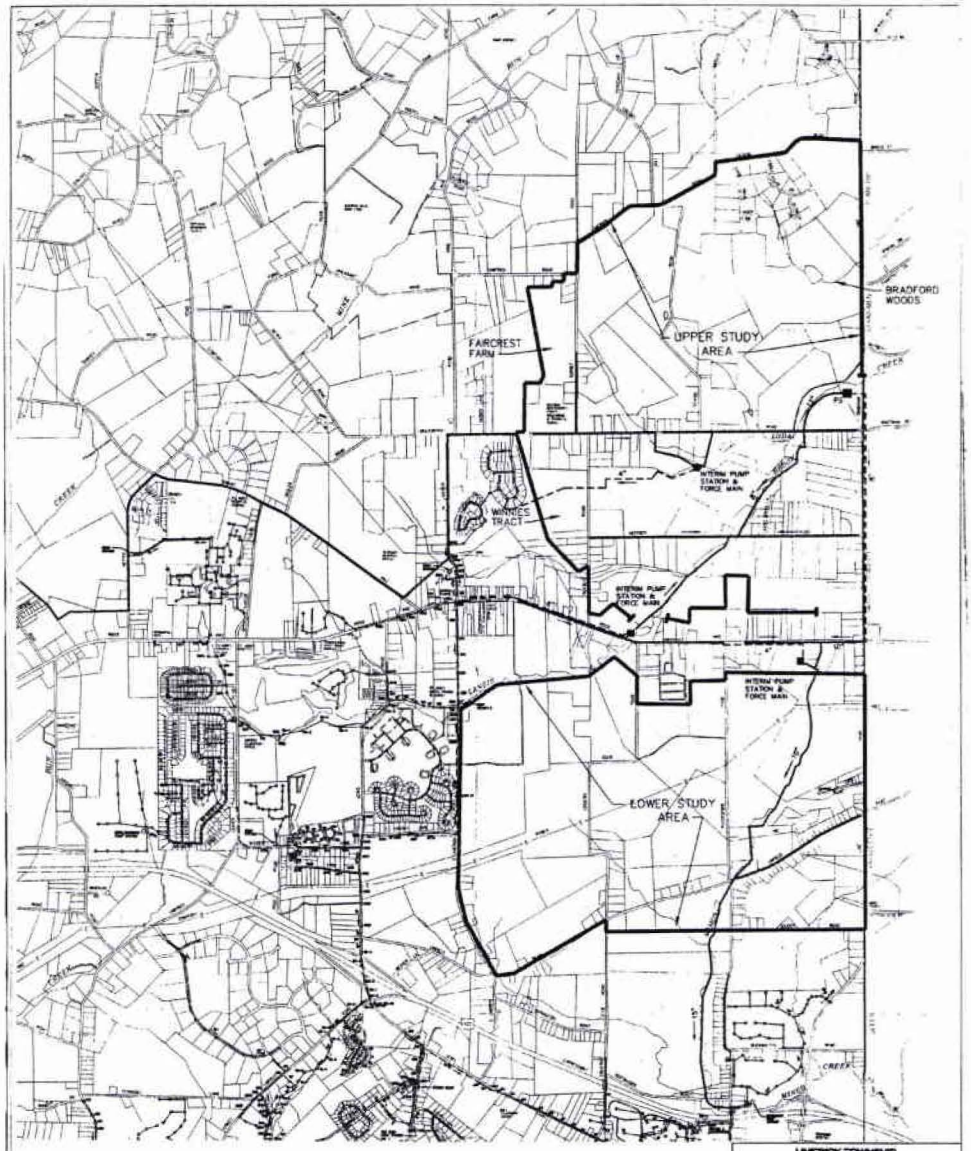
Existing Aeration Process with Additional Tankage (Option 4) - O & M

Item	Description	Total Amount
1	Personnel Costs	
	A. Operators	$134,000.00
	B. Manager	$30,000.00
	C. Office Staff	$46,000.00
	D. Overtime/On-Call	$9,000.00
2	Fringe Benefits	$76,000.00
3	General and Administration Costs	$121,000.00
4	Citizens Readings	$5,000.00
5	Bank Fees	$2,000.00
6	Electric Expenses	
	A. Office Staff	$6,000.00
	B. STP	$127,000.00
7	Processing Expenses	
	A. Water	$2,000.00
	B. Sludge, Grit and Screening Disposal	$156,000.00
	C. Refuse/Trash	$700.00
	D. Tank Cleaning	$9,000.00
	E. Chlorine	$200.00
	F. Polymer/Sludge	$7,700.00
	G. Odor Control/Sludge Building	$9,000.00
8	Laboratory Expenses	
	A. Lab Supplies	$1,400.00
	B. Outside Laboratory Analysis	$6,000.00
9	System Maintenance Expenses	
	A. Plant Maintenance	$18,000.00
	B. Equipment Maintenance	$500.00
	C. Materials and Small Tools	$5,500.00
	D. Equipment Rental	$1,000.00
	E. Major Maintenance	$4,500.00
	F. Outside Contractor Services	$2,500.00
	G. Private Meter Repair	$4,500.00

	H. UV Lamps	$3,000.00
10	Other Plant Overhead	
	A. Insurance	$23,000.00
	B. Dues	$200.00
	C. Training	$2,000.00
	D. Uniform Rental	$3,000.00
	E. Lawn Maintenance	$2,000.00
	F. Immunizations	$300.00
	Operations and Maintenance Cost:	**$818,000.00**

APPENDIX D

LONG TERM SELECTED ALTERNATIVE MAP
1997 ACT 537 REVISION

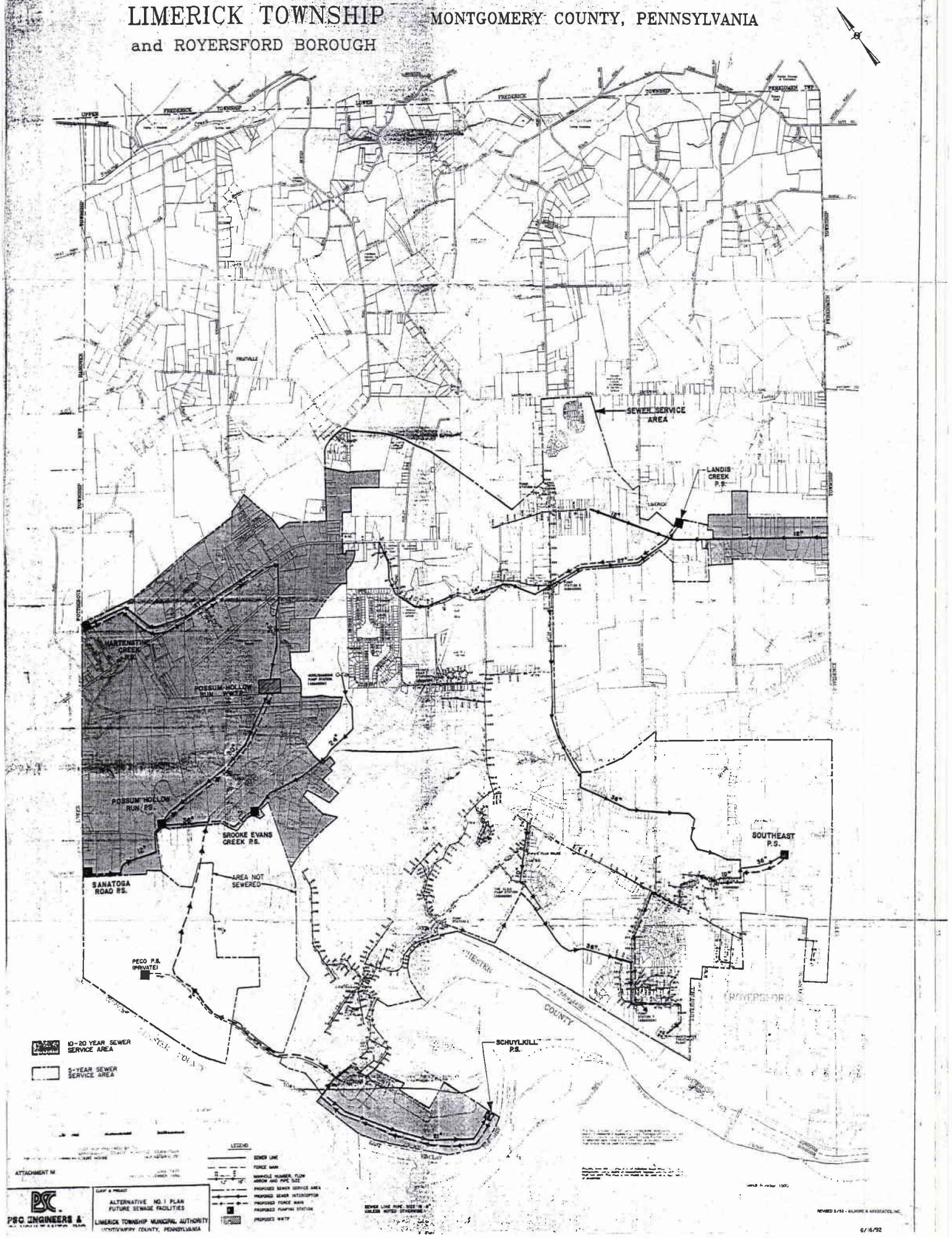

BRADFORD WOODS
UPPER STUDY AREA
FAIROREST FARM
WINNES TRACT
INTERIM PUMP STATION & FORCE MAIN
INTERIM PUMP STATION & FORCE MAIN
INTERIM PUMP STATION & FORCE MAIN
LOWER STUDY AREA
NOTES:
1. ONLY PRINCIPAL COLLECTION AND CONVEYANCE FACILITIES ASSOCIATED WITH MEETING CURRENTLY IDENTIFIED NEEDS ARE REPRESENTED HEREIN. OTHER MINOR SEWERS AND PUMP STATIONS MAY BE NECESSARY FOR MEETING ULTIMATE STUDY AREA NEEDS.
2. UPPER AREA INTERIM FACILITIES, INCLUDING THE PUMP STATION, FORCE MAIN AND GRATERFORD ROAD AND SUNSET ROAD COLLECTOR SEWERS WILL BE BUILT AND FINANCED BY DEVELOPERS.
3. INTERIM FACILITIES WILL BE BUILT TO LTMA STANDARDS AND WILL BE PHASED OUT WHEN DOWNSTREAM DEMAND CREATES A NEED FOR IMPLEMENTATION OF THE LONG TERM PLAN.
4. WHERE THE BOUNDARY OF THE IDENTIFIED STUDY AREA RUNS ALONG THE CENTER OF A ROAD, BOTH SIDES OF THE ROAD WILL BE SERVICED.
LEGEND
STUDY AREA BOUNDARY
CURRENT 537 PLAN SEWER SERVICE AREA BOUNDARY
EXISTING SANITARY SEWERS
FUTURE SANITARY SEWERS (8" UNLESS OTHERWISE NOTED)
FUTURE FORCE MAIN
LIMERICK TOWNSHIP
ACT 537 PLAN AMENDMENT
FIGURE NO. 16 - ALTERNATIVE 4C
TREATMENT VIA L.T.M.A.
SYSTEM - MINGO CREEK
WITHOUT RIDGE PIKE
PUMP STATION
GILMORE & ASSOCIATES, INC.
CONSULTING ENGINEERING & LAND SURVEYORS
1200 0 1200 2400
SCALE FEET
DATE: MAY 1997
REVISED: NOV. 1997

APPENDIX E

BENNER ROAD INTERCEPTOR ALTERNATIVE MAP
1992 COMPREHENSIVE SEWAGE
FACILITIES PLANNING STUDY

LIMERICK TOWNSHIP
and ROYERSFORD BOROUGH

MONTGOMERY COUNTY, PENNSYLVANIA



ATTACHMENT M

PSC ENGINEERS &

ALTERNATIVE NO. 1 PLAN
FUTURE SEWAGE FACILITIES

LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
MONTGOMERY COUNTY, PENNSYLVANIA

REVISED 5/93 - KILGORE & ASSOCIATES, INC.

