
EXHIBIT P1

LOWER MAKEFIELD TOWNSHIP
ACT 537 PLAN DOCUMENTS (1999 PLAN)

CKS Engineers, Inc.

**TOWNSHIP OF LOWER MAKEFIELD
BUCKS COUNTY, PENNSYLVANIA**

**ACT 537
SEWAGE FACILITIES PLAN UPDATE**

ADOPTED: FEBRUARY 1, 1999

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REF. #2478

**CKS ENGINEERS, INC.
88 SOUTH MAIN STREET
DOYLESTOWN, PA 18901**

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SECTION I

PLAN SUMMARY

The Township of Lower Makefield Act 537 Sewage Facilities Plan Update identifies, analyzes and selects new and/or improved sewage facility alternatives needed to serve the existing and future wastewater treatment needs of the Township. The Plan Update has been prepared in accordance with the Sewage Facilities Planning Guidelines as most recently published by the Pennsylvania Department of Environmental Protection (PA DEP).

The Plan Update is divided into numerous sections for evaluation. This section, Section I, provides a summary of the Plan Update and selected sewerage facility alternatives. Section II provides necessary background information, including the purpose and objective of the Plan Update, as well as a discussion on previous sewerage facilities planning and municipal comprehensive planning. Section III provides a physical description of the Township and Section IV identifies the existing sewerage facilities serving the Township. Section V identifies the sewerage facility needs of the planning area and evaluates alternatives to solve inadequacies in the existing system, as well as public sewer extensions needed to serve on-lot disposal system problem areas. Section V also determines the consistency of the alternatives evaluated with various acts, programs and policies. Section VI discusses the implementation and funding of the alternatives selected.

One of the most important objectives of the Plan Update is to plan for the servicing of all future (large-scale) development by public sewers. Another important objective is to plan for correction of malfunctioning on-lot disposal systems, either through the proper maintenance and upgrade of these systems or extension of public sewers. A benefit analysis, presented in the Plan Update, evaluating these two alternatives, has determined that, for the protection of public health and the environment, as well as consideration of costs, public sewer service should be planned for these areas.

As a result of these objectives, public sewer service has been planned for the entire Township, with the exception of a few scattered parcels which may continue to use on-lot disposal systems.

Based on the projected sewerage facility needs of the Township, inadequacies in the existing sewer system have been identified and alternatives selected to correct these potential problems. These alternatives include increasing the pumping capacity of Black Rock Road Sewage Pumping Station, and potentially increasing the capacity allocated to Lower Makefield Township in their agreement with Yardley Borough.

The Plan Update has also identified areas which are having problems with on-lot disposal systems and proposes public sewer service to be provided to these areas. The problem areas identified in the five-year needs of the Township include: Edgewood Village Historic District and the River Road/Robinson Place area. The problem areas identified in

the ten-year needs of the Township include: Hillside and Spring Lanes area, Delaware Rim Drive and Sunnyside Lane area, West Afton Avenue area, and the Yardley-Newtown Road area near Cultipacker Road.

The cost to implement the selected public sewerage facilities alternatives required to serve the five-year needs of the Township is estimated at \$849,473, based upon present day costs. This estimate includes construction cost, plus contingency, engineering, surveying, inspection and legal/administrative costs for the upgrades needed to solve inadequacies anticipated in the existing sewerage facilities and to serve on-lot disposal system problem areas included in the five-year needs of the Plan Update. Table 5-14 herein details the cost to implement each selected alternative.

Municipal commitments necessary to implement the Plan Update include adoption of the Plan Update, as well as a potential increase in allocated capacity in the Township's current agreement with Yardley Borough.

Implementation of the selected alternatives is projected to be completed within the next five years. A detailed implementation schedule describing the various activities involved in the implementation process is presented in Table 6-1 herein.

Funding for implementation of the selected alternatives is anticipated from several sources. Within planned and future development areas, funding will be provided by developer contributions and/or tapping fees. Within on-lot sewage disposal system areas to be served by public sewers, funding will be through an assessment to property owners. Alternatives for upgrading existing sanitary sewerage facilities to address existing capacity deficiencies that have been identified within the Plan Update will be by means of Sewer Revenue Reserve Funds or General Obligation and Revenue Bonds.

SECTION II

BACKGROUND INFORMATION

2.1 AUTHORIZATION

The Township of Lower Makefield Board of Supervisors and Lower Makefield Township Sewer Authority (hereinafter generally referred to as the "Township") have authorized CKS Engineers, Inc. to prepare an update of the Township's Act 537 Sewage Facilities Plan. A "Pre-Planning" meeting was held with the PA DEP on February 27, 1996 to review the proposed plan of study required for the Plan Update. As a result of this meeting, a Proposed Plan Content Outline was prepared, along with a detailed Task-Activity Report, for submission and approval by PA DEP. This material was sent to the PA DEP on January 17, 1997. The PA DEP approved the submittal by a letter dated February 24, 1997, and the preparation of the plan was initiated. A copy of the PA DEP approved Plan Content Outline pertaining to the Plan Update is contained in Appendix D herein.

2.2 PURPOSE AND OBJECTIVES OF PLAN UPDATE

The purpose of this Plan Update is to comply with the PA DEP Act 537 requirements regarding sewage facilities planning. The Plan Update will identify, analyze and select new and/or improved sewage facility alternatives needed to serve the existing and future wastewater treatment needs of Lower Makefield Township. The selected alternatives will become the foundation for the Official Sewage Plan for the Township and will function as a regulatory plan for resolving wastewater management problems associated with development, and provide guidance for new procedures and ordinances by the Township.

The specific objectives of this plan include the following:

- Address the purpose of a Sewage Facilities Plan described in Section 2.3.1 herein.
- Provide sewage facilities planning consistent with the Lower Makefield Township Comprehensive Plan, 1992.
- Provide sewage facilities planning consistent with Volumes I and II of the Bucks County Wastewater Facilities Plan, 1989 and 1991, respectively.
- Document the changes in wastewater facilities planning since the completion of the Township's Sewage Facilities Plan of 1976.
- Plan for public sewers to be provided to all future large-scale developments.

- Plan for the correction of malfunctioning on-lot disposal systems (OLDS), either through the proper maintenance and upgrade of these systems or extension of public sewers.

2.3 PREVIOUS SEWAGE FACILITIES PLANNING

2.3.1 General

On January 24, 1966, Act 537 (P.L. 1535, as amended, 35 P.S. Section 750.1 et. seq.), known as the Pennsylvania Sewage Facilities Act, became law. The overall intent of the Pennsylvania Sewage Facilities Act is to eliminate existing, and prevent new, environmental health problems and pollution through comprehensive sewage facilities planning and the administration of a program establishing standards for the design and installation of on-lot sewage disposal systems.

A major provision of the Act requires that every municipality in the Commonwealth develop and maintain an up-to-date Sewage Facilities Plan. The Act establishes the requirements for the plan and allows reimbursement of up to one-half the eligible costs incurred in preparing the plan.

The purpose of a municipality's Sewage Facilities Plan is to:

- Protect the health, safety and welfare of the citizens living in the municipality by correcting malfunctioning on-lot septic systems, overloaded treatment plants or sewer lines, and wildcat sewers.
- Prevent future sewage disposal problems from occurring.
- Provide protection for both the groundwater and surface waters of the Commonwealth through coordinating planning for the sanitary disposal of sewage with a comprehensive program of water quality management.

2.3.2 The Bucks County Master Plan for Sewerage Facilities (1960)

The Bucks County Master Plan for Sewerage Facilities of 1960 (1960 County Plan) delineated existing and proposed wastewater treatment facilities and Service Areas throughout the County. With respect to Lower Makefield Township, the 1960 County Plan anticipated the existing Falls Township Sewage Treatment Plant would serve areas of Lower Makefield Township adjacent to Fairless Hills. However, this facility was to be phased out to the proposed Lower Neshaminy Sewage Treatment Plant in the year 2010. The proposed Lower Neshaminy Sewage Treatment Plant would then serve the areas of Lower Makefield Township, among other areas, in the Neshaminy Creek watershed tributary to the plant, as well as the areas formerly discharging to the Falls Township Sewage Treatment Plant. The 1960 County Plan also proposed the existing Morrisville Sewage Treatment Plant to serve portions

of Lower Makefield Township after the year 2010. The areas of Lower Makefield Township to be served by this plant would be in watersheds discharging toward the Delaware River which are tributary to the plant.

2.3.3 Bucks County Sewerage Facilities Plan (1970)

In September 1969, Lower Makefield Township prepared and approved their own sewage facilities plan. This subsequently became part of the 1970 Bucks County Act 537 Plan (1970 County Plan). The 1970 County Plan was an update to the County Master Plan for Sewerage Facilities of 1960.

Contrary to the 1960 Master Plan, the phaseout of the Falls Township Sewage Treatment Plant was not proposed by the 1970 County Plan. The 1970 County Plan proposed that the Falls Township Sewage Treatment Plant serve additional areas in Lower Makefield Township. Flows in excess of the plant's capacity would be diverted to the Bristol Township Sewage Treatment Plant by a proposed extension to the then existing Neshaminy Interceptor. The 1970 County Plan also proposed the construction of the Lower Neshaminy Sewage Treatment Plant by 1980 to serve flows in excess of the Bristol Township Sewage Treatment Plant. In addition, flows in excess of the Lower Neshaminy Sewage Treatment Plant would be served by an expansion of the plant or conveyance to the Northeast Philadelphia Sewage Treatment Plant.

During the period 1960 to 1970, the Morrisville Sewage Treatment Plant was expanded and began accepting sewage from portions of Lower Makefield Township and Yardley Borough. The 1970 County Plan proposed that the expanded plant serve, among others, additional areas in Lower Makefield Township, as well as parts of Upper Makefield Township, by 1980. After 1980, the plant would serve the remaining portions of the Township within the watersheds discharging toward the Delaware River which are tributary to the plant.

2.3.4 Lower Makefield Township Sewerage Facilities Plan (1975)

During the period 1970 to 1975, significant sewer expansion took place in Lower Makefield Township as a result of development activity. Consistent with the 1970 County Plan, the Core Creek Branch of the Neshaminy Interceptor was completed and Morrisville Borough expanded and upgraded their treatment facility. Contrary to the 1970 County Plan, the Lower Neshaminy Sewage Treatment Plant was not constructed and flows were diverted to The City of Philadelphia, Northeast Wastewater Treatment Facility via the Neshaminy Interceptor.

In 1975, Lower Makefield Township completed a sewage facilities plan as an update to their 1969 Plan and the 1970 Bucks County Sewerage Facilities Plan. The plan (1975 Township Plan) was adopted by Lower Makefield Township on July 21,

1975 as its official wastewater facilities plan and currently remains as such.

In general, the 1975 Township Plan recommended the following: construction of a new parallel interceptor from the Dyers Creek Basin along Taylorsville Road to Yardley Borough; discharge of flows from portions of Dyers Creek, Buck Creek and Brock Creek Drainage Basins to the Morrisville Sewage Treatment Plant; discharge of future flows from the Core Creek Basin to the Core Creek Interceptor; discharge of future flows from the Mill Creek Basin to Middletown Township; discharge of future flows from the Silver Lake and Black Rock Basins to Morrisville Borough; discharge of future flows from the Rock Run Basin to Falls Township. In addition, the 1975 Township Plan had provisions for accepting and conveying the future flow from Upper Makefield Township and Newtown Township, as did the 1970 County Plan.

2.3.5 Bucks County Sewerage Facilities Plan Update (1977)

The primary purpose of the 1977 County Plan was to evaluate the changes in wastewater facilities planning since the completion of the County Sewerage Facilities Plan in 1970. Except for expressing the need to reevaluate the proposed expansion of sewer service into Upper Makefield Township for treatment at the Morrisville Sewage Treatment Plant, the 1977 County Plan was consistent with the 1975 Township Plan.

2.3.6 Lower Makefield Township Sewerage Facilities Plan Revision (1990)

After the adoption of the Township's Sewerage Facilities Plan in 1975, development in Lower Makefield Township had accelerated beyond expectations and, as a result, the Morrisville Sewage Treatment Plant was reaching its hydraulic capacity. Until the Morrisville Sewage Treatment Plant was expanded, as proposed by the Township's 1975 Plan, the Heacock Road Sewage Pumping Station was constructed to temporarily pump wastewater from the lower portion of the Brock Creek Basin to the Bucks County Water and Sewer Authority, Core Creek Interceptor system. Once the Morrisville Sewage Treatment Plant was expanded, it was anticipated that the flows would be redirected back to the Morrisville Sewage Treatment Plant, consistent with the Township's 1975 Plan.

In 1990, as completion of the Morrisville Sewage Treatment Plant expansion neared, Lower Makefield Township adopted an Act 537 Plan Revision eliminating the temporary Heacock Road Sewage Pumping Station pump over and implementing the original recommendations set forth in the Township's 1975 Plan. This plan revision was based upon a re-rating of the Morrisville Sewage Treatment Plant from 7.1 mgd to 8.7 mgd and a proposed expansion and redirection of the flow from the Heacock Road Sewage Pumping Station to the Morrisville Sewage Treatment Plant.

2.4 COMPREHENSIVE PLANNING AND ZONING

The 1992 Comprehensive Master Plan Update of the Township of Lower Makefield (1992 Master Plan) guides its development policies and serves as a long-range planning tool. Of particular importance to sewage facilities planning are the current planning and zoning policies, as well as the future needs and recommendations regarding sewage facilities cited in the 1992 Master Plan. The current planning and zoning policies regarding sewage facilities stated in the 1992 Master Plan are as follows:

- o "The significance (or importance) of (on-lot) sewage treatment systems has diminished in the Township as the policy and practice of connecting development to public sewers has moved forward (or been implemented)."
- o "The 1981 (Comprehensive) Master Plan envisioned restricting sewer service to the portions of the Township generally lying below Quarry Road and I-95. Large-scale residential development in this area (above Quarry Road and I-95) has created a need for sewer service in this area."
- o "Township policy requires public sewerage for large-scale developments and tie-ins to public services where service lines are within a reasonable distance from a new development."