6/16/92

APPENDIX F

1999 WASTELOAD MANAGEMENT REPORT (CHAPTER 94)

Limerick Township Municipal Authority
Montgomery County, Pennsylvania

1999 Wasteload Management Report (Chapter 94)

February 2000

Prepared By:

Gilmore & Associates, Inc.
350 Butler Avenue
New Britain, PA 18901
(215) 345-4330

TABLE OF CONTENTS

2.0 HYDRAULIC LOADING

During 1999, the total flow through the wastewater treatment plant was 211.76 million gallons. This figure represents an increase in the flows from those reported for 1998 of approximately 19.68 million gallons. On average, approximately 580,000 gallons per day of sewage was generated and treated. On occasion, daily peaks were noted which were higher. A peak monthly average flow of 636,000 gallons per day occurred during September. The three (3) month maximum flow occurred during the period of September - November and averaged about 621,000 gallons per day. As the capacity of the wastewater treatment plant is 1.6 mgd, the reported hydraulic loading does not represent an overload to the plant. Specifically, the reported average annual daily flow accounts for 38.8 percent of the treatment plant's permitted hydraulic capacity. Table 1, Hydraulic Loadings, details 1999 flow information.

TABLE 1
HYDRAULIC LOADINGS

Month	Average Daily Flow	Maximum Daily Flow
JANUARY	0.622	0.834
FEBRUARY	0.577	0.782
MARCH	0.602	0.878
APRIL	0.581	0.721
MAY	0.547	0.639
JUNE	0.522	0.580
JULY	0.501	0.579
AUGUST	0.522	0.695
SEPTEMBER	0.636	0.945
OCTOBER	0.630	0.822
NOVEMBER	0.598	0.745
DECEMBER	0.624	0.891
Average Annual Daily Flow:	0.580	
Max Month - Average Daily Flow:	0.636	(September)
Max Month – Maximum Daily Flow:	0.945	(September)
3 Month Maximum Average Daily Flow:	0.621	(September - November)

Note: All flows in millions gallons per day
Source: 1999 Monthly Operator's Reports

The primary source of wastewater contributions is residences, although there are several industrial/commercial operations located throughout the township which are served by public sewer.

An additional 768 EDUs were connected to the sanitary sewer system during the year for a total connected year-end EDU count of 4478. However, a large number of these EDUs are "dry", in the process of being connected, and were not contributing flow to the LTMA treatment plant.

Due to the time delay from when a lateral connection permit is issued to the time flow is contributed a six month "shift" was done to get a better idea of the total number of EDUs contributing flow to the treatment plant. This "shift" was accomplished by taking the known number of total lateral connections to the treatment plant at the end of a given month and moving this total six months forward. Table 3 illustrates the EDU shift and the corresponding flows and connections per month for 1999. The year end count of EDUs contributing flow is 4,007 by this method.

The LTMA treatment plant experiences a significant increase in flow during the weekend and shows some increase in flow during storm events. A thirteen (13) percent and five (5) percent safety factor was added to the total EDU contribution calculated above to compensate for these increases in flow. This results in a total per EDU contribution of 210 gallons per day for use in future flow projections.

The projected hydraulic loading on the wastewater treatment plant over the next five (5) years, and the proposed development to be serviced by public sewer, is presented in Table 3, Approved and Projected Development, EDU Totals. Figure 1, Historical & Projected Hydraulic Loadings, is a graphical representation of hydraulic loadings to the treatment plant over the past five (5) years on a monthly basis and as projected over the next five (5) years annually.

In accordance with the projections, the rated hydraulic capacity of the treatment plant (1.6 mgd) will be only marginally sufficient to handle the projected flows through the year 2004. By December 2004, the average daily flow at the treatment plant is expected to reach approximately 1.4 mgd, which will account for approximately eighty-seven (87) percent of the rated hydraulic capacity. It is important to note, however, that the three month maximum projected for 2004 is approximately 1.5 mgd, which accounts for ninety-four (94) percent of the rated hydraulic capacity. Furthermore, plant performance is expected to deteriorate as the hydraulic loading approaches 1.6 mgd. Based on this projection, the LTMA is currently working on a revision to the Act 537 Plan which addresses the expansion of treatment facilities.

TABLE 2

GALLON/EDU CALCULATIONS

(EDUs SHIFTED SIX MONTHS FORWARD)

Month (1999)	Raw Sewage Flow (gpd)	Connected EDUs	Gallons/EDU per Day
JANUARY	621,800	3,534	176
FEBRUARY	577,000	3,577	161
MARCH	602,000	3,590	168
APRIL	581,000	3,602	161
MAY	547,000	3,616	151
JUNE	522,000	3,656	143
JULY	501,000	3,710	135
AUGUST	522,000	3,751	139
SEPTEMBER	**636,000**	3,775	168
OCTOBER	630,000	3,872	163
NOVEMBER	598,000	3,924	152
DECEMBER	624,000	4,007	156

Notes:

1. Sewage flow figures from 1999 Monthly Monitoring Reports
2. Connected EDUs form Manager's monthly reports.
   Figures represent totals as of beginning of month.

Maximum three months

BOLD Maximum month value

TABLE 3
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
1999 WASTELOAD MANAGEMENT REPORT
(CHAPTER 94)

APPROVED AND PROJECTED DEVELOPMENT (as of 12/31/99)

Name	Remaining No. of EDUs	Sewage Flow (GPD)	Projected Buildout Schedule 2000	2001	2002	2003	2004
A. Approved Developments							
Betty & Roberta Lane	4	840	4				
Bradford Woods (Inc. Twp. Line Road)	220	46200	85	75	60		
Burger King	5	1050	5				
Chestnut Pointe	122	25620	80	42			
Crosswinds	36	7560	20	16			
Deer Run	4	840	4				
Faircrest Estates (inc. Sunset & Graterford Rds.)	97	20370	50	47			
Fairways	7	1470	7				
Fox Ridge	31	6510	15	16			
Galie	1	210	1				
Golf Ridge	77	16170	20	20	20	17	
Gro	1	210	1				
Harleysville Bank	1	210	1				
Harold Herr	3	630		3			
Jubb Tract	34	7140	14	20			
Kugler Road	1	210	1				
Lewis Associates	80	16800		40	40		
Limerick Airport Business Center (Gambone)	50	10500	20	20	10		
Limerick Center (offices only)	60	12600		30	30		
Limerick Township	1	210	1				
Limerick Village (Manuf. Housing)	120	25200	20	20	20	20	20
Linfield Corp. Center (incl. 422 Auto Park)	177	37170	20	20	20	20	20
Linfield Woods	63	13230	20	20	23		
Links at Springford	36	7560	36				
North Limerick Road	10	2100	10				
Oehlert Brothers	3	630		3			
Pine Tree	27	5670	7	20			
Presbytery of Phila.	2	420		2			
Reifsnyder Road	10	2100	10				
Ridge Pike	72	15120	25	25	22		
Ridge View Trailer Park	109	22890	109				

TABLE 2
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
1999 WASTELOAD MANAGEMENT REPORT
(CHAPTER 94)

APPROVED AND PROJECTED DEVELOPMENT (as of 12/31/99)

Name	Remaining No. of EDUs	Sewage Flow (GPD)	Projected Buildout Schedule 2000	2001	2002	2003	2004
Shoppes at Abbey Downs	8	1680	4	4			
Summer Chase	8	1680	8				
Tarragam	6	1260		3	3		
Vo-Tech School	20	4200		20			
Waltz Golf Farm	3	630	3				
West Cherry & Reed Road	3	630	3				
Wayside	1	210	1				
William Penn Villas	88	18480	20	34	34		
Subtotal	**1601**	**336210**	**625**	**500**	**282**	**57**	**40**
3. Projected Developments							
Albert S. Herr and Sons	2	420		2			
Airport Industrial Park (PECO)	12	2520				12	
Anthony Ciancluilli	10	2100		5	5		
Berman	25	5250			15	10	
Brunk Sbdivision	69	14490				30	30
Colonial Hills Bowl	14	2940		14			
Edward Moore	19	3990		10	9		
Elliot Town Center	53	11130			25	28	
Graterford Road	11	2310				11	
James Bros.	6	1260		6			
Joseph Bean	4	840		4			
Lakeview Commercial Center	40	8400	20	20			
Limerick Car Wash	3	630	3				
Limerick Center Road	83	17430				43	40
Limerick Elementary School (new)	20	4200			20		
Limerick Golf Clubhouse	3	630	3				
Linfield Industrial Park	25	5250			10	15	
Mazzamuto	10	2100		10			
Neil Dreslin (Ridge Pike)	36	7560		18	18		
PECO Generating Station	88	18480				88	

TABLE 2
LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
1999 WASTELOAD MANAGEMENT REPORT
(CHAPTER 94)

APPROVED AND PROJECTED DEVELOPMENT (as of 12/31/99)

Name	Remaining No. of EDUs	Sewage Flow (GPD)	Projected Buildout Schedule 2000	2001	2002	2003	2004
Pinecrest Estates	5	1050				5	
537 Plan Future Growth (unofficial)	1063	223230				250	250
Sankey	50	10500			20	30	
Springford Estates	10	2100			5	5	
Wensel (various sites)	11	2310		11			
YMCA	48	10080			48		
Subtotal	**1720**	**361200**	**26**	**100**	**175**	**527**	**320**
EDU Totals	**3321**		**651**	**600**	**457**	**584**	**360**
Flow Totals		**697410**	**136710**	**126000**	**95970**	**122640**	**75600**
Cumulative EDU Totals* (1999 = 4,007 EDUs)			**5129**	**5729**	**6186**	**6770**	**7130**
Cumulative Flow Totals (1999 = 841,470 gpd)**			**978180**	**1104180**	**1200150**	**1322790**	**1398390**

* A high number of lateral connection permits were issued in the last few months of 1999. While these connections count towards the total number of connections to the LTMA treatment plant, these connections would be "dry" connections (i.e. no flow contribution). Although permits were issued for 4,478 lateral connections in 1999 due to this lag in flow contribution versus connections, the number of EDUs connected was shifted six months forward and gallons/EDU per day was calculated. This six month shift resulted in a total of 4,007 "live" EDUs in Decemnber of 1999.

4478 − 4007 = 471

3321 + 471 = 3792

3792 − 1308 (x projects)

**Safety factors of 13% and 5% were utilized based on the increase of flows seen at the treatment plant during the weekend and during storm events, respectively. Therefore, the Cumulative Flow Total for 1999 was based on 210 gallons per day per EDU.