The future needs and recommendations for sewage facilities stated in the 1992 Master Plan are as follows:

- o "Septic System Failures - of concern to the community is the protection of public health (and the environment) by connecting failing septic systems. This will be addressed in the proposed system extension(s) to be made in the near future in connection with the upgrading of the Morrisville Sewage Treatment Plant. (Until that time,) consideration should be given to the need for OLDS, maintenance requirements, as well as an educational program to encourage regular and proper maintenance of on-lot systems."
- o "Public Sewerage - the recommendation of the 1981 (Comprehensive) Master Plan of restricting public sewers to the areas below Quarry Road needs to be revised to reflect current needs. Because of the pace and location of development has affected the northern portion of the Township, public sewerage extends into this area. The 1991 (Comprehensive) Master Plan, therefore, reaffirms the current township policy now in effect of requiring all major new development to be served by public sewers."
- o "Township Official Sewage Facilities Plan - the Township's Act 537 Sewage Facilities Plan should be reviewed for consistency with current Township policy and revised as needed."

Zoning is the major tool used to implement Comprehensive Plans. The Lower Makefield Township Zoning Ordinance, last revised May 1997, sets zoning district boundaries as delineated on Exhibit 2-1 herein, and specifies minimum lot sizes. The development requirements set forth in this Ordinance shall be used in determining projected future development in Section 5.2.3 of this Plan Update.

SECTION III

DESCRIPTION OF THE PLANNING AREA

3.1 LOCATION AND BOUNDARIES

Lower Makefield Township is situated in Bucks County, Pennsylvania, on the west bank of the Delaware River, immediately upstream from the Borough of Morrisville and across the river from Trenton, New Jersey. The Township lies to the northeast of Philadelphia, approximately 30 miles from the central business district, and is bounded by the Borough of Morrisville and Falls Township to the south, Middletown and Newtown Townships to the west, and Upper Makefield Township to the north. The Township also surrounds the Borough of Yardley on three sides, with the Delaware River acting as the eastern boundary for both Lower Makefield and Yardley.

3.2 TOPOGRAPHY AND DRAINAGE

Lower Makefield Township is comprised of ten natural drainage areas. These areas were used by the Township's 1975 Sewage Facilities Plan as the areal basis for sewage facilities planning. The drainage areas include the Core Creek, Dyers Creek, Buck Creek, Scudder Falls, Brock Creek, Silver Creek, Rock Run, Delaware River/Canal, Queen Anne Creek and Mill Creek Basins. The drainage areas' names and approximate sizes are shown on Table 3-1, and the boundaries of these areas are shown on Exhibit 3-1. Exhibit 3-1 also illustrates floodplain areas within the Township, based on the Township's Floodplain Map.

The Core Creek and Mill Creek Basins drain naturally westward to Newtown Township and Middletown Township, respectively. The Rock Run and Queen Anne Creek Basins drain naturally southward to Falls Township. The entire areas of the Dyers Creek, Brock Creek, Buck Creek, Scudder Falls and Silver Creek Basins drain naturally eastward and northward to Yardley and the Delaware River. The Delaware River/Canal Basin drains southward to the Borough of Morrisville.

| TABLE 3-1 DRAINAGE BASINS IN LOWER MAKEFIELD TOWNSHIP | |
|--|---------------|
| NAME | SIZE (ACRES) |
| Dyers Creek | 582 |
| Buck Creek | 1,407 |
| Scudder Falls | 1,070 |
| Brock Creek | 2,090 |
| Silver Creek | 980 |
| Rock Run | 1,130 |
| Delaware River/Canal | 1,433 |
| Core Creek | 2,070 |
| Queen Anne Creek | 476 |
| Mill Creek | 183 |
| TOTAL | 11,421 |

3.3 SOILS

Based on the Soil Survey of Bucks and Philadelphia Counties, Pennsylvania, published by the USDA Soil Conservation Service in 1975, and an Interim Report updating the survey, dated June 1996, most of the Township soil is broadly classified into two soil Associations; the Lansdale-Lawrenceville Association and the Urban Land-Howell Association.

The Lansdale-Lawrenceville Association of soil is located in the central and northern portions of the Township. This association is characterized as nearly level to sloping, moderately well drained and well drained soils on uplands, which consist of about thirty-five percent (35%) Lansdale soils, fifteen percent (15%) Lawrenceville soils and fifty percent (50%) minor soils.

Soils of the Urban Land-Howell Association are located in the southern southeastern portions of the Township. This association is characterized as nearly level and gently sloping, well drained land types and soils on terraces, which consist of about fifty-five percent (55%) Urban land, fifteen percent (15%) Howell soils, and thirty percent (30%) minor soils and low areas of marsh. For an illustration and detailed description of soil types contained in the Township, see Exhibit 3-2.

For the purpose of sewage facilities planning, soils can be significant because they will affect, to some degree, the nature and location of on-lot sewage disposal systems. However, due to the extensive public sewer system in Lower Makefield and the planning for future extensions, soils will not be a significant factor in the planning of new sewage facilities by this Plan Update.

Also of importance is the role agricultural soils play in the planning and preservation of land. Soils which are good for agricultural activities are a factor in planning decisions because good farming areas are an important natural resource. The Township has embraced the concept of preserving land for future farming and other open space uses through its Farmland Preservation Program.

This program utilizes the Farmland Preservation Development Performance Standards established under the R-1 zoning of the Township's Zoning Ordinance to preserve these areas. Most of this district is located in the northwest part of the Township which contains a great deal of prime agricultural soils, as illustrated in Exhibit 3-2. The Performance Standards require that fifty-one percent (51%) of a tract be saved as open space to be used for farming or other open space uses. Lot sizes must average 22,000 square feet, and the density on the buildable area cannot exceed two units per acre. The total number of housing units cannot exceed that which can be achieved under the R-1 zoning provisions. Provided the open space land created meets certain soil, size, location and farming requirements, the land may then be dedicated to the Township's Farmland Preservation Corporation which ensures

the future use of this land for farming and other open space uses. This program has resulted in the preservation of approximately 250 acres of farmland as of the date of this report.

The Township has also endorsed the formation of an Agricultural Security District which includes nearly 630 acres throughout several properties. This district does not restrict development, but provides farmers special protection and makes them eligible for State funding for the purchase of development rights.

3.4 POTABLE WATER SUPPLY

Public water supply in the Township is provided by the Morrisville Water Authority and the Pennsylvania-American Water Company (PAWC). The Morrisville Water Authority serves a very small area of the Township adjacent to the Borough of Morrisville. PAWC supplies water and holds "service rights" to the remainder of the Township. PAWC currently uses surface and groundwater to supply the needs of the Township. These sources are considered sufficient to serve the present and future housing demand. Exhibit 3-3 illustrates PAWC's supply and distribution facilities throughout Lower Makefield Township.

PAWC's primary source of water supply is surface water from the Delaware River. Treatment of surface water is provided by the Mill Road Treatment Plant. Other sources include a series of six groundwater supply wells and two water supply interconnections with nearby water purveyors.

The Mill Road Treatment Plant is supplied with water from the Delaware River by a 12 and 16 inch main. Treatment at the plant includes coagulation, sedimentation, and filtration. Chemicals used are chlorine, aluminum sulfate, lime, polymer, powdered activated carbon, copper sulfate, soda ash and C-9, a filter aid for coagulation. This facility is presently undergoing an expansion that will upgrade the capacity from 2 mgd to 6 mgd. The scope of this project also includes a 6 mgd raw water pump station, and the construction of a new 24 inch raw water transmission main. These facilities are scheduled to be on-line by early 1998.

Supplemental supplies from PAWC's six groundwater wells have a combined safe yield of 1.570 mgd. A description of each well and their rated capacity is detailed in Table 3-2.

| TABLE 3-2 PAWC GROUNDWATER SUPPLY WELLS | | | |
|--|----------------|-------------|---------------------|
| WELL NO. | DIAMETER (IN.) | DEPTH (FT.) | PUMP CAPACITY (GPM) |
| 4 | 10 | 485 | 450 |
| 6 | 15 | 500 | 250 |
| 7 | 10 | 265 | 420 |
| 8 | 12 | 390 | 300 |
| 9 | 12 | 400 | 150 |
| 10 | 12 | 300 | 150 |

Interconnection with adjacent systems includes the Borough of Morrisville and the Newtown Artesian Water Company. The Morrisville interconnection has the capacity to supply 800,000 gpd, if needed. During 1996, PAWC purchased 2.938 million gallons from Morrisville Borough over 63 days, for an average of 46,635 gpd. The Newtown Artesian interconnection has the capacity to supply approximately 600,000 gpd. PAWC is under contract to purchase a minimum of 150,000 gpd from this source through the year 2001. During 1996, the PAWC purchased 70.804 million gallons from Newtown Artesian on all 366 days, for an average of 193,454 gpd.

PAWC currently has four storage tanks with a total capacity of 2.102 million gallons. PAWC is currently in the process of constructing a sixth storage tank along Washington Crossing Road, providing an added capacity of 1,000,000 (one million) gallons.

Five booster pump stations help maintain pressure and supply throughout the system. The latest station to be constructed is the Quarry Road booster station, which went on-line in the Fall of 1996. This station serves the northwest area of the Township. Until this station went on-line, this area was entirely dependent on purchased water from Newtown Artesian Water Company. The use of this station allows PAWC to purchase their contract minimum of 0.150 mgd from Newtown Artesian Water Company, while providing the bulk of the demand in this area with water from PAWC's main service gradient.

For residential areas, the water consumption data generally provides a good basis for estimating sewage flows and is actually used to determine the billings for sewer service in Lower Makefield Township. PAWC records indicate an average consumption rate of approximately 187 gallons per dwelling unit per day last year. Assuming 2.81 persons per dwelling unit, the average daily per capita consumption was 67 gallons.

Table 3-3 summarizes water usage and sources, as compiled in 1996 by PAWC.

| TABLE 3-3 AVERAGE WATER SUPPLY AND WATER USAGE IN LOWER MAKEFIELD TOWNSHIP (FOR AREAS SERVED BY PENNSYLVANIA-AMERICAN WATER COMPANY) 1996 | | | |
|--|-------------------------|--------------------------------|--------------------------------------|
| WATER USAGE | | | |
| CUSTOMER | NO. OF CUSTOMERS | AVE. DAILY USE (GPD) | AVE. DAILY USE/CUSTOMER (GPD) |
| Residential | 10,679 | 1,994,399 | 187 |
| Non-Residential | 479 | 379,713 | 792 |
| WATER SUPPLY | | | |
| SOURCE | | AVE. DAILY SUPPLY (GPD) | |
| Wells | | 973,421 | |
| Surface Water | | 1,789,749 | |
| Purchased Water | | 201,481 | |

3.5 WETLANDS

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adopted for life in saturated soil conditions, including swamps, marshes, bogs and similar areas." (40 CFR Section 230.3)

The National Wetlands Inventory Maps for Langhorne, Pennsylvania, West Trenton, Pennsylvania - New Jersey, Lumberville, Pennsylvania-New Jersey and Pennington, Pennsylvania - New Jersey, as prepared by the U. S. Department of the Interior, identify wetlands at several locations within the Township. These wetlands are primarily located along the Buck, Brock, Core and Dyers Creeks and drainage channels tributary to these creeks, as well as the Pennsylvania Canal.

The two (2) typical wetland types in the planning area include:

- Palustrine System - Inland marshes, bogs and swamps.
- Riverine System - A deep water habitat system along freshwater river and stream channels.

Exhibit 3-4 reflects the wetlands locations and identification found in the Inventory Maps. Refer to the Inventory Maps to obtain a more detailed description of wetlands in the Township.

SECTION IV

EXISTING SEWERAGE FACILITIES

4.1 MUNICIPAL SEWERAGE FACILITIES SERVING LOWER MAKEFIELD TOWNSHIP

4.1.1 General

Lower Makefield Township owns and maintains a sanitary sewer collection/conveyance system which extends throughout nearly all of the Township. Treatment and disposal of the wastewater collected by this system is provided by the Morrisville Borough Wastewater Treatment Plant (MWTP) and The City of Philadelphia, Northeast Wastewater Treatment Plant. Lower Makefield utilizes the conveyance facilities of other municipalities or authorities to transport its wastewater to these plants for treatment. These conveyance systems include the Borough of Yardley, the Bucks County Water and Sewer Authority, Middletown Township and the Township of Falls Authority. The Service Areas discharging into these conveyance systems shall be used to describe and evaluate the public sewerage facilities serving Lower Makefield Township. Exhibit 4-1 delineates these Service Areas, as well as illustrates the Township's collection system.

4.1.2 Morrisville Borough Service Area

The sewage generated in the Morrisville Service Area is treated at the Morrisville Wastewater Treatment Plant (MWTP) located in the Borough of Morrisville. With participation in the ongoing MWTP Plant expansion, Lower Makefield has been allocated an average daily flow capacity of 3.097 mgd in the plant. Lower Makefield was previously limited to an average daily flow of 1.697 mgd until the expansion of the plant in 1991 to 7.1 mgd. It should be noted that the MWTP has hydraulic capabilities to expand ultimately to 8.7 mgd. These expansions were initiated to address development activity/growth within the municipalities contributing to the plant, as well as to accommodate the reversal of flows by the Heacock Road Sewage Pumping Station, completed in 1994.

The Morrisville Borough Service Area in Lower Makefield includes the following facilities:

- o Collection/conveyance sewers ranging in size from 6 to 30 inches in diameter; force mains ranging from 6 to 12 inches.
- o Ferry Road Metering Chamber - contains a 12 inch parshall flume and an ultrasonic flowmeter. Sewage from all of Yardley Borough and the Morrisville Service Area of Lower Makefield is gauged by this meter.

- Heacock Road Pumping Station - is a package pumping station containing two pumps rated at 1,220 gpm each, driven by constant speed 75 hp. motors. The station also has a generator for standby power. An upgrade of this station was completed in 1994, at which time flows from this station were reversed from the Core Creek Service Area.
- Delmorr Avenue Metering Chamber - contains a 12 inch parshall flume and an ultrasonic flowmeter. Sewage conveyed by the Delmorr Interceptor is gauged by this meter.
- Delmorr Interceptor - 30 inch interceptor constructed as an extension to Pennsylvania Canal Interceptor. Sewage from all of Yardley Borough and the Morrisville Service Area of Lower Makefield is conveyed by this interceptor to the Borough of Morrisville WWTP.
- Pennsylvania Canal Interceptor - 27 and 30 inch interceptor line conveying sewage from all of Yardley Borough and the Morrisville Service Area to the Delmorr Interceptor.
- Stackhouse Ejector Station - contains two pneumatic ejector pots, air compressors and all necessary appurtenances. The capacity of the ejectors is 50 gpm (0.030 mgd).
- Sherwood Park Pumping Station - contains two pumps rated at 300 gpm each. The pumps are operated by constant speed 10 hp. motors. The station has a diesel driven generator to provide standby power.
- Black Rock Road Pumping Station - contains two pumps rated at 550 gpm each. The station has a diesel driven generator to provide standby power.
- Silver Lake Pumping Station - contains three pumps rated at 600 gpm each and constant speed 30 hp. motors. The station has a diesel driven generator to provide standby power.

4.1.3 Yardley Borough Service Area

The Borough of Yardley also receives sewage treatment at the MWTP. An agreement currently exists between Yardley and Lower Makefield for the joint use of the sewage facilities necessary to convey the sewage from both municipalities to the MWTP.

The sewage from the northern portion of Lower Makefield flows into Yardley's collection system at five different points of connection. Four of these connections are metered, and the

fifth point (at University Drive) serves 57 houses. The sewage from these points is then combined with Yardley's sewage and is pumped by the Yardley Pumping Station into the Canal Interceptor, where it is combined with the sewage from the southern portion of Township's Morrisville Borough Service Area. The total quantity of sewage then passes through the Ferry Road and Delmorr Avenue Metering Chambers before it enters Morrisville for treatment.

The Yardley Borough Service Area in Lower Makefield includes the following facilities:

- o Collection sewers ranging in size from 6 to 12 inches in diameter; force mains ranging from 4 to 6 inches.
- o Main Street Metering Chamber - contains a 6 inch parshall flume and an ultrasonic flowmeter. Sewage conveyed by the Taylorsville Road Trunk Line is gauged by this meter.
- o Sandy Run Metering Chamber - contains a 6 inch parshall flume and an ultrasonic flowmeter. Sewage conveyed by the Brock Creek and Sandy Run Road Lines are gauged by this meter.
- o Buck Creek Metering Chamber - contains a 6 inch parshall flume and an ultrasonic flowmeter. Sewage conveyed by the Buck Creek Trunk Line is gauged by this meter.
- o Belmondo Metering Chamber - contains a 3 inch parshall flume and an ultrasonic flowmeter. Sewage from 195 apartments is gauged by this meter.
- o Yardley Estates Pumping Station - is a package pumping station containing two pumps rated at 140 gpm each, driven by constant speed 10 hp. motors. The station also has a generator for standby power. Modifications to this station were completed in 1994, at which time flows from this station were reversed from the Core Creek Service Area.
- o Maplevale Ejector Station - contains two pneumatic ejector pots, air compressors and all necessary appurtenances. The capacity of the ejectors is 50 gpm (0.030 mgd).
- o Fox Hill Pumping Station - is a package pumping station containing two pumps rated at 320 gpm each. The pumps are operated by two constant speed 25 hp. motors. The station has a diesel driven generator to provide standby power.

- Buck Creek Trunk Line - 10 and 12 inch trunk line conveying sewage from part of Yardley Borough Service Area to Yardley Borough.
- Taylorsville Road Trunk Line - 10 and 12 inch trunk line conveying sewage from part of Yardley Borough Service Area to Yardley Borough.

4.1.4 Core Creek Service Area

The sewage generated in the Core Creek Service Area is conveyed by the Core Creek Interceptor of the Bucks County Water and Sewer Authority (BCWSA) to the Neshaminy Interceptor, also of BCWSA, and ultimately to The City of Philadelphia, Northeast Wastewater Treatment Plant for treatment. The Township has an existing agreement with the BCWSA for the acceptance of all sewage generated within the Core Creek Service Area. An agreement between the BCWSA and The City of Philadelphia allows the discharge of the Neshaminy Interceptor into the treatment plant.

Lower Makefield has two points of connection with the Core Creek Interceptor. The first is through the North Shore Core Creek Interceptor, which enters the Township at Lindenhurst Road and extends to serve the Gray Nuns Academy and adjacent areas. The second point of connection is made through the Village Road Interceptor, which enters the Township along Village Road to its point of terminus just east of I-95.

The Core Creek Service Area has collection/conveyance sewers ranging in size from 8 to 15 inches.

- North Shore Core Creek Interceptor - 15 inch interceptor conveying sewage from the northern part of the Core Creek Service Area to the BCWSA Core Creek Interceptor.
- Village Road Extension to Core Creek Interceptor - 12 inch interceptor conveying sewage from the southern part of the Core Creek Service Area to the BCWSA Core Creek Interceptor.

4.1.5 Middletown Township Service Area

The sewage generated in the Middletown Township Service Area is collected and conveyed to Middletown Township through the "Yerkes" Interceptor, and ultimately to The City of Philadelphia, Northeast Wastewater Treatment Plant via the Neshaminy Interceptor. There is an existing agreement between Middletown and Lower Makefield for Middletown to accept 0.535 mgd of sewage from Lower Makefield. An agreement between the BCWSA and The City of Philadelphia allows the discharge of the Neshaminy Interceptor into the treatment plant.

The Middletown Township Service Area contains the following facilities:

- o Collection/conveyance sewers ranging in size from 8 to 18 inches and a 6 inch force main.
- o Yardley Oaks pumping station - is a package pumping station containing two pumps rated at 148 gpm, each operated by 10 hp. motors. Standby power is also provided by a diesel driven generator.
- o A metering chamber containing a 6 inch parshall flume and electrical connections. A meter will be installed in the future.
- o Yerkes Trunk Line - 12 inch trunk line conveying sewage from the Middletown Township Service Area to Middletown Township.

4.1.6 Falls Township Service Area

A portion of the sewers in the Rock Run Basin are owned and operated by Falls Township. The area containing these sewers is referred to as the "Falls Township Service Area." Falls Township has also contracted, by agreement, to accept the flow originating in the area known as the "Falls Township Contract Area" (total flow of 0.331 mgd). These sewers in this area are owned and operated by Lower Makefield Township. Exhibit 4-1 identifies the "Service" and "Contract" areas within the area discharging to Falls Township. Sewage from Lower Makefield is conveyed by the Falls Township sewer system to the Neshaminy Interceptor of BCWSA and ultimately to The City of Philadelphia, Northeast Wastewater Treatment Plant for treatment.

The Falls Township Service Area contains the following facilities:

- o Derbyshire Trunk Line - 8, 10 and 12 inch trunk line conveying sewage from part of Falls Township "Contract Area" to Falls Township "Service Area," and ultimately to Falls Township.
- o Derbyshire Meter - sewage conveyed by the Derbyshire Trunk Line is gauged by this meter.
- o Long Meadow Trunk Line - 10 and 12 inch trunk line conveying sewage from Falls Township "Service Area" to Falls Township.

4.1.7 Summary of Existing Agreements and Permitted Treatment Plant Capacities

The details of the existing sewage flow agreements, including capacities and flows, are presented in Table 4-1.

The adequacy of these agreements will be examined later in this report, once future sewage flows are projected.

| TABLE 4-1 SUMMARY OF EXISTING SEWAGE FLOW AGREEMENTS AND PERMITTED TREATMENT PLANT CAPACITIES AFFECTING LOWER MAKEFIELD TOWNSHIP | | | |
|--|---------------------------------|--------------------------------|--------------------------------------|
| AGREEMENTS | | | |
| PARTIES | CAPACITY ALLOCATED (MGD) | 1996 AVERAGE FLOW (MGD) | PAST 5-YR. AVERAGE FLOW (MGD) |
| Lower Makefield Township and Borough of Morrisville | 3.097 | 2.545 | 2.232 (5) |
| Lower Makefield Township and Borough of Yardley (1) | 1.008 | 0.851 | 0.677 |
| Lower Makefield Township and Falls Township (Contract Area) (2) | 0.331 | 0.285 | 0.228 |
| Lower Makefield Township and Falls Township (Service Area) (3) | None Specified | 0.006 | 0.006 |
| Lower Makefield Township and Middletown Township | 0.535 | 0.149 | 0.143 |
| Lower Makefield Township and BCWSA | None Specified (4) | 0.552 | 0.254 (5) |
| BCWSA and The City of Philadelphia for Discharge of Neshaminy Interceptor | 20.0 | 22.66 | 18.68 |
| PERMITTED TREATMENT PLANT CAPACITIES | | | |
| TREATMENT PLANT | PERMITTED CAPACITY (MGD) | AVERAGE FLOW 1996 (MGD) | PAST 5-YR. AVERAGE FLOW (MGD) |
| The City of Philadelphia, Northeast Wastewater Treatment Plant | 210.0 | 214.6 | 206.19 |
| Borough of Morrisville Wastewater Treatment Plant | 7.1 | 5.107 | 4.55 (5) |
| (1) Agreement for capacity in sewers and pumping station only. A portion of Township flows is transported through Yardley. (2) Agreement for Falls Township "Contract Area" only. (3) Falls Township "Service Area" only. No allocated capacity specified. (4) No capacity limits are specified. Service must be provided to all EDU's in Service Area. (5) Only 1995 and 1996 flows used to account for present discharge point of Heacock Road Sewage Pumping Station. | | | |

4.1.8 Industrial Wastes in Lower Makefield Township

There are currently no industries in Lower Makefield Township which discharge non-domestic industrial or process waste into the sewer system. The Township's 1992 Master Plan has developed zoning and land use which designate areas within the Township for industrial uses. The Master Plan specifies that those industrial land areas within the Township should be office/research type uses.

The industrial uses are to be located in the area west of I-95 and south of Yardley-Newtown Road. This area will be a natural extension of the abutting existing and planned industrial areas in Newtown and Middletown Townships. Access to sewer service is available in the Village Road extension or through a potential trunk line extension through Newtown Township, both of which would discharge to the Core Creek Interceptor. The existing interceptor to Middletown Township will also provide sewer access to potential future industrial users located south of Village Road.

4.2 ON-LOT SEWAGE DISPOSAL SYSTEMS

4.2.1 General

The Bucks County Department of Health (BCDH) is the "local agency" responsible for administering the on-lot sewage disposal program in Lower Makefield Township. Enforcement of the program is through permitting, inspection and complaint response.

A majority of the on-lot sewage disposal systems (OLDS) in the Township are utilized by residences, however, a few of the systems are utilized by commercial facilities. These commercial systems are concentrated in the Edgewood Village Historic District Area.

Many of the existing OLDS throughout the Township were constructed prior to current PA DEP design criteria. System types include seepage pits, seepage trenches and seepage beds. There are no known cesspools or retaining tanks in the Township.

4.2.2 Problem Areas

Based on information provided by the BCDH, six areas within the Township have been identified to have malfunctioning OLDS. All of the areas consist mostly of residential developments which have old systems constructed prior to current design criteria. All of the systems are the in-ground (non-mounded) type and most contain seepage trenches. Any one or combination of factors may contribute to system malfunctions. These factors may include: age of system, poor soil conditions, relatively small lot sizes, and/or improper system maintenance.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

Instructions for Completing Act 537 Plan Content and Environmental Assessment Checklist

Remove and recycle these instructions prior to submission

CHECKLIST INSTRUCTIONS

These instructions are designed to assist the applicant in completing the Act 537 Plan Content and Environmental Assessment Checklist.

This checklist is composed of three parts: one for "General Information," one for "Administrative Completeness," and one for "General Plan Content". A plan must be "administratively complete" in order to be formally reviewed by DEP. The General Plan Content portion of the checklist identifies each of the issues that must be addressed in your Act 537 Plan Update based on the pre-planning meeting between you and/or your consultant and DEP.

Use the right-hand column blanks in the checklist to identify the page in the plan on which each planning issue is found or to 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.

When information required as part of an official plan update revision has been developed separately or in a previous update revision, incorporate the information by reference to the planning document and page.

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

Wastewater projects proposing funding through the following sources must prepare an "Environmental Report" as described in the Uniform Environmental Review Process (UER) and include it with the plan submission designated as "Plan-Appendix A". The following funding programs use the UER process.

- The Clean Water State Revolving Loan Fund (PENNVEST, DEP, EPA)
- The RUS Water and Waste Disposal Grant and Loan Program (USDA-RD)
- The Community Development Block Grant Program (DCED, HUG)
- Other Federal Funding Efforts (EPA)

The checklist items or portions of checklist items required in the Act 537 Plan Update revision and that are also included in the UER process are indicated by shading. Most of the "Environmental Report" document may be constructed from the Act 537 Official Plan Update revision by using "copy & paste" techniques. The technical guidance document *Uniform Environmental Review Process* (UER) (DEP ID. 381-5511-111) is available electronically on DEP's website at www.depweb.state.pa.us.

After Municipal Adoption by Resolution, submit three copies of the plan, any attachments or addenda and this checklist to DEP.