2484 − 88 (PECO)

2396 uncommitted vs 2393 p. B9

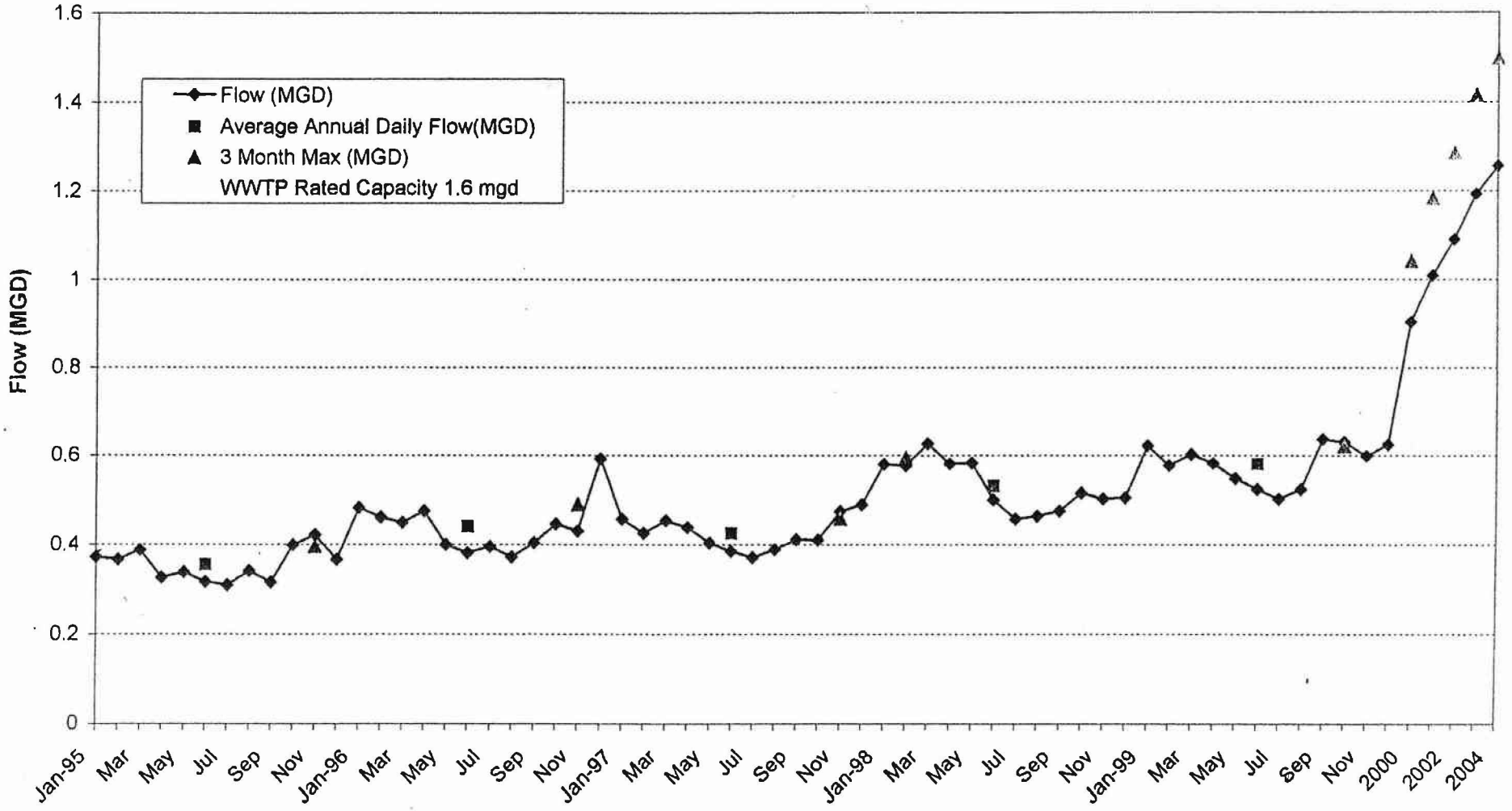
Figure 1: Data
Historical and Projected Hydraulic Loadings
1999 Wasteload Management Report (Chapter 94)

Hydraulic Loadings (MG)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
January	0.371	0.481	0.456	0.579	0.622	1.049	1.184	1.287	1.418	1.499
February	0.365	0.46	0.424	0.576	0.577	0.973	1.098	1.194	1.316	1.392
March	0.387	0.448	0.452	**0.626**	0.602	1.015	1.145	1.244	1.371	1.451
April	0.325	0.474	0.437	0.58	0.581	0.980	1.105	1.201	1.324	1.400
May	0.337	0.399	0.403	0.582	0.547	0.922	1.040	1.131	1.246	1.317
June	0.316	0.38	0.384	0.499	0.522	0.880	0.993	1.079	1.189	1.257
July	0.308	0.394	0.37	0.456	0.501	0.845	0.953	1.036	1.141	1.206
August	0.34	0.371	0.388	0.463	0.522	0.880	0.993	1.079	1.189	1.257
September	0.315	0.403	0.41	0.474	**0.636**	1.072	1.210	1.315	1.449	1.531
October	0.398	0.445	0.409	0.514	0.63	1.062	1.198	1.302	1.435	1.517
November	**0.421**	0.429	0.473	0.501	0.598	1.008	1.137	1.236	1.362	1.440
December	0.365	**0.592**	**0.488**	0.504	0.624	1.052	1.187	1.290	1.422	1.503
Average Annual Daily Flow (lbs)	0.354	0.440	0.425	0.530	0.580	0.978	1.104	1.200	1.322	1.398

FIGURE 1: LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
1999 WASTELOAD MANAGEMENT REPORT
(CHAPTER 94)

HISTORICAL AND PROJECTED HYDRAULIC LOADINGS



January 1995
through December 2004

3.0 ORGANIC LOADING

Table 4, Organic Loadings, outlines, on a monthly basis, the average daily organic loadings to the treatment plant. The rated organic loading capacity of the treatment plant is 2720 lbs/day although this number may be somewhat high in light of the plant's hydraulic re-rating.

The average organic loading to the treatment plant during 1999 was 1130 lbs/day. It is important to note that this number may be an anomaly as it falls below the three (3) year trend which indicates a 300 lbs/day/year increase.

TABLE 4
ORGANIC LOADINGS

Month	Average Daily Loading
JANUARY	1141
FEBRUARY	1239
MARCH	1077
APRIL	857
MAY	1130
JUNE	1412
JULY	1141
AUGUST	941
SEPTEMBER	1338
OCTOBER	877
NOVEMBER	1166
DECEMBER	1239
Average Daily Organic Loading:	1130

Note: All loadings in lbs/day
Source: 1999 Monthly Operator's Reports

Based on the number of active EDUs as of December 1999, and the average organic loading to the treatment plant, the ratio of organic loading per EDU is approximately 0.25 lbs/day/EDU. Therefore, we have projected future organic loadings to the wastewater treatment plant (Table 5, Five Year Organic Loading Projections) on an annual basis for the next five (5) years using 0.25 lbs/day/EDU and the projected number of EDUs for that corresponding year as outlined in Section II, "Hydraulic Loading". It is projected that by December 2004, the average daily organic loading to the treatment plant will be 1783 lbs/day. This figure represents about sixty-six (66) percent of the pre-hydraulic re-rate organic loading capacity. Figure 2, Historical and Projected Organic Loadings, illustrates the average daily organic loadings to the treatment plant on a monthly basis from January 1995 through December 1999, and annually beginning 2000 through 2004.

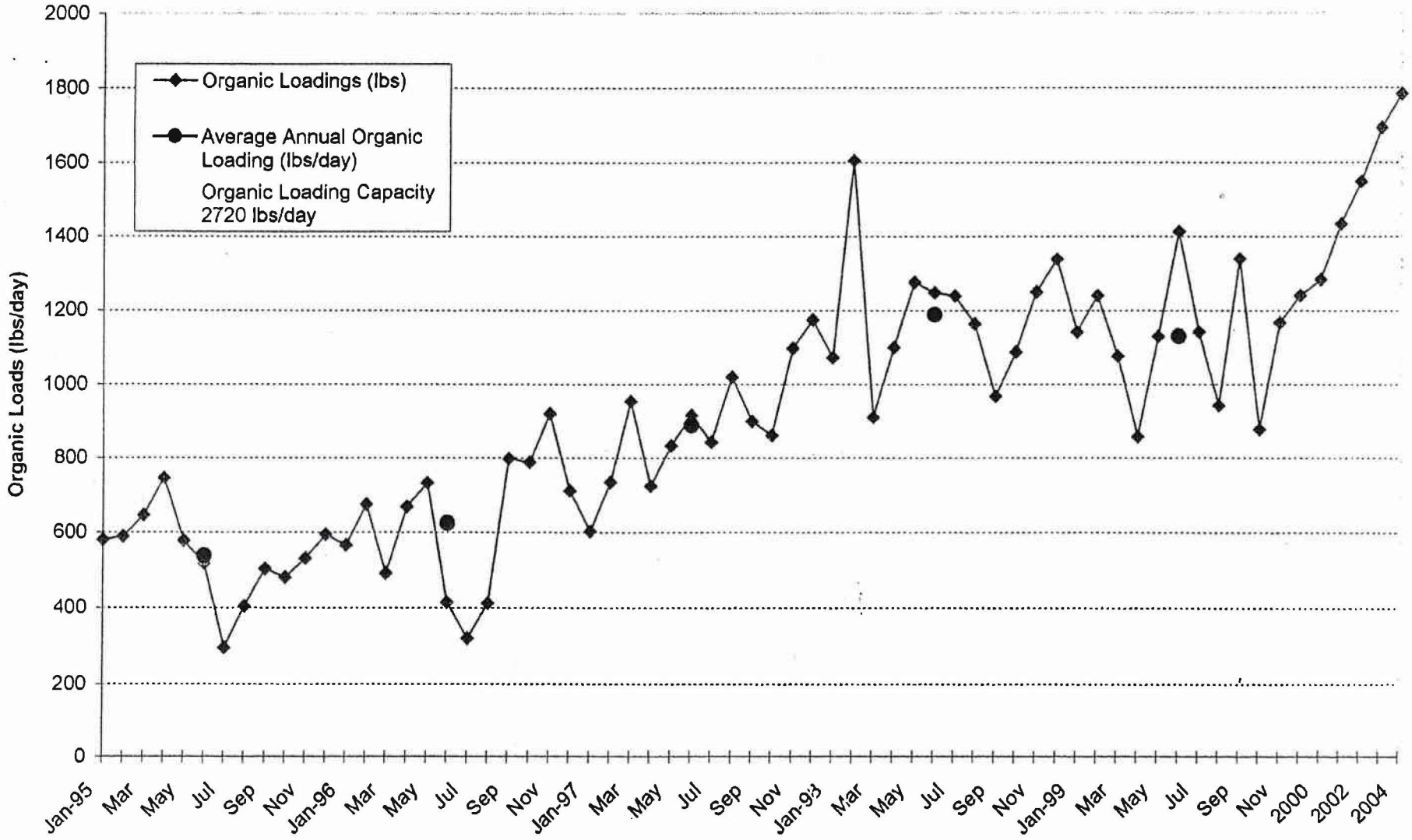
TABLE 5
FIVE YEAR ORGANIC LOADING PROJECTIONS

YEAR	TOTAL NEW EDUs	TOTAL EDUs	AVERAGE DAILY LOAD FROM NEW EDUs	TOTAL AVERAGE DAILY ORGANIC LOADING
1999	---	4478	---	1130
2000	651	5129	163	1282
2001	600	5729	150	1432
2002	457	6186	114	1547
2003	584	6770	146	1693
2004	360	7130	90	1783

Note: Based on end-of-year projections.
All loadings in lbs/day.
Source: 1999 Monthly Operator's Reports

FIGURE 2: LIMERICK TOWNSHIP MUNICIPAL AUTHORITY
1999 WASTELOAD MANAGEMENT REPORT
(CHAPTER 94)

HISTORICAL AND PROJECTED ORGANIC LOADINGS



January 1995 through December 2004

Figure 2: Data
Historical and Projected Organic Loadings
1999 Wasteload Management Report (Chapter 94)

Organic Loadings (lbs)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
January	580	566	603	1073	1141	1294	1446	1562	1709	1800
February	588	673	734	1604	1239	1406	1570	1696	1856	1954
March	644	491	952	909	1077	1222	1365	1474	1613	1699
April	744	667	723	1099	857	972	1086	1173	1284	1352
May	578	732	833	1275	1130	1282	1432	1547	1693	1783
June	516	414	914	1247	1412	1602	1789	1934	2117	2230
July	295	320	842.5	1238	1141	1294	1446	1563	1711	1802
August	403	412	1019	1163	941	1068	1192	1288	1409	1484
September	502	797	898	966	1338	1518	1696	1831	2004	2111
October	480	787	861	1088	877	995	1111	1200	1314	1383
November	530	919	1097	1249	1166	1323	1478	1596	1746	1839
December	594	710	1174	1337	1239	1406	1570	1696	1856	1954
Average Annual Organic Loading (lbs)	538	624	888	1187	1130	1282	1432	1547	1693	1783

4.0 INDUSTRIAL WASTEWATER CONTRIBUTIONS

As mentioned previously, the primary source of wastewater contributions is residences. However, there are a few industrial/commercial operations located within Limerick Township that are serviced by public sewer. Although under current regulations the LTMA is not required to implement a Municipal Industrial Pretreatment Program (MIPP), the LTMA must maintain compliance with effluent discharge limitations outlined in its NPDES Permit. To facilitate maintaining this goal, in 1986, the Authority adopted a resolution to regulate the industrial wastewater contributions to the sanitary sewer system. This resolution was amended in 1994, as discussed in previous reports, and enables the LTMA to require all industrial facilities to be permitted, to complete on-site inspections of industrial facilities and to enforce compliance with the standards set in the resolution. A copy of the resolution as amended was submitted as Appendix "C" of the 1994 Wasteload Management Report.