A copy of this completed checklist must be included with your Act 537 plan. DEP will use the "DEP USE ONLY" column during the completeness evaluation of the plan. This column may also be used by DEP during the pre-planning meeting with the municipality to identify planning elements that are not required to be included in the plan.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

Act 537 Plan Content and Environmental Assessment Checklist

PART 1 GENERAL INFORMATION

A. Project Information

1. Project Name

2. Brief Project Description

B. Client (Municipality) Information

| | | | | |
|-------------------|--------|--------------------------|--------------------------|--------------------------|
| Municipality Name | County | City | Boro | Twp |
| | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | |
|---|------------|----|--------|-------|
| Municipality Contact Individual - Last Name | First Name | MI | Suffix | Title |
|---|------------|----|--------|-------|

| | | | | |
|---------------------------------|------------|----|--------|-------|
| Additional Individual Last Name | First Name | MI | Suffix | Title |
|---------------------------------|------------|----|--------|-------|

| | |
|-------------------------------------|------------------------|
| Municipality Mailing Address Line 1 | Mailing Address Line 2 |
|-------------------------------------|------------------------|

| | | |
|---------------------------|-------|-------|
| Address Last Line -- City | State | ZIP+4 |
|---------------------------|-------|-------|

| | | |
|--------------|----------------|------------------|
| Phone + Ext. | FAX (optional) | Email (optional) |
|--------------|----------------|------------------|

C. Site Information

Site (or Project) Name (Municipal Name) Act 537 Plan

| | |
|----------------------|----------------------|
| Site Location Line 1 | Site Location Line 2 |
|----------------------|----------------------|

D. Project Consultant Information

| | | | |
|-----------|------------|----|--------|
| Last Name | First Name | MI | Suffix |
|-----------|------------|----|--------|

| | |
|-------|----------------------|
| Title | Consulting Firm Name |
|-------|----------------------|

| | |
|------------------------|------------------------|
| Mailing Address Line 1 | Mailing Address Line 2 |
|------------------------|------------------------|

| | | | |
|--------------------------|-------|-------|---------|
| Address Last Line - City | State | ZIP+4 | Country |
|--------------------------|-------|-------|---------|

| | | |
|-------|--------------|-----|
| Email | Phone + Ext. | FAX |
|-------|--------------|-----|

| PART 2 ADMINISTRATIVE COMPLETENESS CHECKLIST | | |
|--|----------------------------|--|
| DEP Use Only | Indicate Page #(s) in Plan | In addition to the main body of the plan, the plan must include items one through eight listed below to be accepted for formal review by the department. Incomplete Plans will be returned unless the municipality is clearly requesting an advisory review. |
| _____ | ✓ | 1. Table of Contents |
| _____ | ✓ | 2. Plan Summary |
| _____ | ✓ | A. Identify the proposed service areas and major problems evaluated in the plan. (Reference - Title 25, §71.21.a.7.i). |
| _____ | ✓ | B. Identify the alternative(s) chosen to solve the problems and serve the areas of need identified in the plan. Also, include any institutional arrangements necessary to implement the chosen alternative(s). (Reference Title 25 §71.21.a.7.ii). |
| _____ | ✓ | C. Present the estimated cost of implementing the proposed alternative (including the user fees) and the proposed funding method to be used. (Reference Title 25, §71.21.a.7.ii). |
| _____ | ✓ | D. Identify the municipal commitments necessary to implement the Plan. (Reference Title 25, §71.21.a.7.iii). |
| _____ | ✓ | E. Provide a schedule of implementation for the project that identifies the MAJOR milestones with dates necessary to accomplish the project to the point of operational status. (Reference Title 25, §71.21.a.7.iv). |
| _____ | ✓ | 3. Municipal Adoption: Original , signed and sealed Resolution of Adoption by the municipality which contains, at a minimum, alternatives chosen and a commitment to implement the Plan in accordance with the implementation schedule. (Reference Title 25, §71.31.f) Section V.F. of the Planning Guide. |
| _____ | ✓ | 4. Planning Commission / County Health Department Comments: Evidence that the municipality has requested, reviewed and considered comments by appropriate official planning agencies of the municipality, planning agencies of the county, planning agencies with area wide jurisdiction (where applicable), and any existing county or joint county departments of health. (Reference-Title 25, §71.31.b) Section V.E.1 of the Planning Guide. |
| _____ | ✓ | 5. Publication: Proof of Public Notice which documents the proposed plan adoption, plan summary, and the establishment and conduct of a 30 day comment period. (Reference-Title 25, §71.31.c) Section V.E.2 of the Planning Guide. |
| _____ | ✓ | 6. Comments and Responses: Copies of ALL written comments received and municipal response to EACH comment in relation to the proposed plan. (Reference-Title 25, §71.31.c) Section V.E.2 of the Planning Guide. |
| _____ | ✓ | 7. Implementation Schedule: A complete project implementation schedule with milestone dates specific for each existing and future area of need. Other activities in the project implementation schedule should be indicated as occurring a finite number of days from a major milestone. (Reference-Title 25, §71.31.d) Section V.F. of the Planning Guide. Include dates for the future initiation of feasibility evaluations in the project's implementation schedule for areas proposing completion of sewage facilities for planning periods in excess of five years. (Reference Title 25, §71.21.c). |
| _____ | ✓ | 8. Consistency Documentation: Documentation indicating that the appropriate agencies have received, reviewed and concurred with the method proposed to resolve identified inconsistencies within the proposed alternative and consistency requirements in 71.21.(a)(5)(i-iii). (Reference-Title 25, §71.31.e). Appendix B of the Planning Guide. |

PART 3 GENERAL PLAN CONTENT CHECKLIST

| DEP Use Only | Indicate Page #(s) in Plan | Item Required |
|--------------|----------------------------|--|
| _____ | ✓ | I. Previous Wastewater Planning |
| _____ | ✓ | A. Identify, describe and briefly analyze all past wastewater planning for its impact on the current planning effort: |
| _____ | ✓ | 1. Previously undertaken under the Sewage Facilities Act (Act 537). (Reference-Act 537, Section 5 §d.1). |
| _____ | ✓ | 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. |
| _____ | ✓ | 3. Is anticipated or planned by applicable sewer authorities or approved under a Chapter 94 Corrective Action Plan. (Reference-Title 25, §71.21.a.5.i.A&B). Section V.D. of the Planning Guide. |
| _____ | ✓ | 4. Through planning modules for new land development, planning "exemptions" and addenda. (Reference-Title 25, §71.21.a.5.i.A). |
| _____ | ✓ | 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). |
| _____ | ✓ | A. Identification of planning area(s), municipal boundaries, Sewer Authority/Management Agency service area boundaries. (Reference-Title 25, §71.21.a.1.i). |
| _____ | ✓ | 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). |
| _____ | ✓ | C. Soils - Analysis with description by soil type and soils mapping for areas not presently served by sanitary sewer service. Show areas suitable for in-ground onlot 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). |
| _____ | (S) | D. Geologic Features - (1) Identification through analysis, (2) mapping and (3) their relation to existing or potential nitrate-nitrogen pollution and drinking water sources. Include areas where existing nitrate-nitrogen levels are in excess of 5 mg/L. (Reference-Title 25, §71.21.a.1.iii). |
| _____ | ✓ | E. Topography - Depict areas with slopes that are suitable for conventional systems; slopes that are suitable for elevated sand mounds and slopes that are unsuitable for onlot systems. (Reference-Title 25, §71.21.a.1.ii). |
| _____ | ✓ | F. Potable Water Supplies - Identification through mapping, description and analysis. Include public water supply service areas and available public water supply capacity and aquifer yield for groundwater supplies. (Reference-Title 25 §71.21.a.1.vi). Section V.C. of the Planning Guide. |

- _____ ✓

G. Wetlands-Identify wetlands as defined in Title 25, Chapter 105 by description, analysis and mapping. Include National Wetland Inventory mapping and potential wetland areas per USDA, SCS mapped hydric soils. Proposed collection, conveyance and treatment facilities and lines must be located and labeled, along with the identified wetlands, on the map. (Reference-Title 25, §71.21.a.1.v). Appendix B, Section II.I of the Planning Guide.
- _____ ✓

III. Existing Sewage Facilities in the Planning Area - Identifying the Existing Needs
- _____ ✓

A. Identify, map and describe municipal and non-municipal, individual and community sewerage systems in the planning area including:
- _____ ✓

1. Location, size and ownership of treatment facilities, main intercepting lines, pumping stations and force mains including their size, capacity, point of discharge. Also include the name of the receiving stream, drainage basin, and the facility's effluent discharge requirements. (Reference-Title 25, §71.21.a.2.i.A).
- _____ NA

2. A narrative and schematic diagram of the facility's basic treatment processes including the facility's NPDES permitted capacity, and the Clean Streams Law permit number. (Reference-Title 25, §71.21.a.2.i.A).
- _____ ✓

3. A description of problems with existing facilities (collection, conveyance and/or treatment), including existing or projected overload under Title 25, Chapter 94 (relating to municipal wasteload management) or violations of the NPDES permit, Clean Streams Law permit, or other permit, rule or regulation of DEP. (Reference-Title 25, §71.21.a.2.i.B).
- _____ NA

4. Details of scheduled or in-progress upgrading or expansion of treatment facilities and the anticipated completion date of the improvements. Discuss any remaining reserve capacity and the policy concerning the allocation of reserve capacity. Also discuss the compatibility of the rate of growth to existing and proposed wastewater treatment facilities. (Reference-Title 25, §71.21.a.4.i & ii).
- _____ NA

5. A detailed description of the municipality's operation and maintenance requirements for small flow treatment facility systems, including the status of past and present compliance with these requirements and any other requirements relating to sewage management programs. (Reference-Title 25, §71.21.a.2.i.C).
- _____ NA

6. Disposal areas, if other than stream discharge, and any applicable groundwater limitations. (Reference-Title 25, §71.21.a.4.i & ii).
- _____ (✓)

B. Using DEP's publication titled *Sewage Disposal Needs Identification*, identify, map and describe areas that utilize individual and community onlot 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 onlot systems in use. (Reference-Title 25, §71.21.a.2.ii.A).
- _____ (✓)

2. A sanitary survey complete with description, map and tabulation 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 onlot 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).

(3 parameters)

____ (✓)

4. An individual water supply survey to identify possible contamination by malfunctioning onlot sewage disposal systems consistent with DEP's *Sewage Disposal Needs Identification* publication. (Reference-Title 25 §71.21.a.2.ii.B).

____ (NA)

5. Detailed description of operation and maintenance requirements of the municipality for individual and small volume community onlot systems, including the status of past and present compliance with these requirements and any other requirements relating to sewage management programs. (Reference-Title 25, §71.21.a.2.i.C).

____ NA

C. Identify wastewater sludge and septage generation, transport and disposal methods. Include this information in the sewage facilities alternative analysis including:

____ NA

1. Location of sources of wastewater sludge or septage (Septic tanks, holding tanks, wastewater treatment facilities). (Reference-Title 25 §71.71).

____ NA

2. Quantities of the types of sludges or septage generated. (Reference-Title 25 §71.71).

____ NA

3. Present disposal methods, locations, capacities and transportation methods. (Reference-Title 25 §71.71).

____ ✓

IV. Future Growth and Land Development

A. Identify and briefly summarize all municipal and county planning documents adopted pursuant to the Pennsylvania Municipalities Planning Code (Act 247) including:

____ ✓

1. All land use plans and zoning maps that identify residential, commercial, industrial, agricultural, recreational and open space areas. (Reference-Title 25, §71.21.a.3.iv).

____ ✓

2. Zoning or subdivision regulations that establish lot sizes predicated on sewage disposal methods. (Reference – Title 25§71.21.a.3.iv).

____ ✓

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.

____ ✓

B. Delineate and describe the following through map, text and analysis.

____ ✓

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 EDU's remaining to be developed (include time schedule for EDU's remaining to be developed). (Reference-Title 25, §71.21.a.3.i).

____ ✓

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).

____ ✓

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).

✓

4. Zoning, and/or subdivision regulations; local, county or regional comprehensive plans; and existing plans of any other agency relating to the development, use and protection of land and water resources with special attention to: (Reference-Title 25, §71.21.a.3.iv).

- public ground/surface water supplies
- recreational water use areas
- groundwater recharge areas
- industrial water use
- wetlands

NA

5. Sewage planning necessary to provide adequate wastewater treatment for five and ten year future planning periods based on projected growth of existing and proposed wastewater collection and treatment facilities. (Reference-Title 25, §71.21.a.3.v).

V. Identify Alternatives to Provide New or Improved Wastewater Disposal Facilities

A. Conventional collection, conveyance, treatment and discharge alternatives including:

NA

1. The potential for regional wastewater treatment. (Reference-Title 25, §71.21.a.4).

✓

2. The potential for extension of existing municipal or non-municipal sewage facilities to areas in need of new or improved sewage facilities. (Reference-Title 25, §71.21.a.4.i).

✓

3. The potential for the continued use of existing municipal or non-municipal sewage facilities through one or more of the following: (Reference-Title 25, §71.21.a.4.ii).

✓

a. Repair. (Reference-Title 25, §71.21.a.4.ii.A).

✓

b. Upgrading. (Reference-Title 25, §71.21.a.4.ii.B).

✓

c. Reduction of hydraulic or organic loading to existing facilities. (Reference-Title 25, §71.71).

✓

d. Improved operation and maintenance. Reference-Title 25, §71.21.a.4.ii.C).

✓

e. Other applicable actions that will resolve or abate the identified problems. (Reference-Title 25, §71.21.a.4.ii.D).

✓

4. Repair or replacement of existing collection and conveyance system components. (Reference-Title 25, §71.21.a.4.ii.A).

✓

5. The need for construction of new community sewage systems including sewer systems and/or treatment facilities. (Reference-Title 25, §71.21.a.4.iii).

NA

6. Use of innovative/alternative methods of collection/conveyance to serve needs areas using existing wastewater treatment facilities. (Reference-Title 25, §71.21.a.4.ii.B).