There are four (4) industrial operations within the Township that have been identified by the Authority as having the potential to discharge process wastewater to the treatment plant. These four industrial operations are each classified under the federal pretreatment regulations as Categorical Users. A brief description of each industrial operation is presented below, including an estimate of the wastewater contributed to the sanitary sewer system.

A. Sermatech International, Inc.
The nature of the operations include the application of inorganic finishes to metal components to provide oxidation and corrosion resistance to increase the useful life of the components. This facility discharges an average of approximately 250 gallons per day of pretreated process wastewater to the sewer system.

B. Teleflex, Inc.
This operation is housed in the same building with Sermatech International and includes paint and plasma coatings and heat treating. The estimated process flow from this operation is included in the flow estimation above for Sermatech International.

C. Micro Coax
Micro Coax manufactures semi-rigid coaxial cables and cable assemblies. The estimated process wastewater flow (batch peak) from this operation is approximately 500 gallons per day.

D. Dirty Dawg Brewery

Dirty Dawg Brewery is a microbrewery company which operates twenty-four (24) days a month to produce seven (7) barrels of beer per month. The maximum daily discharge from the operation is 240 gallons per day.

There are no specific problems in the Authority's sewer system or at the treatment plant that are known or suspected to be caused by the industrial operations.

5.0 WASTEWATER TREATMENT PLANT PERFORMANCE

The LTMA's treatment plant consists of four (4) identical pre-engineered treatment units positioned above ground. Each unit is capable of hydraulically handling 0.40 mgd. Currently, three (3) of the above units are in operation. Sludge generated at the treatment plant is removed as liquid and disposed of primarily at the East Norriton - Plymouth Joint Sewer Authority via incineration with the remainder being landfilled at the Berks County Landfill. Sludge disposal for 1999 totaled 1,230,400 gallons, with 924,000 gallons being disposed of through incineration.

The LTMA's NPDES Permit No. PA 0051934 sets standards for conventional pollutants only. The permit also sets monitoring requirements for total residual chlorine and dissolved oxygen. During 1999, the treatment plant operated satisfactorily and within all permit effluent limits, with the exception of one (1) fecal coliform violation in April, one (1) ammonia violation in May and one (1) high suspended solids in October. The annual NPDES compliance inspection completed by PADEP revealed that the treatment plant was operating satisfactorily.

6.0 WASTEWATER COLLECTION SYSTEM

A comprehensive sewer plan which indicates the sewer extensions constructed and put into operation during 1999 is included in Appendix A. Sewer extensions and connections completed during 1999 are summarized below. It should be noted that there are projects currently under construction which will be completed in phases. The sewer extensions and connections described below are relative to the extensions made in 1999 only. Phases of projects that were constructed in previous years are discussed in the Chapter 94 reports for that year and are not included in this summary.

Bradford Woods – Phases 1A and 1B
This project is located off of Township Line Road, north of the Graterford Road intersection. Phases 1A and 1B consisted of seventy-five (75) new homes. Sewage facilities included 7,156 linear feet of eight (8) inch gravity sewer and thirty-nine (39) manholes. The project will be serviced by three (3) pump stations, the first of which was operational in January 2000. These pump stations will discharge to a force main in Township Line Road which eventually connects to the Mingo Creek Interceptor.

Chestnut Pointe
This project is located below Souder Road, between Township Line and Royersford Roads. The project consisted of one hundred and ninety-four (194) apartments. Sewage facilities included 3,385 linear feet of eight (8) inch gravity sewer and twenty-three (23) manholes. The project discharges to Pump Station 6A.

Faircrest Farm - Phases I and II
This project is located on Sunset Road between Graterford and Limerick Roads. Phases I and II consisted of fifty-eight (58) new homes. Sewage facilities included 6,086 linear feet of eight (8) inch PVC gravity sewer, 216 linear feet of DI gravity sewer and twenty-eight (28) manholes. This project discharges to Pump Station #11 (Wayside).

Golf Ridge – Phase III
This project is located off of Limerick Center Road to the east of the intersection of Ridge Pike. Phase III consisted of thirty-nine (39) new homes. Sewage facilities for this project included 1,295 linear feet of eight (8) inch gravity sewer and ten (10) manholes. The gravity sewer from this project connects to the Landis Creek Interceptor at Manhole A147 which discharges to Pump Station #3.

Harleysville Bank
This project is located on Linfield Road, just east of the intersection of Lewis Road. This is the site of one of the privately owned pump stations within the LTMA's service area. This project consisted of the installation of a thirty-one (31) gallon per minute grinder pump station and approximately 390 linear feet of one and one half (1 ½) inch PVC force main. This force main connects to the existing sanitary sewer system at Manhole #291 in Lewis Road.

Limerick Village – Phase IV
The project site is located off of Ridge Pike near Limerick Center Road. Sewage facilities constructed for this phase of the project included 1,570 linear feet of eight (8) inch sanitary sewer and fourteen (14) manholes. This project connects to the existing sewer system via an eight (8) inch gravity main along Ridge Pike.

Linfield Knoll – Phases II and III
This project is located just south of the intersection of Ferndale Lane and Main Street along the west side of Main Street. Phases II and III consisted of the construction of seventy-five (75) new town homes. Sewage facilities for this project consisted of 1,984 linear feet of eight (8) inch gravity sewer and thirteen (13) manholes. The project connects to the Pump Station #5 Interceptor at Manhole 303.

Links at Springford – Phase II
This project is located on the north side of West Cherry Lane. This phase of the project consisted of thirty-three (33) new homes. Sewage facilities for this project included 864 linear feet of eight (8) inch gravity main and four (4) manholes. This project ultimately discharges to Pump Station #8.

Mingo Creek Interceptor
The Mingo Creek Interceptor generally follows Mingo Creek. The interceptor begins at Ridge Pike where it collects sewage from the Township Line Road gravity main and a portion of Ridge Pike, then continues south where it crosses Linfield Trappe Road. At this point the interceptor runs parallel to Royersford Road to its end point at Pump Station #6A. Sewage facilities included 455 linear feet of eight (8) inch collector lines, 4,951 linear feet of twelve (12) inch gravity sewer, 3,412 linear feet of fifteen (15) inch gravity sewer, 767 linear feet of sixteen (16) inch ductile iron gravity main and fifty-three (53) manholes.

North Limerick Road
This project is located along North Limerick Road and included provisions for the connection of nine (9) existing homes to public sanitary sewer service. Sewage facilities for this project included 1,443 linear feet of eight (8) inch gravity sewer and five (5) manholes. The project connected to Manhole 234C and flows to Pump Station #2.

Summer Chase
This project is located along Ridge Pike just east of the Limerick Center Road intersection. This project consisted of the construction of 198 apartments. Sewage facilities for this project included 3,500 linear feet of eight (8) inch gravity sewer and fourteen (14) manholes. This project joins a section of main from the Golf Ridge Subdivision which connects to the existing system at Manhole A147.

Township Line Road
This project is located along Township Line Road, north of Ridge Pike. This project was deigned to accept flows from the Bradford Woods Subdivision and to connect existing homes along the Limerick Township side of Township Line Road. Sewage facilities for this project included approximately 4,135 linear feet of twelve (12) inch gravity sewer main and thirteen (13) manholes. This project connects with the Mingo Creek Interceptor just south of the intersection of Ridge Pike and Township Line Road.

University of Pennsylvania Medical Center
This project is located on Linfield Road, just east of the intersection of Lewis Road. This is the site of one of the privately owned pump stations within the LTMA's service area. This project consisted of the installation of an approximately thirty (30) gallon per day grinder pump station and approximately 935 linear feet of two (2) inch PVC force main. This force main connects to the existing sanitary sewer system at Manhole #291 in Lewis Road.

Walnut Farms
This project site is located along Royersford Road above Buckwalter Road. The project consisted of forty-two (42) new homes. Sewage facilities included fourteen (14) linear feet of twelve (12) inch gravity sewer, 5,027 linear feet of eight (8) inch gravity sewer and nineteen (19) manholes. The project discharges to Pump Station 6A.

7.0 WASTEWATER PUMPING STATIONS

There are ten (10) Authority owned pump stations throughout the Township and one (1) Developer owned pump station; Pump Station #11 (Wayside). This station will ultimately be offered to the Authority for dedication. This process is currently underway.

During 1999 an upgrade was performed on Pump Station #6A. This upgrade resulted in an increased capacity of 2,225 gallons per minute. At Pump Station #2 (which has a rated capacity of 100 gpm), construction is currently underway to expand the facility. Based on an evaluation of this pump station by Gilmore & Associates, Inc., it was determined that this station should be upgraded to achieve a capacity of approximately 130 to 140 gpm.

Presently an Act 537 Plan Revision is underway for the area tributary to the treatment plant. The preliminary pump station calculations included in this revision indicate that some of the pump stations may face an overload situation due to the projected flows from proposed development over the next five (5) years. However, these overload situations are dependent upon the alternatives selected in the Act 537 Plan Revision.

Data relative to the current flows at each pump station for 1999, including the developer owned station, based on drawdown rates and clock run times associated with the respective pump capacities are presented in Table 6, Pumping Station Data. The use of this data is confined to estimating future capacity limitations and is not considered the sole basis for purposes of design. A description of each pump station is included below.

Pump Station #1

This pump station is located near Jones Boulevard in the Limerick Airport Business Center and is equipped with two (2) submersible pumps, each with a rated capacity of 142 gpm. Wastewater is discharged through a six (6) inch force main which ties into the existing sewer at Manhole A109.

Pump Station #2

This pump station is located on North Limerick Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 100 gpm. Wastewater is discharged through a four (4) inch force main which ties into the existing sewer at Manhole 229. Construction is currently underway to upgrade this pump station to 130 gpm.

Pump Station #3
This pump station is located on South Limerick Road and is equipped with two (2) submersible pumps, each with a rated capacity of 1,150 gpm. Wastewater is discharged through a twelve (12) inch force main which ties into the existing sewer at Manhole A107.

Pump Station #4
This pump station is located on Major Hollow Road and is equipped with two (2) submersible pumps, each with a rated capacity of 80 gpm. Wastewater is discharged through a four (4) inch force main which is manifolded into an eighteen (18) inch force main from Pump Station #5.

Pump Station #5
This pump station is located near Trinley Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 1,900 gpm. Wastewater is discharged through an eighteen (18) inch force main which ties into the existing sewer system at Manhole A16.

Pump Station #6A
This pump station is located northeast of Route 422 and Royersford Road. The station is equipped with two (2) dry pit non-clog sewage pumps, each with a rated capacity of 2,225 gpm. Wastewater is discharged through a sixteen (16) inch force main to the LTMA wastewater treatment plant.

Pump Station #7
This pump station is located on King Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 260 gpm. Wastewater is discharged through a four (4) inch force main which is manifolded into the sixteen (16) inch force main to the LTMA wastewater treatment plant.

Pump Station #8
This pump station is located near the intersection of Reed Road and West Cherry Lane. This pump station was upgraded during 1998. The station is currently equipped with two (2) suction lift pumps, each with a rated capacity of 205 gpm. Wastewater is discharged to a four (4) inch force main that conveys the sewage to existing Manhole A113 in West Cherry Lane.

Pump Station #9
This pump station is located on Neiffer Road and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 200 gpm. Wastewater is discharged through a four (4) inch force main which ties into the gravity sewer system servicing the Fox Ridge Development.

Pump Station #10

This pump station is located on Ridge Pike and is equipped with two (2) submersible pumps. Each pump has a rated capacity of 180 gpm. This pump station became operational in October 1998. Wastewater is discharged to a six (6) inch force main which connects to an eight (8) inch gravity sewer at Manhole A206, approximately ¼ mile east of the intersection of Limerick Road and Ridge Pike, which conveys sewage to the existing Pump Station #3.

Pump Station #11 (Wayside)

This pump station is located in the Wayside Development and is equipped with two (2) submersible pumps, each with a rated capacity of 90 gpm. This pump station became operational on December 23, 1998. Wastewater is discharged through a four (4) inch force main which ties into The Fields subdivision. Dedication activities for this pump station are currently underway.

Each pump station (except Pump Station 11) is inspected weekly and necessary maintenance is performed by the Authority personnel or service contractors. To date, each station is operating within its capacity. The Authority's routine preventive maintenance program continues to prevent extensive repair and should continue to do so in the future.

APPENDIX G

REVIEW AGENCY COMMENTS AND MUNICIPAL RESPONSES

99-721

Pennsylvania Department of Environmental Protection

Lee Park, Suite 6010
555 North Lane
Conshohocken, PA 19428

APR 05 2001

Southeast Regional Office

610-832-6130
Fax: 610-832-6133

Edward J. Fink, Manager
Limerick Township
646 W Ridge Pike
Limerick, PA 19468

Re: Act 537 Plan Update
APS Id. 341847, AUTH Id. 349826
Limerick Township
Montgomery County

Dear Mr. Fink:

We have completed our review of your municipality's updated official sewage facilities plan entitled Act 537 Sewage Facilities Plan Revision as prepared by Gilmore & Associates, Inc., dated July, 2000, revised February 28, 2001 and March 9, 2001. The review was conducted in accordance with the provisions of the Pennsylvania Sewage Facilities Act.

Approval of the plan is hereby granted. This approval provides for the following:

1. The expansion of the Township's King Road sewage treatment plant from its current capacity of 1.6 MGD to a capacity of 1.7 MGD. This expansion will provide for the sewage disposal needs of the plant's service area, as depicted on Figure 1A, for a 10-year planning period.

2. The conversion of the King Road sewage treatment plant from an extended aeration process to a sequencing batch reactor process, as described on page 33 and Figure 8 of the plan.

3. The relocation of the King Road sewage treatment plant's outfall to the Schuylkill River, as shown on Figure 8 of the plan.

This planning approval does not relieve the project sponsor of the responsibility to secure a Department permit for the construction and operation of the proposed facility.

This approval is specifically made contingent upon the applicant acquiring all necessary property rights by easement of otherwise, providing for the satisfactory construction, operation, maintenance, and replacement of all sewerage structures associated with the approved discharge in, along, or across private property, with full rights of ingress, egress and regress.

If you have any questions, please contact Elizabeth Mahoney of this office at 610-832-6079.

Sincerely,

James Newbold, P.E.
Regional Manager
Water Management

cc: Montgomery County Planning Commission
Montgomery County Health Department
Ms. Frankel
Mr. Rosenthal
Ms. Mahoney
Ms. Moore
Ms. Grant
Planning Section
Re 30

MONTGOMERY COUNTY PLANNING COMMISSION
Box 311 • Norristown • Pennsylvania • 19404-0311 • (610) 278-3722
Office Location: Suite 201 • One Montgomery Plaza • Swede & Airy Streets • Norristown PA
Fax (610) 278-3941 • Website www.montcopa.org/plancom

SEWAGE FACILITIES PLANNING MODULE
COMPONENT 4b - COUNTY PLANNING AGENCY REVIEW

DEP project number: N/A
MCPC 537 project number: 00-1484
Limerick Township Act 537 Plan Update
Date revision received by the
County Planning Commission: 7/21/00

September 5, 2000

Mr. Edward J. Fink
Limerick Township Manager
646 W. Ridge Pike
Limerick, Pennsylvania 19468

Dear Mr. Fink:

We have reviewed this application for an update to the Township's Sewage Facilities Plan in accordance with regulations issued under Act 537, "The Pennsylvania Sewage Facilities Act," as requested. We are forwarding this letter as a report of our review and recommendations.

BACKGROUND

The central and southeastern sections of Limerick Township have a public sewer system that includes a sewage treatment plant located along the Schuylkill River. This treatment plant is currently rated at 1.6 MGD. This 537 Plan Revision involves the expansion of the existing treatment plant to a proposed rating of 1.7 MGD.

Growth pressure in Limerick Township is strong. Since 1998, an average of 500 new EDUs per year have been connected to the system. Limerick Township Municipal Authority uses a flow figure of 250 gpd/EDU. The current plant rating of 1.6 MGD would therefore allow for a maximum of 6400 EDUs to be hooked into and treated at the plant. Although not all yet connected, these available EDUs have all been allotted to various projects. The need to provide additional capacity for potential failing on-lot systems and any future development has prompted the application for the expansion.

COMMENTS/ISSUES

EDU Contribution Rate: As part of this study for the plant expansion, the EDU figure (250 gpd/EDU) was re-evaluated. This plan revision proposes that 210 gpd/EDU may be a more accurate flow contribution number. Although the adjusted flow capacity per EDU of 210 gpd/EDU may be justifiable, we feel this number should be re-evaluated once the expansion is on-line. The average household size for Limerick Township, based on both 1990 Census data and 1997 DVRPC Estimates, is 2.7 people. Assuming an average daily usage of 80 gallons/day/person results in a flow rate somewhat higher than that proposed (216 gpd/EDU). Additionally, data from a wetter year (possibly the year 2000) may result in the need to increase this flow rate.

Several options to expand the plant, including a no action alternative, were reviewed. The chosen alternative, Option 2, involves modifications to the existing facility to provide for a sequencing batch reactor process. In addition to being economically favorable this option would allow for a low-cost expansion beyond the 1.7 MGD should the EDU contribution reach 250 gallons per day/EDU or the requests for EDUs exceed projections.

Relocated Discharge: We support the recommendation by the consulting engineer to relocate the treatment plant discharge pipe from an unnamed tributary to the Schuylkill River directly to the river itself. The assimilative capacity of the Schuylkill River far exceeds that of the tributary; this relocation should therefore provide water quality benefits while enabling the LTMA to meet the more stringent NPDES permit requirements.

Property Acquisition: Adequate buffering between sewage treatment plants and residential areas and sufficient space for expansion are key issues troubling many municipal authorities. We therefore encourage the LTMA to pursue the acquisition of adjacent land, as recommended by the consulting engineer, as a preventative measure.

RECOMMENDATION

Beyond the EDU contribution rate, we have not identified any land use issues or sewer planning concerns of significance and therefore have no objections to this plan revision provided it is in accordance with all applicable DEP rules and regulations

Sincerely,

Monica Tarantino

Monica S. Tarantino
Environmental Planner

Montgomery County Planning Commission
Courthouse
Norristown, PA 19404 (610) 278-3750

cc: Glenn Stinson, DEP
Stuart L. Rosenthal, PE, Gilmore & Associates, Inc.

Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093

December 6, 2000

Beth Abramovitz
Gilmore & Associates, Inc.
350 Butler Avenue
New Britain, PA 18901

TO EXPEDITE REVIEW USE
BHP REFERENCE NUMBER

Re: File No. ER 2001-0375-091-A
DEP ACT 537 Program: ACT 537 Plan Revision, ACT 537 Plan Revision, Limerick Twp., Montgomery Co.

Dear Ms. Abramovitz:

The Bureau for Historic Preservation has reviewed the above named project under the authority of the Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988). This review includes comments on the project's potential effect on both historic and archaeological resources.

MORE INFORMATION IS NEEDED

We are unable to proceed with our review until the additional information on the attached sheet is provided.

If you need further information regarding archaeological survey please contact Mark Shaffer at (717) 783-9900. If you need further information concerning historic structures please consult Ann Safley at (717) 787-9121. If you need a **status only** of the reviewed project please call Tina Webber at (717) 705-4036.

Sincerely,

Kurt W. Carr, Chief
Division of Archaeology & Protection

Attachment

CC: DEP, Southeast Region
KWC/lmm

ER # 01-0375-091-A

PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
BUREAU FOR HISTORIC PRESERVATION: INFORMATION REQUEST FORM

Please submit the items checked:

( ) A. FUNDING/PERMITTING/LICENSING/APPROVAL PROGRAM
1. Name of federal/state/local agency (please identify all agencies involved)
2. Type of involvement(funding/permit/license/approval)
3. Name of Program (CDBG, HUD, Sewer Module, etc.)
4. Name/address of office at which application has been/will be filed.

B. PROJECT DESCRIPTION: Narrative description of assisted and related work including:
( ) Size of project (number of buildings, units, stories, acres)
( ) Use or purpose
( ) Extent and nature of ground disturbing activities (i.e. trenching, grading, foundation excavation, etc.)
(X) Annotated Site map/plan showing proposed ground disturbance
( ) Architectural plans/specifications
( ) Development plans showing existing conditions and proposed new construction
(X) Please explain how buildings of 50 years or older will be affected by project

PHOTOGRAPHS (3" X 5") showing:
( ) Exterior of buildings in project area
( ) Interior of buildings in project area
( ) Buildings over 50 years old in project area keyed to a site plan or U.S.G.S. quadrangle map
( ) Buildings over 50 years old surrounding the project area keyed to a site plan or U.S.G.S. quadrangle map
( ) Streetscapes near project area

The map you provided shows the entire township — we're not sure where the proposed ground distur will take pl please identi the locatio of the 0.9 acres to be disturb preferably on a U.S.G.S. quadran map.

Thank you

C. PROJECT LOCATION

( ) U.S.G.S. 7.5 min. series (topographic) quadrangle with the PROJECT LOCATION(S) AND LIMITS CLEARLY MARKED using colored pen. Please include name of quadrangle.
( ) Street map (for projects in populated areas)
( ) Street map showing project location and historic district boundaries
( ) acreage of project area
( ) miles/feet of project and right-of-way width
( ) street address of property

D. PROJECT SITE

( ) Supply brief history/use of buildings/property, including historic names/dates for the property.
( ) Describe all buildings on the site using the BHP Historic Resource Form
( ) Floor plans of building
( ) Other: _____

( ) PLEASE EXPLAIN HOW THESE BUILDINGS WILL BE ~~AFFECTED~~ BY THE PROJECT. IF THE BUILDINGS ARE TO BE RETAINED, PLEASE SUBMIT A COPY OF THE DEVELOPMENT PLAN

Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093

January 8, 2001

Beth Abramovitz
Gilmore & Associates, Inc.
350 Butler Avenue
New Britain, PA 18901

TO EXPEDITE REVIEW USE
BHP REFERENCE NUMBER

Re: File No. ER 2001-0375-091-B
DEP ACT 537 Program: Act 537 Revision-Response to Comments, Limerick Township Municipal Authority, Limerick Twp., Montgomery Co.