NA

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

- | | | |
|---|---------------|---|
| <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> | <p>NA</p> | <p>areas suitable for onlot disposal considering: (Reference-Title 25, §71.21.a.4).</p> <p>a. Existing technology and sizing requirements of Title 25 Chapter 73. (Reference-Title 25, §73.31-73.72).</p> <p>b. Use of expanded absorption areas or alternating absorption areas. (Reference-Title 25, §73.16).</p> <p>c. Use of water conservation devices. (Reference-Title 25, §71.73.b.2.iii).</p> |
| <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> | <p>NA</p> | <p>C. The use of small flow sewage treatment facilities or package treatment facilities to serve individual homes or clusters of homes with consideration of: (Reference-Title 25, §71.64.d).</p> <p>1. Treatment and discharge requirements. (Reference-Title 25, §71.64.d).</p> <p>2. Soil suitability. (Reference-Title 25, §71.64.c.1).</p> <p>3. Preliminary hydrogeologic evaluation. (Reference-Title 25, §71.64.c.2).</p> <p>4. Municipal, Local, Agency or other controls over operation and maintenance requirements through a Sewage Management Program. (Reference-Title 25, §71.64.d). See Part "F" below.</p> |
| <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> | <p>NA</p> | <p>D. The use of community land disposal alternatives including:</p> <p>1. Soil and site suitability. (Reference-Title 25, §71.21.a.2.ii.C).</p> <p>2. Preliminary hydrogeologic evaluation. (Reference-Title 25, §71.21.a.2.ii.C).</p> <p>3. Municipality, Local Agency or Other Controls over operation and maintenance requirements through a Sewage Management Program (Reference-Title 25, §71.21.a.2.ii.C). See Part "F" below.</p> <p>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.</p> |
| <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> | <p>NA ✓</p> | <p>E. The use of retaining tank alternatives on a temporary or permanent basis including: (Reference-Title 25, §71.21.a.4).</p> <p>1. Commercial, residential and industrial use. (Reference-Title 25, §71.63.e).</p> <p>2. Designated conveyance facilities (pumper trucks). (Reference-Title 25, §71.63.b.2).</p> <p>3. Designated treatment facilities or disposal site. (Reference-Title 25, §71.63.b.2).</p> <p>4. Implementation of a retaining tank ordinance by the municipality. (Reference-Title 25, §71.63.c.3). See Part "F" below.</p> <p>5. Financial guarantees when retaining tanks are used as an interim sewage disposal measure. (Reference-Title 25, §71.63.c.2).</p> |
| <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> | <p>? NA ✓</p> | <p>F. Sewage Management Programs to assure the future operation and maintenance of existing and proposed sewage facilities through:</p> <p>1. Municipal ownership or control over the operation and maintenance of individual onlot sewage disposal systems, small flow treatment facilities, or other traditionally non-municipal treatment facilities. (Reference-Title 25, §71.21.a.4.iv).</p> <p>2. Required inspection of sewage disposal systems on a schedule established by the municipality. (Reference-Title 25, §71.73.b.1.).</p> <p>3. Required maintenance of sewage disposal systems including septic and aerobic treatment tanks and other system components on a schedule</p> |

_____ ✓
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 _____ ✓

- Planning Guide.
2. **Municipal wasteload management Corrective Action Plans or Annual Reports** developed under PA Code, Title 25, Chapter 94. (Reference-Title 25, §71.21.a.5.i.B). The municipality's recent Wasteload Management (Chapter 94) Reports should be examined to determine if the proposed alternative is consistent with the recommendations and findings of the report. Appendix B, Section II.B of the Planning Guide.
 3. Plans developed under **Title II of the Clean Water Act** (33 U.S.C.A. 1281-1299) or **Titles II and VI of the Water Quality Act of 1987** (33 U.S.C.A 1251-1376). (Reference-Title 25, §71.21.a.5.i.C). Appendix B, Section II.E of the Planning Guide.
 4. **Comprehensive plans** developed under the Pennsylvania Municipalities Planning Code. (Reference-Title 25, §71.21.a.5.i.D). The municipality's comprehensive plan must be examined to assure that the proposed wastewater disposal alternative is consistent with land use and all other requirements stated in the comprehensive plan. Appendix B, Section II.D of the Planning Guide.
 5. **Antidegradation requirements** as contained in PA Code, Title 25, Chapters 93, 95 and 102 (relating to water quality standards, wastewater treatment requirements and erosion control) and the Clean Water Act. (Reference-Title 25, §71.21.a.5.i.E). Appendix B, Section II.F of the Planning Guide.
 6. **State Water Plans** developed under the Water Resources Planning Act (42 U.S.C.A. 1962-1962 d-18). (Reference-Title 25, §71.21.a.5.i.F). Appendix B, Section II.C of the Planning Guide.
 7. **Pennsylvania Prime Agricultural Land Policy** contained in Title 4 of the Pennsylvania Code, Chapter 7, Subchapter W. Provide narrative on local municipal policy and an overlay map on prime agricultural soils. (Reference-Title 25, §71.21.a.5.i.G). Appendix B, Section II.G of the Planning Guide.
 8. **County Stormwater Management Plans** approved by DEP under the Storm Water Management Act (32 P.S. 680.1-680.17). (Reference-Title 25, §71.21.a.5.i.H). Conflicts created by the implementation of the proposed wastewater alternative and the existing recommendations for the management of stormwater in the county Stormwater Management Plan must be evaluated and mitigated. If no plan exists, no conflict exists. Appendix B, Section II.H of the Planning Guide.
 9. **Wetland Protection.** Using wetland mapping developed under Checklist Section II.G, identify and discuss mitigative measures including the need to obtain permits for any encroachments on wetlands from the construction or operation of any proposed wastewater facilities. (Reference-Title 25, §71.21.a.5.i.I) Appendix B, Section II.I of the Planning Guide.
 10. **Protection of rare, endangered or threatened plant and animal species** as identified by the Pennsylvania Natural Diversity Inventory (PNDI). (Reference-Title 25, §71.21.a.5.i.J). Provide DEP with a copy of the completed Request For PNDI Search document. Also provide a copy of the response letter from the Department of Conservation and Natural Resources' Bureau of Forestry regarding the findings of the PNDI search. Appendix B, Section II.J of the Planning Guide.
 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 of 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.

- _____ ✓ 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).
- _____ ✓ 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 years from the date of plan submission. (Reference-Title 25, §71.21.a.5.iv).
- _____ ✓ 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).
- _____ ✓ 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).
- _____ ✓ 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).
- _____ ✓ G. Evaluate administrative organizations and legal authority necessary for plan implementation. (Reference - Title 25, §71.21.a.5.vi.D).

VII. Institutional Evaluation

- _____ ✓ A. Provide an analysis of all existing wastewater treatment authorities, their past actions and present performance including:
 - _____ ✓ 1. Financial and debt status. (Reference-Title 25, §71.61.d.2).
 - _____ ✓ 2. Available staff and administrative resources. (Reference-Title 25, §71.61.d.2)
 - _____ ✓ 3. Existing legal authority to:
 - _____ ✓ a. Implement wastewater planning recommendations. (Reference-Title 25, §71.61.d.2).
 - _____ ✓ b. Implement system-wide operation and maintenance activities. (Reference-Title 25, §71.61.d.2).
 - _____ ✓ c. Set user fees and take purchasing actions. (Reference-Title 25, §71.61.d.2).
 - _____ ✓ d. Take enforcement actions against ordinance violators. (Reference-Title 25,

§71.61.d.2).

____ ✓
 ____ ✓

- e. Negotiate agreements with other parties. (Reference-Title 25, §71.61.d.2).
- f. Raise capital for construction and operation and maintenance of facilities. (Reference-Title 25, §71.61.d.2).

____ NA

B. Provide an analysis and description of the various institutional alternatives necessary to implement the proposed technical alternatives including:

____ |
 ____ |
 ____ |
 ____ ↓

- 1. Need for new municipal departments or municipal authorities. (Reference-Title 25, §71.61.d.2).
- 2. Functions of existing and proposed organizations (sewer authorities, onlot maintenance agencies, etc.). (Reference-Title 25, §71.61.d.2).
- 3. Cost of administration, implementability, and the capability of the authority/agency to react to future needs. (Reference-Title 25, §71.61.d.2).

____ NA

C. Describe all necessary administrative and legal activities to be completed and adopted to ensure the implementation of the recommended alternative including:

____ |
 ____ |
 ____ |
 ____ |
 ____ |
 ____ ↓
 ____ ↓

- 1. Incorporation of authorities or agencies. (Reference-Title 25, §71.61.d.2).
- 2. Development of all required ordinances, regulations, standards and inter-municipal agreements. (Reference-Title 25, §71.61.d.2).
- 3. Description of activities to provide rights-of-way, easements and land transfers. (Reference-Title 25, §71.61.d.2).
- 4. Adoption of other municipal sewage facilities plans. (Reference-Title 25, §71.61.d.2).
- 5. Any other legal documents. (Reference-Title 25, §71.61.d.2).
- 6. Dates or timeframes for items 1-5 above on the project's implementation schedule.

____ ✓

D. Identify the proposed 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. Implementation Schedule and 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:

____ ✓
 ____ ✓
 ____ ✓
 ____ ✓
 ____ ✓
 ____ ✓

- 1. Existing wastewater disposal needs. (Reference-Title 25, §71.21.a.6).
- 2. Future wastewater disposal needs. (five and ten years growth areas). (Reference-Title 25, §71.21.a.6).
- 3. Operation and maintenance considerations. (Reference-Title 25, §71.21.a.6).
- 4. Cost-effectiveness. (Reference-Title 25, §71.21.a.6).
- 5. Available management and administrative systems. (Reference-Title 25, §71.21.a.6).
- 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).

B. Designate and describe the capital financing plan chosen to implement the selected alternative(s). Designate and describe the chosen back-up financing plan. (Reference-Title 25, §71.21.a.6)

C. Designate and describe the implementation schedule for the recommended alternative, including justification for any proposed phasing of construction or implementation of a Sewage Management Program. (Reference - Title 25 §71.31d)

IX. Environmental Report (ER) generated from the Uniform Environmental Review Process (UER)

____ NA

A. Complete an ER as required by the UER process and as described in the DEP Technical Guidance 381-5511-111. Include this document as "Appendix A" to the Act 537 Plan Update Revision. Note: *An ER is required only for Wastewater projects proposing funding through any of the funding sources identified in the UER.*

ADDITIONAL REQUIREMENTS FOR PENNVEST PROJECTS

Municipalities that propose to implement their official sewage facilities plan updates with PENNVEST funds must meet six additional requirements to be eligible for such funds. See A Guide for Preparing Act 537 Update Revisions (362-0300-003), Appendix N for greater detail or contact the DEP regional office serving your county listed in Appendix J of the same publication.

| DEP Use Only | Indicate Page #(s) in Plan | Item Required |
|--------------------|----------------------------------|---|
| _____ | _____ | 1. Environmental Impact Assessment. (Planning Phase) The Uniform Environment Review (UER) replaces the Environmental Impact Assessment that was a previous requirement for PENNVEST projects. |
| _____ | _____ | 2. Cost Effectiveness (Planning Phase) The cost-effectiveness analysis should be a present-worth (or equivalent uniform annual) cost evaluation of the principle alternatives using the interest rate that is published annually by the Water Resources Council. Normally, for PENNVEST projects the applicant should select the most cost-effective alternative based upon the above analysis. Once the alternative has been selected the user fee estimates should be developed based upon interest rates and loan terms of the selected funding method. |
| _____ | | 3. Second Opinion Project Review. (Design Phase) |
| _____ | | 4. Minority Business Enterprise/Women's Business Enterprise (Construction Phase) |
| _____ | | 5. Civil Rights. (Construction Phase) |
| _____ | | 6. Initiation of Operation/Performance Certification. (Post-construction Phase) |

I/A TECHNOLOGIES

PARTIAL LISTING OF INNOVATIVE AND ALTERNATIVE TECHNOLOGIES

TREATMENT TECHNOLOGIES

Aquaculture
Aquifer Recharge
Biological Aerated Filters
Constructed Wetlands
Direct Reuse (NON-POTABLE)
Horticulture
Overland Flow
Rapid Infiltration
Silviculture
Microscreens
Controlled Release Lagoons
Swirl Concentrator

SLUDGE TREATMENT TECHNOLOGIES

Aerated Static Pile Composting
Enclosed Mechanical Composting (In vessel)
Revegetation of Disturbed Land
Aerated Windrow Composting

ENERGY RECOVERY TECHNOLOGIES

Anaerobic Digestion with more than 90 percent
Methane Recovery
Cogeneration of Electricity
Self-Sustaining Incineration

**INDIVIDUAL & SYSTEM-WIDE
COLLECTION TECHNOLOGIES**

Cluster Systems
Septage Treatment
Small Diameter Gravity Sewers
Step Pressure Sewers
Vacuum Sewers
Variable Grade Sewers
Septic Tank Effluent Pump with
Pressure Sewers

Table 4-2 below lists the areas having problems with OLDS and the type of systems in these areas.

| TABLE 4-2 IDENTIFICATION OF ON-LOT DISPOSAL SYSTEM PROBLEM AREAS (1) | |
|--|------------------------|
| AREA | USE |
| Edgewood Village Historic District | Residential/Commercial |
| Hillside and Spring Lanes | Residential |
| Delaware Rim Drive and Sunnyside Lanes | Residential |
| River Road/Robinson Place Area | Residential |
| Yardley-Newtown Road near Cultipacker Road | Residential |
| West Afton Avenue Area | Residential |

NOTES:

(1) Based upon information provided by the BCDH.

SECTION V

WASTEWATER PROJECTIONS AND FACILITIES EVALUATION

5.1 GENERAL

Section 2.2 herein details the objectives of this Plan Update. One of the most important objectives is to plan for public sewers to be provided to all future (large-scale) development.

Development activity has resulted in the extension of public sewers into all areas of the Township, including those areas in the northern and western portions of the Township which were once expected to remain unsewered. Current Township policy requires all new development to tie-in to public sewers where service lines are within a reasonable distance. This has, and will continue, to be the most practical solution for serving new development throughout the entire Township.

Another important objective of this Plan Update is to address the correction of malfunctioning OLDS, either through the proper maintenance and upgrade of these systems or extension of public sewers. A benefit analysis, evaluating these two methods, has determined that, for the protection of public health and the environment, as well as consideration of costs, public sewer service should be planned for these areas. This analysis is presented in Section 5.3 herein.

Except for a few scattered parcels which may continue to use OLDS, both of the above objectives require sewage facilities planning which addresses the extension of public sewer service throughout the entire Township. It is also important to note that these objectives are consistent with the Township's 1992 Master Plan and current Township policies.

5.2 PLANNED AND FUTURE DEVELOPMENT AREAS

5.2.1 Analysis of Population and Housing Growth

Table 5-1 herein presents the population and housing history of Lower Makefield Township, as per the U. S. Census Bureau, for 1970 through 1990. The table also presents the population and housing estimates/projections, as per the Bucks County Planning Commission, for 1996 through 2020.