Dear Ms. Abramovitz:

The Bureau for Historic Preservation has reviewed the above named project under the authority of the Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988). This review includes comments on the project's potential effect on both historic and archaeological resources.

Thank you for submitting the additional information for the above referenced project. Based on this supplemental information it is our opinion that no cultural resource surveys are necessary for this project. Your cooperation in dealing with this matter is appreciated.

If you need further information in this matter please consult Mark Shaffer at (717) 772-0924. If you need a **status only** of the reviewed project please call Tina Webber at (717) 705-4036.

Sincerely,

Kurt W. Carr, Chief
Division of Archaeology & Protection

KWC/lmm

COUNTY OF MONTGOMERY
COMMISSIONERS
MICHAEL D. MARINO, ESQ.
CHAIRMAN
JAMES R. MATTHEWS RUTH S. DAMSKEI

DIRECTOR
ROBERT GAGE
TEL: (610)-278-5117
FAX: (610)-278-5167
TDD: (610)-631-1211

DEPARTMENT OF HEALTH
MONTGOMERY COUNTY HUMAN SERVICES CENTER
1430 DeKALB STREET
P.O. BOX 311
NORRISTOWN, PENNSYLVANIA 19404-0311

October 18, 2000

Stuart L. Rosenthal
Gilmore & Associates
350 Butler Ave
New Britain, PA 18901

RE: Limerick Act 537 Revision, July 2000
Limerick Township, Montgomery County

Dear Mr. Rosenthal:

The Montgomery County Health Department (MCHD), has reviewed the Act 537 Plan Revision including the Upper Brooke Evans and Possum Hollow areas in Limerick Township, Montgomery County.

MCHD has no objections to the proposed revision of the Limerick Township Act 537 plan..

Please contact me at 610-970-5040 if you have any questions.

Sincerely,

Eugene M. Evanna

Eugene M. Evanna
Environmental Health Specialist
Division of Water Quality Management
Eevanna@mail.montcopa.org

cc: Department of Environmental Protection
Limerick Township
Linda Salvati, Field Supervisor
File

APPENDIX H

PROOF OF PUBLICATION OF PUBLIC NOTICE

The Mercury
A PULITZER PRIZE WINNING NEWSPAPER
24 N. HANOVER ST., POTTSTOWN, PA 19464
PHONE: (610) 323-3000

LEGAL ADVERTISING

INVOICE NO. 00044161
ACCT # 6000014

CLASSIFICATION
610-495-6432 20

LTMA

LIMERICK TOWNSHIP
BOARD OF SUPERVISORS
646 WEST RIDGE PIKE
LIMERICK, PA 19468

PAYMENT DUE UPON RECEIPT OF INVOICE

INVOICE DATE 8/14/00

8/10/00	8/10/00	LEGAL NOTICE Notice is he reby given that the	95	1	95	TLEG	99.75
		MER					
		FIRST NOTICE					

P.O. NO.

cc: Proof ✓
ACT 537 FILE

SEWAGE FACILITY PLAN

PROOF CHARGES 7.00

PREPAID AMOUNT

2000 proof file

THE MERCURY

Publishers of The Mercury, The Penny Pincher and Real Estate Today

PROOF OF PUBLICATION OF NOTICE

Under Act No. 587, Approved May 6, 1929

STATE OF PENNSYLVANIA
COUNTY OF MONTGOMERY SS:

Mary Ann Edleman, of The Mercury, of the County and State aforesaid, being duly sworn, deposes and says that THE MERCURY, a newspaper of general circulation published at 24 N. Hanover Street, Borough of Pottstown, County and State aforesaid, was established September 29, 1931 since which time, The Mercury has been regularly issued in said County, and that the printed notice of publication attached hereto is exactly the same as printed and published in the regular editions and issues of the said THE MERCURY on the following dates; viz.

August 10, 2000

Affiant further deposes that he/she is duly authorized by Dennis Pfeiffer, Publisher of said MERCURY, a newspaper of general circulation, to verify the foregoing statement under oath, and affiant is not interested in the subject matter of the aforesaid notice of advertisement, and that all allegations in the foregoing statements as to time, place and character of publication are true.

LEGAL NOTICE

Notice is hereby given that the Limerick Township Board of Supervisors will consider for adoption a revision to the Limerick Township Act 537 Sewage Facilities Plan at their regular meeting on September 19, 2000 commencing at 7:00 p.m. at the Limerick Township Administration Building, Montgomery County, Pennsylvania. The Act 537 Plan Revision includes generally the eastern, southern and central portions of the Township and contains all or part of the Landis Creek, Upper Study Area, Lower Study Area, Southeast, Upper Brooke Evans, Pump Station #5 and, Pump Station #7 drainage areas.

The Sewage Facilities Plan for the area was originally adopted by the Limerick Township Board of Supervisors in May 1992 and approved by the PA Department of Environmental Resources in September 1993. This revisions proposes the expansion of the existing wastewater treatment plant from 1.5 mgd to 1.7 mgd to incorporate the sewage disposal needs of the existing Act 537 Plan area.

A public comment period will extend for thirty

Mary Ann Edleman
Mary Ann Edleman, Classified Manager

Sworn to and subscribed before me this 10th day of August, 20 00

Cindy L Eisenhauer
Notary Public

Notarial Seal
Cindy L Eisenhauer, Notary Public
Pottstown Boro, Montgomery County
My Commission Expires Feb. 1, 2001
Member Pennsylvania Association of Notaries

LEGAL NOTICE

Notice is hereby given that the Limerick Township Board of Supervisors will consider for adoption a revision to the Limerick Township Act 537 Sewage Facilities Plan at their regular meeting on September 22, 2000 commencing at 7:00 p.m. a the Limerick Township Administration Building, Montgomery County, Pennsylvania. The Act 537 Plan Revision includes generally the eastern, southern and central portions of the Township and contains all or part of the Landis Creek, Upper Study Area, Lower Study Area, Southeast, Upper Brooke Evans, Pump Station #5 and Pump Station #7 drainage areas.

The Sewage Facilities Plan for this area was originally adopted by the Limerick Township Board of Supervisors in May 1992 and approved by the PA Department of Environmental Resources in September 1993. This revisions proposes the expansion of the existing wastewater treatment plant from 1.6 mgd to 1.7 mgd to incorporate the sewage disposal needs of the existing Act 537 Plan area.

A public comment period will extend for thirty (30) days from the date of publication of this notice. The proposed Act 537 Plan Revision can be viewed at the Limerick Township Administration Building at 646 West Ridge Pike, Limerick Pennsylvania during regular business hours. Written comments may be directed to: The Limerick Township Board of Supervisors, 646 West Ridge Pike, Limerick, PA 19468.

Limerick Township Board of Supervisors

APPENDIX I

WRITTEN PUBLIC COMMENTS AND MUNICIPAL RESPONSES

C: 9/18/00 BOS Agenda

ARCHDIOCESE OF PHILADELPHIA

SECRETARIAT FOR TEMPORAL SERVICES
222 North Seventeenth Street • Philadelphia, Pennsylvania 19103-1299 • (215) 587-4540 • Fax (215) 587-0512

REAL ESTATE OFFICE

August 18, 2000

Board of Supervisors
Limerick Township
646 West Ridge Pike
Limerick, PA 19468

Attention: Karen Willman

RE: Swamp Pike & Neiffer Road, Limerick Township

Dear Ms. Willman:

I am the Director of Real Estate for the Archdiocese of Philadelphia. The Archdiocese of Philadelphia has signed an agreement of sale to purchase a 24 acre parcel of ground at the Northeast corner of Swamp Pike and Neiffer Road in Limerick Township. We expect to settle on this property within the next sixty (60) days. This site will be used for the relocation of St. Clare's Parish, currently located in Linfield, PA. We will require 15 EDU's to serve the Church, School and Rectory which will be eventually located on this site. We would appreciate it very much, if you would incorporate our needs in your 537 application.

If you need any additional information, please do not hesitate to contact me.

Thank you for your assistance in this matter.

Sincerely,

Eugene F. Brazil, Esquire
Director

ef

S. G. Souder Builders, Inc.

August 14, 2000

LIMERICK TOWNSHIP
646 W. Ridge Pike
Limerick, PA 19468

RE: Neiffer Woods--52+- Acres of Land Located in the R-3 Residential Zoned District. The w/s of Neiffer Rd. bet. Ridge & Swamp Pikes
Limerick Township, Montgomery County
Owner of Record: Patel, Ragesh R. & Amita R.
Equitable Owner: S. G. Souder Builder's Inc.

To Whom It May Concern:

S.G. Souder Builders, Inc. is the equitable owner of the above captioned property presently owned by Ragesh and Amita Patel. On May 23, 2000 a sketch plan was presented to your planning commission for review and comment. In attendance at this meeting was our counsel Robert Brant, Esquire, Mr. Patel and John Backenstose from Bursich Associates. Prior to our planning commission meeting we had attended a staff meeting. On August 8, 2000 we attended our second staff meeting regarding this property.

At the present time , Limerick Township is in a 537 review period for Limerick Municipal Authority's King Road plant expansion and the new Possum Hollow facility. The Patel tract is not within Limerick Township's present 537 boundary.

It has come to our attention that adverse , on site sewer problems exist in areas along Fruitville and Faust Roads just to the west. Our understanding is that if not corrected, these conditions will produce not only adverse health conditions but the potential for unsaleable properties.

We are requesting the supervisors of Limerick Township to consider the inclusion/amendment of the Patel/Ross tract and adjoining malfunctioning lots along Faust & Fruitville Roads into the same growth area/537 district at your September board meeting. We realize that are request comes at a time when additional development and growth are of the upmost concern of residents and township officials. However, in light of the 537 review period this would be an appropriate time to consider and evaluate the amendment of this parcel into your 537 district.

The 537 district bounds the Patel/Ross tract on three sides. It is not significantly outside the existing 537 boundary. The inclusion of this parcel and sewering of this area would provide a health, environmental and sale-value benefit to nearby properties. As the developer of the Patel/Ross tract we would be willing to reasonably assist in the accommodation of public sewer into this area.

As previously noted our professionals (engineer- Bursich & Associates and counsel Robert L. Brant Jr. Esq.) will be available to assist in this process.

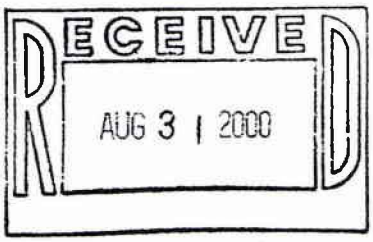
If you have any questions please feel free to call me at 610-935-8280 ext. 361.

Respectfully submitted,

Joseph V. DePaul, CFO
S. G. Souder Builders, Inc.
Country Estate Developers, Inc.

cc: Ragesh Patel
Edward Fink, Township Manage Limerick Township
Robert L. Brant, Esquire
Brad Macy, Bursich Associates
Barbara Frankel, Limerick Municipal Authority

JVD/clm



Ragesh and Amita Patel
32 Rosedale Drive
Pottstown PA 19464
(610) 326-8798
August 29,2000

LIMERICK TOWNSHIP
646 West Ridge Pike
Limerick, PA 19468

RE: 537 Amendments for the
Limerick Township

To Whom It May Concern:

I have learned by attending the township meeting that Limerick Municipal Authority is revising the 537 applications and it is under the Township's review and for the submission to the Department Of Environmental Protection. The plans include expansion of King Road facility and for the conceptual Possum Hollow facility. My property on Neiffer road in Limerick Township is not included in the current or draft revised 537 plans, which is under review by the Limerick Township.

Three sides of my property (Tax parcel # 37-0003267008, 52+ acres) has been bordered by 537 plans and by including the Neiffer Road property, it will help to expedite and correct the septic system problems on Fruitville Pike. Those houses which has been the concerned of the Montgomery County Health Department and also the Department Of Environmental Protection can be connected to a gravity line or a forced main and hook them in to Neiffer Road pumping station which is in front of my property and connected to King Road facility.

At present, I have an agreement of sale with S.G.Souder Builders Inc. for the development of the property as per current R-3 residential zoning. We are requesting the inclusion of the property in 537 amendments and looking forward to work with the Limerick Township. The Developer and myself would entertain any reasonable request Township may have.

Feel free to contact me at my above address and phone number.

Sincerely

Ragesh Patel

CC: Edward Fink, Township Manager Limerick Township
Barbara Frankel, Limerick Municipal Authority
S.G.Souder Builders Inc.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PENNSYLVANIA 19468

ADMINISTRATION
(610) 495-6432
FAX (610) 495-0952
FINANCE (610) 495-5151
CODE ENFORCEMENT/ZONING/PERMITS
(610) 495-0951
PUBLIC WORKS DEPARTMENT
(610) 495-7522
POLICE DEPARTMENT
(610) 495-7909

30 October 2000

Eugene F. Brazil, Esquire
Archdiocese of Philadelphia
222 North Seventeenth Street
Philadelphia, PA 19103-1299

RE: Limerick Township Act 537 Plan Revision

Dear Mr. Brazil:

We have reviewed your comments regarding the Limerick Township Act 537 Plan Revision and inclusion of the twenty-four (24) acre parcel on the northeast corner of Swamp Pike and Neiffer Road in the 537 Plan Area.

As you are aware, this parcel is not currently included in the 537 Plan Area and the township does not plan on expanding the existing boundaries at this time. However, please be advised that when a land development plan is submitted to the township for review, the appropriate planning modules may be submitted for review as well. A determination will be made based on the land development plan and related information provided during the review period as to whether public sewer service for this project will be available.

If you have questions or require any further information, please contact me.

Sincerely,

Edward J. Fink
Township Manager

/ktw

cc: Board of Supervisors
B. Frankel, LTMA
S. Rosenthal, Gilmore & Assoc.
Correspondence
LTMA General
LTMA (King Rd. Exp.)

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PENNSYLVANIA 19468

ADMINISTRATION (610) 495-6432
FAX (610) 495-0952
FINANCE (610) 495-5151
CODE ENFORCEMENT/ZONING/PERMITS (610) 495-0951
PUBLIC WORKS DEPARTMENT (610) 495-7522
POLICE DEPARTMENT (610) 495-7909

30 October 2000

Ragesh and Amita Patel
32 Rosedale Drive
Pottstown PA 19464

RE: Limerick Township Act 537 Plan Revision

Dear Mr. and Mrs. Patel:

We have reviewed your comments and the comments of S.G. Souder Builders, regarding the Limerick Township Act 537 Plan Revision and inclusion of Tax Parcel #37-0003267008 in the 537 Plan Area.

As you are aware, this parcel is not currently included in the 537 Plan Area and the township does not plan on expanding the existing boundaries at this time. However, please be advised that when a land development plan is submitted to the township for review, the appropriate planning modules may be submitted for review as well. A determination will be made based on the land development plan and related information provided during the review period as to whether public sewer service for this project will be available.

If you have questions or require any further information, please contact me.

Sincerely,

Edward J. Fink
Township Manager

/ktw

cc: Board of Supervisors
B. Frankel, LTMA
S. Rosenthal, Gilmore & Assoc.
Joseph V. DePaul, Souder
LTMA General
LTMA (King Rd. Exp.)

APPENDIX J

RESOLUTION OF ADOPTION

LIMERICK TOWNSHIP
RESOLUTION NO. 2000-33

RESOLUTION OF THE SUPERVISORS OF LIMERICK TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA (hereinafter "the municipality").

WHEREAS, Section 5 of the Act of January, 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 for providing 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, Gilmore & Associates, Inc. has prepared a Revision to the Limerick Township Act 537 Sewage Facilities Plan which provides for the expansion of the King Road Wastewater Treatment Plant from a 1.6 mgd treatment plant to a 1.7 mgd treatment plant, and

The alternative of choice to be implemented is identified in the Act 537 Sewage Facilities Plan Revision, Limerick Township, Montgomery County, Pennsylvania dated July, 2000 as Option No. 2. This option involves the modification of the existing wastewater treatment facilities to provide for a sequencing batch reactor (SBR) process. The plant will receive flow from the eastern portion of the Township only, with all areas being within the Act 537 Plan boundary set in 1997. The modifications to the existing treatment plant would also include a new headworks facility to allow for removal of screenings and grit from the wastewater flow; effluent disinfection via ultraviolet light radiation to eliminate the use of chlorine; sludge dewatering facilities to allow for disposal/utilization options and reduce the cost of off-site disposal/utilization; and an outfall for direct discharge to the Schuylkill River. Ultimately, this option provides for the addition of 1,700 new EDUs to provide sewer service to the remainder of the Study Area and a higher level of effluent treatment. The key implementation activities/dates include:

1.	Township 537 Study Adoption	September 2000
2.	PADEP 537 Study Approval	January 2001
3.	Part 1 NPDES Application Submission	January 2001
4.	PADEP Part 1 NPDES Approval	May 2001
5.	Part 2 Water Quality Management Application Submission	October 2001
6.	PADEP Part 2 Water Quality Management Approval	January 2002
7.	Bid Document Issuance	February 2002
8.	Construction Contracts Award	April 2002
9.	Construction Completion / Start-up	September 2003

WHEREAS, Limerick 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 Limerick hereby adopt and submit to the Department of Environmental Protection for its approval as a revision 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).

Adopted this 17th day of October, 2000.

LIMERICK TOWNSHIP
BOARD OF SUPERVISORS

ATTEST:

Karen T. Willman

I, Karen T. Willman Secretary, Limerick Township Board of Supervisors, hereby certify that the foregoing is a true copy of the Township's Resolution No. 2000-33, adopted 17 October, 2000.

AUTHORIZED SIGNATURE

Karen T. Willman
Twp. Secretary

TOWNSHIP SEAL

APPENDIX K

DEPARTMENT OF ENVIRONMENTAL PROTECTION INSTRUCTIONS FOR COMPLETING ACT 537 PLAN CONTENT AND ENVIRONMENTAL ASSESSMENT CHECKLIST

Commonwealth of Pennsylvania
Department of Environmental Protection
Bureau of Water Quality Protection

ACT 537 PLAN CONTENT AND ENVIRONMENTAL ASSESSMENT CHECKLIST

For specific details covering Act 537 planning requirements, refer to Chapters 71 and 73 of the Department's Regulations.

Municipality: Limerick Township **County:** Montgomery

Local Municipal Contact Official: Barbara P. Frankel

Telephone Number of Official: (610) 948-1033

Consultant: Gilmore & Associates, Inc.

Consultant's Telephone Number: (215) 345-4330

Consultant's Contact Person: Stuart L. Rosenthal, P. E.

Title of Submission: Vice President

Date Submitted: November 6, 2000

About this checklist . . . . .

* **DEP publication 3640-BK-DER1480 11/92, "A Guide For Preparing Act 537 Update Revisions -- November 1992", is obsolete. Do not use checklist pages from that publication.**

* **You must complete and attach this checklist when you submit the Plan to the Department for review and approval.**

* **This checklist is composed of two parts, one for Administrative Completeness and one for General Plan Content. A Plan must be "administratively complete" in order to be formally reviewed and approved by the Department. The General Plan Content checklist identifies each of the issues which must be addressed in your Act 537 Plan Update based on a pre-planning meeting between you and/or your consultant and the Department. The Administrative Completeness checklist is found on Pages I-16. The General Content checklist is found on Pages I-17 through I-27. PENNVEST funded or applicant plans must address planning requirements on Page I-28.**

* **You must use the right-hand column blanks in the checklist to identify the page in the Plan on which each planning issue is found or reference a previously approved update or special study (title and page number.)**

* **If you determine a planning issue is not applicable even though it was previously thought to be needed, please explain your decision within the text of the Plan (or as a footnote) and indicate the page number where this documentation is found.**

* **After Municipal Adoption by Resolution, submit three (3) copies of the Plan, any attachments or addenda, and this checklist to the Department.**

GENERAL PLAN CONTENT CHECKLIST

DEP Use Only	Indicate Page #(s) in Plan	Item Required
		I. Previous Wastewater Planning
		A. Identify and briefly analyze all existing wastewater planning that:
_____	Sec. 3.0	1. Has been previously undertaken under the Sewage Facilities Act (Act 537). (Reference-Act 537, Section 5 §d.1)
_____	Sec. 3.0; 6.3.3; 6.3.4; 6.3.5	2. Has not been carried out according to an approved implementation schedule contained in the plans. (Reference-Title 25, §71.21.a.5.i.A-D) Section V.F of the Planning Guide
_____	Sec. 6.3.2; 6.3.4; 6.3.5	3. Is anticipated or planned by applicable sewer authorities. (Reference-Title 25, §71.21.a.5.i.A) Section V.D. of the Planning Guide.
_____	N/A *	4. Has been done through planning modules for new land development, planning "exemptions" and addenda. (Reference-Title 25, §71.21.a.5.i.A).
		B. Identify and briefly summarizes all municipal and county planning documents adopted pursuant to the Pennsylvania Municipalities Planning Code (Act 247) including:
_____	Sec. 4.1 Appendix A,B Figure 3	1. All land use plans and zoning maps which identify residential, commercial, industrial, agricultural, recreational, and open space areas. (Reference-Title 25, §71.21.a.3.iv).
_____	Appendix A,B	2. Zoning or subdivision regulations that establish lot sizes predicated on sewage disposal methods. (Reference-Title 25 §71.21.a.3.iv).
_____	N/A *	3. All limitations and plans related to floodplain and stormwater management and special protection (Ch. 93) areas. (Reference-Title 25 §71.21.a.3.iv) Appendix B, Section II.F of the Planning Guide.
		II. Physical and Demographic Analysis utilizing written description and mapping (All items listed below require MAPS, and all maps should show all current lots and structures and be of appropriate scale to clearly show significant information).
_____	Figure 1-3	A. Identification of planning area(s), municipal boundaries, Sewer Authority/Management Agency service area boundaries. (Reference-Title 25, §71.21.a.1.i).
_____	Figure 1	B. Identification of physical characteristics (streams, lakes, impoundments, natural conveyance, channels, drainage basins in the planning area). (Reference-Title 25, §71.21.a.1.ii).
_____	N/A*	C. Soils - Analysis with description by soil type and soils mapping. Show areas suitable for in-ground on-lot systems, elevated sand mounds, individual residential spray irrigation systems, and areas unsuitable for soil dependent systems. (Reference-Title 25, §71.21.a.1.iii). Show Prime Agricultural Soils and any locally protected agricultural soils. (Reference-Title 25, §71.21.a.1.iii).

*Not applicable/not required as per meeting at DEP, April 7, 1998/ covered by previously approved Act 537 Plan.