TABLE 5-1
POPULATION AND HOUSING
LOWER MAKEFIELD TOWNSHIP

| YEAR | POPULATION | | HOUSING | | AVERAGE HOUSEHOLD SIZE |
|----------|------------|----------|---------|---------|------------------------|
| | PERSONS | % CHANGE | UNITS | %CHANGE | PERSON/DU |
| 1970 (1) | 14,804 | | 3,979 | | 3.72 |
| 1980 (1) | 17,351 | 17% | 5,534 | 39% | 3.13 |
| 1990 (1) | 25,083 | 45% | 8,861 | 60% | 2.83 |
| 1996 (2) | 31,067 | 24% | 11,059 | 25% | 2.81 |
| 2000 (3) | 28,820 | -7% | 11,010 | <-1% | 2.62 |
| 2010 (3) | 32,900 | 14% | 12,790 | 16% | 2.57 |
| 2020 (3) | 35,730 | 9% | 14,400 | 13% | 2.48 |

NOTES:

- (1) Based upon U.S. Census Bureau data.
- (2) Estimated by Bucks County Planning Commission.
- (3) Projected Median Population by Bucks County Planning Commission.

The trends illustrated by the table include the following:

- o Growth between 1980 and 1990 was very high.
- o Estimated growth between 1990 and 1996 was significant enough to exceed the year 2000 projections.
- o Growth after 2010 is anticipated to taper off.
- o The average household size has and will continue to decrease.

Interpretation of the trends that growth has occurred faster than the year 2000 projections and that growth after 2010 will taper off may mean that a majority of the undeveloped land remaining in Lower Makefield Township will be developed by the year 2010, or even sooner. Assuming this interpretation is correct, sewage facilities planning within this update will address the anticipated "build-out" of the Township, which is expected to occur within the next ten years.

5.2.2 Planned Development

Planned development consists of areas which are currently in the construction or planning phase of development. It should be noted that only 1997, and remaining connections from development in the construction phase, are included in the planned development unit projections. Connections from developments in the construction phase prior to 1997 are already included in the existing sewage flows. Planned development areas will be used to determine the sewage facilities needs of the Township within the next five years.

Table 5-2 presents the planned development within Lower Makefield Township. Exhibit 5-1 also illustrates these areas.

| TABLE 5-2 LOWER MAKEFIELD TOWNSHIP PLANNED DEVELOPMENT | | | |
|--|---------------------------|---------------------------------------|------------------|
| USE | DEVELOPMENT | NO. OF UNITS OR PROJECTED FLOWS | UNIT DESCRIPTION |
| Residential | Foley Tract | 26 | Single-Family |
| | Dolington Estates II | 42 | Single-Family |
| | Clearview Estates | 63 | Single-Family |
| | Towering Oaks | 9 | Single-Family |
| | Buck Hill Farms II | 33 | Single-Family |
| | Peake Farm | 33 | Single-Family |
| | Mill Road Estates | 45 | Single-Family |
| | Pebble Creek | 19 | Single-Family |
| | Estelle Smith Subdivision | 7 | Single-Family |
| | Oak Tree Farms | 10 | Single-Family |
| | Dolington Estates I | 86 | Single-Family |
| | Kapetanovic Subdivision | 4 | Single-Family |
| | Hidden Pond Estates | 27 | Single-Family |
| | Longshore Estates | 50 | Single-Family |
| | Ridings | 31 | Single-Family |
| | Willow Wisp | 3 | Single-Family |
| | Yardley Estates | 11 | Single-Family |
| | Farmview 4, 5 and 6 | 15 | Single-Family |
| | Bridle Estates | 74 | Single-Family |
| | Devonshire | 36 | Single-Family |
| | Santosa Estates | 30 | Single-Family |
| | Rock Run | 34 | Single-Family |
| | Sanctuary | 1 | Single-Family |
| | Afton Chase | 59 | Single-Family |
| | Lost Tree | 19 | Single-Family |
| | Pennsbury Walk | 5 | Single-Family |
| Hidden Oaks II | 1 | Single-Family | |
| Village at Makefields (Brookstone I) | 24 | Multi-Family | |

| TABLE 5-2 (CONT'D) LOWER MAKEFIELD TOWNSHIP PLANNED DEVELOPMENT | | | |
|---|--|---------------------------------------|--|
| USE | DEVELOPMENT | NO. OF UNITS OR PROJECTED FLOWS | UNIT DESCRIPTION |
| Commercial | Edgewood Point Bucks County Corp. Center (Bellmeade) | 1,530 gpd 155,000 gpd | Commercial Stores Office Campus |
| | Newtown Office Park Oxford Oaks | 57,630 gpd 15,000 gpd | Office Commercial Stores |
| Institutional | Bible Fellowship Church Yardley-Make Rescue Congregate Beth-El | 1,875 gpd 350 gpd 1,400 gpd | Church Ambulance Rescue Synagogue, Hall & School |

5.2.3 Future Development

Future development within the Township has been projected based on the current Lower Makefield Township Zoning Ordinance. Undeveloped tracts of land which have not been developed to their fullest potential and/or the current zoning are included in this category. Many of these tracts are currently used for agricultural purposes and have high development potential. Based on the most intensive use and density allowed by zoning, the future development of these areas has been projected. These projections shall be used to determine the future sewage facilities needs of the Township within the next ten years.

Table 5-3 presents the future development projected within Lower Makefield Township. Exhibit 5-1 also illustrates these areas.

| TABLE 5-3 LOWER MAKEFIELD TOWNSHIP FUTURE DEVELOPMENT PROJECTIONS | | | | | | |
|---|-----------|--------------------------|--|--------------------|---|---|
| USE | TMP | GROSS AREA (ACRES) | EST. NET DEVELOPMENT AREA* (ACRES) | ZONING DISTRICT | MAXIMUM ALLOWABLE DENSITY UNITS/ACRE OR % BLDG. COVERAGE | EST. NO. OF DU'S OR BLDG. AREA |
| Residential | 20-3-11-2 | 37.2 | 26.0 | R-1 | 1.0 | 26 |
| | 20-3-10 | 8.1 | 5.7 | R-1 | 1.0 | 5 |
| | 20-3-8 | 2.6 | 1.8 | R-1 | 1.0 | 1 |
| | 20-3-3 | 7.9 | 5.5 | R-1 | 1.0 | 5 |

TABLE 5-3 (CONT'D)
 LOWER MAKEFIELD TOWNSHIP
 FUTURE DEVELOPMENT PROJECTIONS

| USE | TMP | GROSS AREA (ACRES) | EST. NET DEVELOPMENT AREA* (ACRES) | ZONING DISTRICT | MAXIMUM ALLOWABLE DENSITY UNITS/ACRE OR % BLDG. COVERAGE | EST. NO. OF DU'S OR BLDG. AREA |
|----------------------|-------------|--------------------|------------------------------------|-----------------|--|--------------------------------|
| Residential (cont'd) | 20-3-2.1 | 85.9 | 60.13 | R-1 | 1.0 | 60 |
| | 20-3-2 | 44.3 | 31.01 | R-1 | 1.0 | 31 |
| | 20-3-28.2 | 11.0 | 7.7 | R-1 | 1.0 | 7 |
| | 20-3-28 | 19.9 | 13.9 | R-1 | 1.0 | 13 |
| | 20-3-41-4 | 14.8 | 10.4 | R-1 | 1.0 | 10 |
| | 20-27-5-2 | 11.5 | 8.0 | R-1 | 1.0 | 8 |
| | 20-27-8 | 13.6 | 9.5 | R-RP | 0.33 | 3 |
| | 20-27-7 | 25.9 | 18.1 | R-RP | 0.33 | 6 |
| | 20-20-120 | 19.6 | 13.7 | R-2 | 1.8 | 24 |
| | 20-20-113-4 | 3.2 | 2.2 | R-2 | 1.8 | 4 |
| | 20-20-113 | 29.2 | 20.4 | R-2 | 1.8 | 36 |
| | 20-31-4 | 9.8 | 6.9 | R-2 | 1.8 | 12 |
| | 20-16-30 | 27.5 | 19.2 | R-2 | 1.8 | 34 |
| | 20-16-30-2 | 4.4 | 3.1 | R-2 | 1.8 | 5 |
| | 20-16-31 | 4.0 | 2.8 | R-2 | 1.8 | 5 |
| | 20-16-31-1 | 2.3 | 1.6 | R-2 | 1.8 | 2 |
| | 20-16-20 | 18.0 | 12.6 | R-1 | 1.0 | 12 |
| | 20-16-23 | 5.9 | 4.1 | R-1 | 1.0 | 4 |
| | 20-16-35-1 | 6.6 | 4.6 | R-2 | 1.8 | 8 |
| | 20-16-27 | 7.5 | 5.2 | R-1 | 1.0 | 5 |
| | 20-18-1 | 11.2 | 7.8 | R-1 | 1.0 | 7 |
| | 20-18-1-2 | 2.8 | 2.0 | R-1 | 1.0 | 2 |
| | 20-16-2 | 36.3 | 25.4 | R-1 | 1.0 | 25 |
| | 20-16-11 | 108.6 | 76.0 | R-1 | 1.0 | 76 |
| 20-16-46 | 99.3 | 69.5 | R-1 | 1.0 | 69 | |

TABLE 5-3 (CONT'D)
 LOWER MAKEFIELD TOWNSHIP
 FUTURE DEVELOPMENT PROJECTIONS

| USE | TMP | GROSS AREA (ACRES) | EST. NET DEVELOPMENT AREA* (ACRES) | ZONING DISTRICT | MAXIMUM ALLOWABLE DENSITY UNITS/ACRE OR % BLDG. COVERAGE | EST. NO. OF DU'S OR BLDG. AREA |
|----------------------|------------|--------------------|------------------------------------|-----------------|--|--------------------------------|
| Residential (cont'd) | 20-16-49 | 127.6 | 89.3 | R-1 | 1.0 | 89 |
| | 20-16-12 | 50.6 | 35.4 | R-1 | 1.0 | 35 |
| | 20-12-25-1 | 9.2 | 6.4 | R-4 | 2.1** | 13 |
| | 20-32-36-1 | 5.7 | 4.0 | R-3 | 2.1** | 8 |
| | 20-34-54 | 5.1 | 3.6 | R-2 | 1.8 | 6 |
| | 20-34-60 | 15.7 | 11.0 | R-2 | 1.8 | 19 |
| | 20-34-43 | 33.4 | 23.4 | R-2 | 1.8 | 42 |
| | 20-34-44 | 15.0 | 10.5 | R-2 | 1.8 | 18 |
| | 20-16-73 | 39.0 | 27.3 | R-2 | 1.8 | 49 |
| | 20-16-69-1 | 14.3 | 10.0 | R-2 | 1.8 | 18 |
| | 20-16-69 | 17.0 | 11.9 | R-2 | 1.8 | 21 |
| | 20-16-94 | 8.9 | 6.2 | R-2 | 1.8 | 11 |
| | 20-34-132 | 44.6 | 31.22 | R-3M | 2.1 | 65 |
| | 20-53-44 | 42.3 | 29.6 | R-RP | 0.33 | 9 |
| | 20-53-42 | 55.6 | 38.9 | R-RP | 0.33 | 12 |
| | 20-52-2 | 7.1 | 5.0 | R-2 | 1.8 | 9 |
| | 20-49-38 | 8.9 | 6.2 | R-2 | 1.8 | 11 |
| | 20-49-37 | 2.9 | 2.0 | R-2 | 1.8 | 3 |
| | 20-49-36 | 5.9 | 4.1 | R-2 | 1.8 | 7 |
| | 20-49-34-2 | 4.9 | 3.4 | R-2 | 1.8 | 6 |
| | 20-49-34 | 3.0 | 2.1 | R-2 | 1.8 | 3 |
| | 20-41-1 | 2.3 | 1.6 | R-2 | 1.8 | 2 |
| | 20-41-32 | 2.5 | 1.7 | R-2 | 1.8 | 3 |
| | 20-34-127 | 5.7 | 4.0 | R-2 | 1.8 | 7 |
| 20-34-128 | 7.2 | 5.0 | R-2 | 1.8 | 9 | |

TABLE 5-3 (CONT'D)
 LOWER MAKEFIELD TOWNSHIP
 FUTURE DEVELOPMENT PROJECTIONS

| USE | TMP | GROSS AREA (ACRES) | EST. NET DEVELOPMENT AREA* (ACRES) | ZONING DISTRICT | MAXIMUM ALLOWABLE DENSITY UNITS/ACRE OR % BLDG. COVERAGE | EST. NO. OF DU'S OR BLDG. AREA |
|----------------------|-----------|--------------------|------------------------------------|-----------------|--|--------------------------------|
| Residential (cont'd) | 20-34-129 | 18.6 | 13.0 | R-2 | 1.8 | 23 |
| | 20-31-4 | 9.8 | 6.9 | R-RP | 0.33 | 2 |
| | 20-3-43-3 | 20.3 | 14.2 | R-1 | 1.0 | 14 |
| | 20-9-1-2 | 11.2 | 7.8 | R-1 | 1.0 | 7 |
| | 20-9-1 | 11.2 | 7.8 | R-1 | 1.0 | 7 |
| | 20-9-1-1 | 2.5 | 1.7 | R-1 | 1.0 | 1 |
| | 20-9-2 | 15.1 | 10.6 | R-1 | 1.0 | 10 |
| | 20-9-2-1 | 8.1 | 5.7 | R-1 | 1.0 | 5 |
| | 20-9-3-1 | 1.6 | 1.1 | R-1 | 1.0 | 1 |
| | 20-9-3 | 37.5 | 26.2 | R-1 | 1.0 | 26 |
| | 20-9-4-3 | 1.6 | 1.1 | R-1 | 1.0 | 1 |
| | 20-9-4-1 | 2.6 | 1.8 | R-1 | 1.0 | 1 |
| | 20-9-4 | 6.9 | 4.8 | R-1 | 1.0 | 4 |
| | 20-9-5 | 19.4 | 13.6 | R-1 | 1.0 | 13 |
| | 20-9-6 | 9.7 | 6.8 | R-1 | 1.0 | 6 |
| | 20-9-7 | 9.0 | 6.3 | R-1 | 1.0 | 6 |
| | 20-9-8 | 158.3 | 110.8 | R-1 | 1.0 | 110 |
| | 20-9-9 | 2.6 | 1.8 | R-RP | 0.33 | 1 |
| | 20-9-10 | 9.2 | 6.4 | R-RP | 0.33 | 2 |
| | 20-64-72 | 11.7 | 8.2 | R-1 | 1.0 | 8 |
| Commercial/ Office | 20-12-28 | 17.6 | 12.3 | C-3 | 35% | 187,525 SF |
| | 20-32-8-2 | 6.5 | 4.0 | C-3 | 35% | 68,607 SF |
| | 20-16-40 | 18.3 | 12.8 | O/R | 35% | 195,149 SF |
| | 20-16-39 | 10.2 | 7.1 | O/R | 35% | 108,247 SF |
| | 20-12-1 | 66.5 | 46.5 | O/R | 35% | 708,939 SF |

**TABLE 5-3 (CONT'D)
LOWER MAKEFIELD TOWNSHIP
FUTURE DEVELOPMENT PROJECTIONS**

| USE | TMP | GROSS AREA (ACRES) | EST. NET DEVELOPMENT AREA* (ACRES) | ZONING DISTRICT | MAXIMUM ALLOWABLE DENSITY UNITS/ACRE OR % BLDG. COVERAGE | EST. NO. OF DU'S OR BLDG. AREA |
|-----------------------|------------|--------------------|------------------------------------|-----------------|--|--------------------------------|
| Commercial/ Office | 20-12-1-1 | 8.9 | 6.2 | O/R | 35% | 94,525 SF |
| | 20-12-1-2 | 5.9 | 4.1 | O/R | 35% | 62,509 SF |
| | 20-12-6-3 | 31.2 | 21.8 | O/R | 35% | 332,363 SF |
| | 20-12-4 | 9.0 | 6.3 | H-C | 40% | 109,771 SF |
| | 20-32-12 | 1.6 | 1.1 | C-3 | 35% | 16,771 SF |
| | 20-32-13-1 | 1.3 | 0.9 | C-3 | 35% | 13,874 SF |

* Net development area estimated, based on 30% reduction in the gross area to account for rights-of-way, resource protected land, open space, etc.