DEP Use Only	Plan Page No.	Item Required
	N/A *	B. Using DEP's manual titled "Sewage Disposal Needs Identification Guidance," identify, map and describe areas that utilize individual and community on-lot sewage disposal and, unpermitted collection and disposal systems ("wildcat" sewers, borehole disposal, etc.) and retaining tank systems in the planning area including:
_____	_____	1. The types of systems in use. (Reference-Title 25, §71.21.a.2.ii.A).
_____	_____	2. A sanitary survey complete with a description of documented and potential public health pollution, and operational problems (including malfunctioning systems) with the systems, including violations of local ordinances, the Sewage Facilities Act, the Clean Stream Law or regulations promulgated thereunder. (Reference-Title 25, §71.21.a.2.ii.B).
_____	_____	3. A comparison of the types of on-lot sewage systems installed in an area with the types of systems which are appropriate for the area according to soil, geologic conditions, topographic limitations sewage flows, and Title 25 Chapter 73 (relating to standards for sewage disposal facilities). (Reference-Title 25, §71.21.a.2.ii.C).
_____	_____	4. An individual water supply survey to identify possible contamination by malfunctioning on-lot sewage disposal systems consistent with the DEP Sewage Disposal Needs Identification Guidance manual. (Reference-Title 25 §71.21.a.2.ii.B)
	N/A *	C. Identify wastewater sludge and septage generation, transport, and disposal methods. Include this information in the sewage facilities alternative analysis including:
_____	_____	1. Location of sources of wastewater sludge or septage (Septic tanks, holding tanks, wastewater treatment facilities). (Reference-Title 25 §71.71)
_____	_____	2. Quantities of the types of sludges or septage generated. (Reference-Title 25 §71.71).
_____	_____	3. Present disposal methods, locations, capacities, and transportation methods. (Reference-Title 25 §71.71).

IV. Future Growth and Land Development

A. Delineate and describe the following through map, text and analysis:

_____	Sec. 4.2 Figure 3	1. Areas with existing development or plotted subdivisions. Include the name, location, description, total number of EDU's in development, total number of EDU's currently developed, and total number of EDUs remaining to be developed (include time schedule for EDU's remaining to be developed). (Reference-Title 25, §71.21.a.3.i).
_____	Appendix A	2. Land use designations established under the Pennsylvania Municipalities Planning Code (35 P.S. 10101-11202), including residential, commercial and industrial areas. (Reference-Title 25,§71.21.a.3.ii). Include a comparison of proposed land use as allowed by zoning and existing sewage facility planning (Reference-Title 25, §71.21.a.3.iv).
_____	Sec. 4.2, 4.3	3. Future growth areas with population and EDU projections for these areas using historical, current and future population figures and projections of the municipality. Discuss and evaluate discrepancies between local, county, state and federal projections as they relate to sewage facilities. (Reference-Title 25, §71.21.a.1.iv). (Reference-Title 25, §71.21.a.3.iii).

*Not applicable/not required as per meeting at DEP, April 7, 1998/ covered by previously approved Act 537 Plan.

DEP Use Only	Plan Page No.	Item Required
	N/A *	B. The use of individual sewage disposal systems including individual residential spray irrigation systems based on:
_____	_____	1. Soil and slope suitability. (Reference-Title 25, 71.21.a.2.ii.C)
_____	_____	2. Preliminary hydrogeologic evaluation. (Reference-Title 25, §71.21.a.2.ii.C)
_____	_____	3. The establishment of a sewage management program. (Reference-Title 25, §71.21.a.4.iv). See also Part "F" below.
_____	_____	4. The repair, replacement or upgrading of existing malfunctioning systems in areas suitable for on-lot disposal considering: (Reference-Title 25, §71.21.a.4).
_____	_____	a. Existing technology and sizing requirements of Title 25 Chapter 73. (Reference-Title 25, §73.31-73.72).
_____	_____	b. Use of expanded absorption areas or alternating absorption areas. (Reference-Title 25, §73.16.
_____	_____	c. Use of water conservation devices. (Reference-Title 25, §71.73.b.2.iii).
	N/A *	C. The use of small flow sewage treatment facilities or package treatment facilities to serve individual homes or clusters of homes based on: (Reference-Title 25, §71.64.d).
_____	_____	1. Treatment and discharge requirements. (Reference-Title 25, §71.64.d).
_____	_____	2. Soil suitability. (Reference-Title 25, §71.64.c.l).
_____	_____	3. Preliminary hydrogeologic evaluation. (Reference-Title 25, §71.64.c.2).
_____	_____	4. Agency or other controls over operation and maintenance requirements. (Reference-Title 25, §71.64.d). See Part "F" below.
	N/A *	D. The use of community land disposal alternatives including:
_____	_____	1. Soil and site suitability. (Reference-Title 25, 71.21.a.2.ii.C)
_____	_____	2. Preliminary hydrogeologic evaluation. (Reference-Title 25, 71.21.a.2.ii.C)
_____	_____	3. Controls over operation and maintenance requirements through a Sewage Management Program (Reference-Title 25, 71.21.a.2.ii.C). See Part "F" below.
_____	_____	4. The rehabilitation or replacement of existing malfunctioning community land disposal systems. (See Part V, B, 4, a, b, c above). See also Part "F" below.

*Not applicable/not required as per meeting at DEP, April 7, 1998/ covered by previously approved Act 537 Plan.

DEP Use Only	Plan Page No.	Item Required
	N/A *	G. Non-structural comprehensive planning alternatives that can be undertaken to assist in meeting existing and future sewage disposal needs including: (Reference-Title 25, §71.21.a.4)
		1. Modification of existing comprehensive plans involving:
		a. Land use designations. (Reference-Title 25, §71.21.a.4)
		b. Densities. (Reference-Title 25, §71.21.a.4)
		c. Municipal ordinances and regulations. (Reference-Title 25, §71.21.a.4)
		d. Improved enforcement. (Reference-Title 25, §71.21.a.4)
		e. Protection of drinking water sources. (Reference-Title 25, §71.21.a.4)
		2. Consideration of a local comprehensive plan to assist in producing sound economic and consistent land development. (Reference-Title 25, §71.21.a.4)
		3. Alternatives for creating or changing municipal subdivision regulations to assure long-term use of on-site sewage disposal which consider lot sizes and protection of replacement areas. (Reference-Title 25, §71.21.a.4)
		4. Evaluation of existing local agency programs and the need for technical or administrative training. (Reference-Title 25, §71.21.a.4)
		H. A no-action alternative which includes discussion of both short-term and long-term impacts on: (Reference-Title 25, §71.21.a.4).
	Sec. 6.3.1	1. Water Quality/Public Health. (Reference-Title 25, §71.21.a.4).
	Sec. 6.3.1	2. Growth potential (residential, commercial, industrial). (Reference-Title 25, 71.21.a.4).
	Sec. 6.3.1	3. Community economic conditions. (Reference-Title 25, 71.21.a.4)
	Sec. 6.3.1	4. Recreational opportunities. (Reference-Title 25, §71.21.a.4)
	Sec. 6.3.1	5. Drinking water sources. (Reference-Title 25, §71.21.a.4)
	Sec. 6.3.1	6. Other environmental concerns. (Reference-Title 25, 71.21.a.4)

VI. Evaluation of Alternatives

A. Technically feasible alternatives identified in Section V of this check-list must be evaluated for consistency with respect to the following: (Reference-Title 25, §71.21.a.5.i.A)

	N/A *	1. Applicable plans developed and approved under Sections 4 and 5 of the Clean Streams Law or Section 208 of the Clean Water Act (33 U.S.C.A. 1288). (Reference-Title 25, §71.21.a.5.i.A) Appendix B, Section II.A of the Planning Guide.

*Not applicable/not required as per meeting at DEP, April 7, 1998/ covered by previously approved Act 537 Plan.

DEP Use Only	Plan Page No.	Item Required
_____	Request Pending	11. Historical and archaeological resource protection under P.C.S. Title 37, Section 507 relating to cooperation by public officials with the Pennsylvania Historical and Museum Commission. (Reference-Title 25, §71.21.a.5.i.K) Provide the Department with a completed copy of a Cultural Resource Notice request to the Bureau of Historic Preservation (BHP) to provide a listing of known historical sites and potential impacts on known archaeological and historical sites. Also provide a copy of the response letter from the BHP. Appendix B, Section II.K of the Planning Guide.
_____	Appendix G	B. Provide for the resolution of any inconsistencies in any of the points identified in Section VI.A. of this checklist by submitting a letter from the appropriate agency stating that the agency has received, reviewed, and concurred with the resolution of identified inconsistencies. (Reference-Title 25, §71.21.a.5.ii) Appendix B of the Planning Guide.
_____	_____	C. Evaluate alternatives identified in Section V of this checklist with respect to applicable water quality standards, effluent limitations or other technical, legislative or legal requirements. (Reference-Title 25, §71.21.a.5.iii).
_____	Appendix C	D. Provide cost estimates using present worth analysis for construction, financing, on going administration, operation and maintenance and user fees for alternatives identified in Section V of this checklist. Estimates shall be limited to areas identified in the plan as needing improved sewage facilities within five (5) years from the date of plan submission. (Reference-Title 25, §71.21.a.5.iv).
_____	Sec. 7.0, 8.5	E. Provide an analysis of the funding methods available to finance the proposed alternatives evaluated in Section V of this checklist. Also provide documentation to demonstrate which alternative and financing scheme combination is the most cost-effective; and a contingency financial plan to be used if the preferred method of financing cannot be implemented. The funding analysis shall be limited to areas identified in the plan as needing improved sewage facilities within five years from the date of the plan submission. (Reference-Title 25, §71.21.a.5.v).
		F. Analyze the need for immediate or phased implementation of each alternative proposed in Section V of this checklist including: (Reference-Title 25, §71.21.a.5.vi).
_____	N/A *	1. A description of any activities necessary to abate critical public health hazards pending completion of sewage facilities or implementation of sewage management programs. (Reference-Title 25, §71.21.a.5.vi.A)
_____	N/A *	2. A description of the advantages, if any, in phasing construction of the facilities or implementation of a sewage management program justifying time schedules for each phase. (Reference-Title 25, §71.21.a.5.vi.B)
_____	Sec. 7.0	G. Evaluate administrative organizations and legal authority necessary for Plan implementation. (Reference - Title 25, §71.21.a.5.vi.D.)

*Not applicable/not required as per meeting at DEP, April 7, 1998/ covered by previously approved Act 537 Plan.

DEP Use Only	Plan Page No.	Item Required
_____	Sec. 7.0	D. Identify the chosen institutional alternative for implementing the chosen technical wastewater disposal alternative. Provide justification for choosing the specific institutional alternative considering administrative issues, organizational needs and enabling legal authority. (Reference-Title 25, §71.61.d.2)

VIII. Justification for Selected Technical & Institutional Alternatives

A. Identify the technical wastewater disposal alternative which best meets the wastewater treatment needs of each study area of the municipality. Justify the choice by providing documentation which shows that it is the best alternative based on:

_____	Sec. 8.1	1. Existing wastewater disposal needs. (Reference-Title 25, §71.21.a.6)
_____	Sec. 8.3	2. Future wastewater disposal needs. (5 and 10 years growth areas). (Reference-Title 25, §71.21.a.6)
_____	Sec. 8.4	3. Operation and maintenance considerations. (Reference-Title 25, §71.21.a.6)
_____	Sec. 6.6.6	4. Cost-effectiveness. (Reference-Title 25, §71.21.a.6)
_____	Sec. 6.6.4	5. Available management and administrative systems. (Reference-Title 25, §71.21.a.6)
_____	Sec. 8.5	6. Available financing methods. (Reference-Title 25, §71.21.a.6)
_____	_____	7. Environmental soundness and compliance with natural resource planning and preservation programs. (Reference-Title 25, §71.21.a.6)
_____	Sec. 8.5	B. Designate and describe the capital financing plan chosen to implement the selected alternative(s). Designate and describe the chosen back-up financing plan.