** Due to lot size, maximum allowable density has been based on single-family home requirements.

5.3 EXISTING ON-LOT AREAS REQUIRING SEWER SERVICE

Section 4.2.2 herein describes areas of the Township identified to have malfunctioning OLDS. These areas have been identified based on information provided by the BCDH, the agency responsible for regulating their use. The areas identified are described as having older systems with chronic problems on relatively small lots. One of the objectives of this Plan Update is to address the correction of malfunctioning OLDS, either through the proper maintenance and upgrade of these systems or the extension of public sewers into these areas. Based on the benefit analysis presented in Table 5-4, it has been determined that the benefits of providing public sewer service to these areas outweigh the benefits of upgrading and continuing to maintain these systems. Therefore, these areas shall be included in the evaluation of public sewerage facilities needs of the Township. Based on the degree of need and interest expressed by property owners, the Edgewood Village Historic District and the River Road/Robinson Place Area will be considered in determining the sewage facility needs of the Township within the next five years. The remaining problem areas will be used in the evaluation of the ten year needs of the Township.

**TABLE 5-4
CORRECTION OF MALFUNCTIONING ON-LOT DISPOSAL SYSTEMS
BENEFIT ANALYSIS**

| CRITERIA | ALTERNATIVE BENEFIT | |
|--------------------------------|---|---|
| | UPGRADE AND MAINTENANCE OF SYSTEM | EXTENSION OF PUBLIC SEWERS |
| 1. Costs | <p>None: The most appropriate means of correcting a malfunctioning OLDS is by replacement of the leach field. This type of repair could range anywhere from \$15,000 to \$20,000 or more, depending on the type of system. In addition, these repairs/upgrades may only temporarily resolve problems, and due to soils, limited lot size and other site conditions, reoccurrence of malfunction(s) may occur.</p> <p>Maintenance and continual pumpage of a problem system could range between \$300 and \$2,000 per year, depending on how often pumpage occurs.</p> <p>Based upon a present worth analysis over a 20-year period, assuming an initial \$15,000 repair and another \$15,000 repair in year 20, along with pumping every year and a half until year 15, at which time pumping increases to twice per year, the overall present worth cost of upgrading and maintaining a malfunctioning OLDS would be \$22,462.</p> <p>The cost associated with repairing and maintaining a problem system may never be recouped in the sale of the property, and the stigma of having a "problem" system may make property resale difficult.</p> | <p>Slight: The costs associated with the extension of public sewers vary from area to area, dependent upon the facilities that are required to service the area in question. Assessment costs for the malfunctioning OLDS Areas identified herein are projected to range between \$12,000 and \$27,000 per unit, based upon current pricing information. However, in the past, assessment costs have been shared by the Township.</p> <p>Based upon a present worth analysis over a 20-year period, assuming an initial assessment to the property owner of \$13,600, which is approximately the cost of the two 5-year projects, and a sewer rate of \$224/unit/year, the overall present worth cost of public sewers would be \$16,391 per unit.</p> <p>In addition, any cost to the property owner should enhance the value of the property and, more than likely, be recouped in the resale of the property. Public sewer service is often viewed as a selling feature in marketing the sale of a property.</p> |
| 2. Protection of Public Health | <p>Slight to None: May only temporarily resolve problem. Reoccurrence of malfunction(s) may lead to sewage overflow or backups causing unsanitary conditions, which can lead to the spread of disease and harmful health effects.</p> | <p>Beneficial: Will permanently resolve problem and eliminate potential health problems.</p> |
| 3. Protection of Environment | <p>Slight to None: May only temporarily resolve problem. Reoccurrence of malfunction(s) may lead to surface discharge of sewage, killing wildlife and vegetation, especially harmful if discharge reaches a stream or watercourse.</p> | <p>Beneficial: Will permanently resolve problem and eliminate potential impacts on environment. Disturbance during construction will only be temporary and proper restoration will remedy any construction impacts.</p> |
| 4. Aesthetics | <p>Slight to None: May only temporarily resolve problem. Reoccurrence of malfunction(s) may lead to foul odors, soggy lawn areas and potential surface discharge of sewage. In addition, reoccurrence of malfunction(s) may result in backup(s) into houses, causing damage to property.</p> | <p>Beneficial: Will permanently resolve problem and eliminate any foul odors or unsightly conditions.</p> |

Table 5-5 provides a breakdown of the number of dwelling units in each area. Exhibit 5-1 illustrates the areas.

| TABLE 5-5 ON-LOT DISPOSAL SYSTEM PROBLEM AREAS NUMBER OF UNITS | | |
|--|------------------------|--------------|
| AREA | USE | NO. OF UNITS |
| Edgewood Village Historic District | Residential/Commercial | 29 |
| Hillside and Spring Lanes | Residential | 45 |
| Delaware Rim Drive and Sunnyside Lanes | Residential | 61 |
| River Road/Robinson Place Area | Residential | 28 |
| Yardley-Newtown Road near Cultipacker | Residential | 8 |
| West Afton Area | Residential | 8 |

5.4 WASTEWATER FLOW PROJECTIONS

5.4.1 Method of Projecting Wastewater Flows

Wastewater flow projections utilized in evaluating the existing public sewerage facilities within the Township are based on existing and future development to be served and a flow factor for each type of development. Section 5.2 of this Plan Update presents the planned and future development projected within the Township. Section 5.3 of this plan presents the number of dwelling units having malfunctioning OLDS which are planned to be served by public sewers. The flow factor to be used for each type of development is: 320 gpd/single family residential unit, 280 gpd/multi-family residential unit and 0.1 gpd/square foot of commercial/office building space. These flow factors are based upon prior analyses of wastewater flows performed by the Township and contain a sufficient allowance for potential infiltration and inflow.

Existing wastewater flows utilized in evaluating the existing agreements and sewage treatment plant capacities are based on an average of the daily flow for each existing Service Area over the past five years, unless otherwise noted. This five-year average was chosen because it is representative of both typical dry and wet weather periods which influence sewage flows through infiltration and inflow. Existing wastewater flows utilized in evaluating pumping and collection facilities of the Township are based on 1996 and up-to-date 1997 average flows.

5.4.2 Wastewater Flow Projections

Tables 5-6 through 5-10 project the wastewater flows for each of the five existing sewer systems serving Lower Makefield Township by agreement. These Service Areas and the Tables projecting their flows are as follows:

Yardley Borough: Table 5-6
 Morrisville Borough: Table 5-7
 Core Creek Interceptor: Table 5-8
 Middletown Township: Table 5-9
 Falls Township: Table 5-10

| TABLE 5-6 WASTEWATER FLOW PROJECTIONS YARDLEY BOROUGH SERVICE AREA | | | | | | |
|--|------------------------------------|--------------------|---|--------------------------------|-------------|----------------|
| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| 5-YEAR FLOW PROJECTIONS | | | | | | |
| PLANNED DEVELOPMENT (5-YEAR GROWTH AREAS) | | | | | | |
| Residential | Clearview Estates | Gravity | 63 DU'S | Single-Family | 320 GPD/DU | 20,160 |
| | Pebble Creek | Gravity | 19 DU'S | Single-Family | 320 GPD/DU | 6,080 |
| | Buck Hill Farms II | Fox Hill SPS | 33 DU'S | Single-Family | 320 GPD/DU | 10,560 |
| | Mill Road Estates | Fox Hill SPS | 45 DU'S | Single-Family | 320 GPD/DU | 14,400 |
| | Hidden Pond Estates | Yardley Est. SPS | 5 DU'S | Single-Family | 320 GPD/DU | 1,600 |
| | Yardley Estates | Yardley Est. SPS | 11 DU'S | Single-Family | 320 GPD/DU | 3,520 |
| | Longshore Estates | Gravity | 50 DU'S | Single-Family | 320 GPD/DU | 16,000 |
| | Ridings | Gravity | 31 DU'S | Single-Family | 320 GPD/DU | 9,920 |
| | Willow Wisp | Gravity | 3 DU'S | Single-Family | 320 GPD/DU | 960 |
| Commercial | Edgewood Point | Gravity | --- | Commercial Stores | ----- | 1,530 |
| Institutional | Yardley-Makefield Rescue | Fox Hill SPS | --- | Ambulance Service | --- | 350 |
| ON-LOT DISPOSAL SYSTEM PROBLEM AREAS (5-YEAR GROWTH AREAS) | | | | | | |
| Residential | River Road/Robinson Place Area | Gravity | 22 DU'S | Single-Family | 320 GPD/DU | 7,040 |
| Residential/Commercial | Edgewood Village Historic District | Gravity | 29 DU'S | Single-Family/Small Commercial | 320 GPD/DU | 9,280 |
| TOTAL OF 5-YEAR FLOW PROJECTIONS | | | | | | 101,400 |

| TABLE 5-6 (CONT'D) WASTEWATER FLOW PROJECTIONS YARDLEY BOROUGH SERVICE AREA | | | | | | |
|---|--------------------------|--------------------------|---|------------------|-------------|------------|
| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| 10-YEAR FLOW PROJECTIONS | | | | | | |
| FUTURE DEVELOPMENT (10-YEAR GROWTH AREAS) | | | | | | |
| Residential | 20-27-5-2 | Clearview SPS (Proposed) | 8 DU'S | Single-Family | 320 GPD/DU | 2,560 |
| | 20-27-8 | Clearview SPS (Proposed) | 3 DU'S | Single-Family | 320 GPD/DU | 960 |
| | 20-27-7 | Clearview SPS (Proposed) | 6 DU'S | Single-Family | 320 GPD/DU | 1,920 |
| | 20-20-120 | Gravity | 24 DU'S | Single-Family | 320 GPD/DU | 7,680 |
| | 20-20-113-4 | Gravity | 4 DU'S | Single-Family | 320 GPD/DU | 1,280 |
| | 20-20-113 | Gravity | 36 DU'S | Single-Family | 320 GPD/DU | 11,520 |
| | 20-31-4 | Gravity | 12 DU'S | Single-Family | 320 GPD/DU | 3,840 |
| | 20-16-30 | Gravity | 34 DU'S | Single-Family | 320 GPD/DU | 10,880 |
| | 20-16-30-2 | Gravity | 5 DU'S | Single-Family | 320 GPD/DU | 1,600 |
| | 20-16-31 | Gravity | 5 DU'S | Single-Family | 320 GPD/DU | 1,600 |
| | 20-16-31-1 | Gravity | 2 DU'S | Single-Family | 320 GPD/DU | 640 |
| | 20-16-20 | Gravity | 12 DU'S | Single-Family | 320 GPD/DU | 3,840 |
| | 20-16-23 | Gravity | 4 DU'S | Single-Family | 320 GPD/DU | 1,280 |
| | 20-16-35-1 | Gravity | 8 DU'S | Single-Family | 320 GPD/DU | 2,560 |
| | 20-16-27 | Gravity | 5 DU'S | Single-Family | 320 GPD/DU | 1,600 |
| | 20-18-1 | Gravity | 7 DU'S | Single-Family | 320 GPD/DU | 2,240 |
| | 20-18-1-2 | Gravity | 2 DU'S | Single-Family | 320 GPD/DU | 640 |
| | 20-16-2 | Gravity | 25 DU'S | Single-Family | 320 GPD/DU | 8,000 |
| | 20-16-11 | Gravity | 76 DU'S | Single-Family | 320 GPD/DU | 24,320 |
| | 20-16-46 | Gravity | 69 DU'S | Single-Family | 320 GPD/DU | 22,080 |
| 20-16-49 | Gravity | 89 DU'S | Single-Family | 320 GPD/DU | 28,480 | |
| 20-16-94 | Gravity | 11 DU'S | Single-Family | 320 GPD/DU | 3,520 | |
| 20-3-43-3 | Clearview SPS (Proposed) | 14 DU'S | Single-Family | 320 GPD/DU | 4,480 | |

TABLE 5-6 (CONT'D)
WASTEWATER FLOW PROJECTIONS
YARDLEY BOROUGH SERVICE AREA

| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
|----------------------|------------------------|--------------------------|---|------------------|-------------|------------|
| Residential (cont'd) | 20-9-1-2 | Clearview SPS (Proposed) | 7 DU's | Single-Family | 320 GPD/DU | 2,240 |
| | 20-9-1 | Clearview SPS (Proposed) | 7 DU'S | Single-Family | 320 GPD/DU | 2,240 |
| | 20-9-1-1 | Clearview SPS (Proposed) | 1 DU | Single-Family | 320 GPD/DU | 320 |
| | 20-9-2 | Clearview SPS (Proposed) | 10 DU'S | Single-Family | 320 GPD/DU | 3,200 |
| | 20-9-2-1 | Clearview SPS (Proposed) | 5 DU's | Single-Family | 320 GPD/DU | 1,600 |
| | 20-9-3-1 | Clearview SPS (Proposed) | 1 DU | Single-Family | 320 GPD/DU | 320 |
| | 20-9-3 | Clearview SPS (Proposed) | 26 DU'S | Single-Family | 320 GPD/DU | 8,320 |
| | 20-64-72 | Gravity | 8 DU'S | Single-Family | 320 GPD/DU | 2,560 |
| | 20-9-4-3 | Clearview SPS (Proposed) | 1 DU | Single-Family | 320 GPD/DU | 320 |
| | 20-9-4-1 | Clearview SPS (Proposed) | 1 DU | Single-Family | 320 GPD/DU | 320 |
| | 20-9-4 | Clearview SPS (Proposed) | 4 DU'S | Single-Family | 320 GPD/DU | 1,280 |
| | 20-9-5 | Clearview SPS (Proposed) | 13 DU'S | Single-Family | 320 GPD/DU | 4,160 |
| | 20-9-6 | Clearview SPS (Proposed) | 6 DU'S | Single-Family | 320 GPD/DU | 1,920 |
| | 20-9-7 | Clearview SPS (Proposed) | 6 DU'S | Single-Family | 320 GPD/DU | 1,920 |
| | 20-9-8 | Clearview SPS (Proposed) | 110 DU'S | Single-Family | 320 GPD/DU | 35,200 |
| | 20-9-9 | Clearview SPS (Proposed) | 1 DU | Single-Family | 320 GPD/DU | 320 |
| | 20-9-10 | Clearview SPS (Proposed) | 2 DU'S | Single-Family | 320 GPD/DU | 640 |
| | 20-34-54 | Fox Hill SPS | 6 DU'S | Single-Family | 320 GPD/DU | 1,920 |
| | 20-34-60 | Fox Hill SPS | 19 DU'S | Single-Family | 320 GPD/DU | 6,080 |

| TABLE 5-6 (CONT'D) WASTEWATER FLOW PROJECTIONS YARDLEY BOROUGH SERVICE AREA | | | | | | |
|---|--|--------------------|---|------------------|-------------|------------|
| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| Residential (cont'd) | 20-34-43 | Fox Hill SPS | 42 DU'S | Single-Family | 320 GPD/DU | 13,440 |
| | 20-34-44 | Fox Hill SPS | 18 DU'S | Single-Family | 320 GPD/DU | 5,760 |
| | 20-16-73 | Fox Hill SPS | 49 DU'S | Single-Family | 320 GPD/DU | 15,680 |
| | 20-16-69-1 | Yardley Est. SPS | 18 DU'S | Single-Family | 320 GPD/DU | 5,760 |
| | 20-16-69 | Yardley Est. SPS | 21 DU'S | Single-Family | 320 GPD/DU | 6,720 |
| Commercial | 20-12-4 | Gravity | 109,771 SF | Commercial | 0.1 GPD/SF | 10,977 |
| ON-LOT DISPOSAL SYSTEM PROBLEM AREAS (10-YEAR GROWTH AREAS) | | | | | | |
| Residential | Delaware Rim Drive and Sunnyside Lanes | Gravity | 61 DU'S | Single-Family | 320 GPD/DU | 19,520 |
| | Yardley-Newtown Road near Cultipacker Road | Gravity | 8 DU'S | Single-Family | 320 GPD/DU | 2,560 |
| | West Afton Avenue Area | Gravity | 8 DU'S | Single-Family | 320 GPD/DU | 2,560 |
| TOTAL OF 10-YEAR FLOW PROJECTIONS | | | | | | 305,377 |

| TABLE 5-7 WASTEWATER FLOW PROJECTIONS MORRISVILLE BOROUGH SERVICE AREA | | | | | | |
|--|------------------------------|------------------------|--|---------------------|----------------|---------------|
| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| 5-YEAR FLOW PROJECTIONS | | | | | | |
| PLANNED DEVELOPMENT (5-YEAR GROWTH AREA) | | | | | | |
| Residential | Estelle Smith Subdivision | Silver Lake SPS | 7 DU'S | Single-Family | 320 GPD/DU | 2,240 |
| | Hidden Pond Estates | Heacock Road SPS | 22 DU'S | Single-Family | 320 GPD/DU | 7,040 |
| | Peake Farm | Heacock Road SPS | 33 DU'S | Single-Family | 320 GPD/DU | 10,560 |
| | Foley Tract | Heacock Road SPS | 26 DU'S | Single-Family | 320 GPD/DU | 8,320 |
| | Pennsbury Walk | Silver Lake SPS | 3 DU'S | Single-Family | 320 GPD/DU | 960 |
| | Sanctuary | Sherwood Park SPS | 1 DU | Single-Family | 320 GPD/DU | 320 |
| | Afton Chase | Silver Lake SPS | 59 DU'S | Single-Family | 320 GPD/DU | 18,800 |
| | Lost Tree | Silver Lake SPS | 19 DU'S | Single-Family | 320 GPD/DU | 6,080 |
| | Hidden Oaks II | Silver Lake SPS | 1 DU | Single-Family | 320 GPD/DU | 320 |
| Institutional | Bible Fellowship Church | Silver Lake SPS | ---- | Church | ---- | 1,875 |
| TOTAL OF 5-YEAR FLOW PROJECTIONS | | | | | | 56,515 |
| 10-YEAR FLOW PROJECTIONS | | | | | | |
| FUTURE DEVELOPMENT (10-YEAR GROWTH AREA) | | | | | | |
| Residential | 20-53-44 | Black Rock Road SPS | 9 DU'S | Single-Family | 320 GPD/DU | 2,880 |
| | 20-53-42 | Gravity | 12 DU'S | Single-Family | 320 GPD/DU | 3,840 |
| Commercial/ Office | 20-12-28 | Heacock Road SPS | 187,526 SF | Commercial | 0.1 GPD/SF | 18,752 |
| | 20-32-12 | Heacock Road SPS | 16,771 SF | Commercial | 0.1 GPD/SF | 1,677 |
| | 20-32-13-1 | Heacock Road SPS | 13,874 SF | Commercial | 0.1 GPD/SF | 1,387 |
| TOTAL OF 10-YEAR FLOW PROJECTIONS | | | | | | 28,536 |

| TABLE 5-8 WASTEWATER FLOW PROJECTIONS CORE CREEK SERVICE AREA | | | | | | |
|---|---------------------------|------------------------------------|--|---------------------|----------------|----------------|
| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| 5-YEAR FLOW PROJECTIONS | | | | | | |
| PLANNED DEVELOPMENT (5-YEAR GROWTH AREA) | | | | | | |
| Residential | Dolington Estates I | Gravity | 86 DU'S | Single-Family | 320 GPD/DU | 27,520 |
| | Dolington Estates II | Gravity | 42 DU'S | Single-Family | 320 GPD/DU | 13,440 |
| | Towering Oaks | Gravity | 9 DU'S | Single-Family | 320 GPD/DU | 2,880 |
| | Kapetonovic | Gravity | 4 DU'S | Single-Family | 320 GPD/DU | 1,280 |
| | Farmview IV, V, VI | Gravity | 15 DU'S | Single-Family | 320 GPD/DU | 4,800 |
| | Bridle Estates | Gravity | 74 DU'S | Single-Family | 320 GPD/DU | 23,680 |
| | Devonshire | Gravity | 36 DU'S | Single-Family | 320 GPD/DU | 11,520 |
| | Brookstone I | Gravity | 24 DU'S | Multi-Family | 280 GPD/DU | 6,720 |
| Commercial/ | Newtown Office | Gravity | 576,300 | Office | 0.1 GPD/SF | 57,630 |
| TOTAL OF 5-YEAR FLOW PROJECTIONS | | | | | | 149,470 |
| 10-YEAR FLOW PROJECTIONS | | | | | | |
| ON-LOT DISPOSAL SYSTEM PROBLEM AREAS (10-YEAR GROWTH AREA) | | | | | | |
| Residential | Hillside and Spring | Gravity | 45 DU'S | Single-Family | 320 GPD/DU | 14,400 |
| FUTURE DEVELOPMENT (10-YEAR GROWTH AREA) | | | | | | |
| Residential | 20-3-11-2 | Gravity | 26 DU'S | Single-Family | 320 GPD/DU | 8,320 |
| | 20-3-10 | Gravity | 5 DU'S | Single-Family | 320 GPD/DU | 1,600 |
| | 20-3-8 | Gravity | 1 DU | Single-Family | 320 GPD/DU | 320 |
| | 20-3-3 | Gravity | 5 DU'S | Single-Family | 320 GPD/DU | 1,600 |
| | 20-3-2.1 | Gravity | 60 DU'S | Single-Family | 320 GPD/DU | 19,200 |
| | 20-3-2 | Gravity | 31 DU'S | Single-Family | 320 GPD/DU | 9,920 |
| | 20-3-28.2 | Gravity | 7 DU'S | Single-Family | 320 GPD/DU | 2,240 |
| | 20-3-28 | Gravity | 13 DU'S | Single-Family | 320 GPD/DU | 4,160 |
| | 20-3-41-4 | Farmview SPS (Not Dedicated) | 10 DU'S | Single-Family | 320 GPD/DU | 3,200 |
| | 20-16-12 | Gravity | 35 DU'S | Single-Family | 320 GPD/DU | 11,200 |
| Commercial/ Office | 20-16-40 | Gravity | 195,149 SF | Office | 0.1 GPD/SF | 19,515 |
| | 20-16-39 | Gravity | 108,247 SF | Office | 0.1 GPD/SF | 10,825 |
| | 20-12-1 | Gravity | 708,939 SF | Office | 0.1 GPD/SF | 70,894 |

| TABLE 5-8 (CONT'D) WASTEWATER FLOW PROJECTIONS CORE CREEK SERVICE AREA | | | | | | |
|--|---------------------------|-----------------------|--|---------------------|----------------|---------------|
| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| Commercial/ Office (cont'd) | 20-12-1-1 | Gravity | 94,525 SF | Office | 0.1 GPD/SF | 9,453 |
| | 20-12-1-2 | Gravity | 62,509 SF | Office | 0.1 GPD/SF | 6,251 |
| | 20-12-6-3 | Gravity | 332,363 SF | Office | 0.1 GPD/SF | 33,236 |
| TOTAL OF 10-YEAR FLOW PROJECTIONS | | | | | | 226,334 |

| TABLE 5-9 WASTEWATER FLOW PROJECTIONS MIDDLETOWN TOWNSHIP SERVICE AREA | | | | | | |
|--|---|-----------------------|--|---------------------|----------------|---------------|
| USE | DEVELOPMENT OR TMP NO. | RECEIVING FACILITY | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| 5-YEAR FLOW PROJECTIONS | | | | | | |
| PLANNED DEVELOPMENT (5-YEAR GROWTH AREA) | | | | | | |
| Office | Bucks County Corporate Center (Bellmeade) | Gravity | --- | Offices | ---- | 155,000 |
| Commercial | Oxford Oaks | Gravity | --- | Shopping Center | ---- | 15,000 |
| TOTAL OF 5-YEAR FLOW PROJECTIONS | | | | | | 170,000 |
| 10-YEAR FLOW PROJECTIONS | | | | | | |
| FUTURE DEVELOPMENT (10-YEAR GROWTH AREA) | | | | | | |
| Residential | 20-12-25-1 | Gravity | 13 DU'S | Single-Family | 320 GPD/DU | 4,160 |
| | 20-32-36-1 | Gravity | 8 DU'S | Single-Family | 320 GPD/DU | 2,560 |
| Commercial | 20-32-8-2 | Gravity | 68,607 SF | Commercial | 0.1 GPD/SF | 6,861 |
| TOTAL OF 10-YEAR FLOW PROJECTIONS | | | | | | 13,581 |

| TABLE 5-10 WASTEWATER FLOW PROJECTIONS FALLS TOWNSHIP SERVICE AREA | | | | | | |
|--|---------------------------|-----------------------------------|--|-----------------------------|----------------|---------------|
| USE | DEVELOPMENT OR TMP NO. | SERVICE OR CONTRACT AREA | PROPOSED OR EST. NO. OF UNITS OR BLDG. AREA | UNIT DESCRIPTION | FLOW FACTOR | FLOW (GPD) |
| 5-YEAR FLOW PROJECTIONS | | | | | | |
| PLANNED DEVELOPMENT (5-YEAR GROWTH AREA) | | | | | | |
| Residential | Oak Tree Farms | Service | 10 DU'S | Single-Family | 320 GPD/DU | 3,200 |
| | Santosa Estates | Contract | 30 DU'S | Single-Family | 320 GPD/DU | 9,600 |
| | Rock Run | Contract | 34 DU'S | Single-Family | 320 GPD/DU | 10,880 |
| | Pennsbury Walk | Contract | 2 DU'S | Single-Family | 320 GPD/DU | 640 |
| Institutional | Congregate Beth-El | Contract | ----- | Synagogue, Hall & School | ----- | 1,400 |
| TOTAL OF 5-YEAR FLOW PROJECTIONS | | | | | | 25,720 |
| 10-YEAR FLOW PROJECTIONS | | | | | | |
| FUTURE DEVELOPMENT (10-YEAR GROWTH AREA) | | | | | | |
| Residential | 20-34-132 | Contract | 65 DU'S | Single-Family | 320 GPD/DU | 20,800 |
| | 20-52-2 | Contract | 9 DU'S | Single-Family | 320 GPD/DU | 2,880 |
| | 20-34-127 | Contract | 7 DU'S | Single-Family | 320 GPD/DU | 2,240 |
| | 20-49-38 | Service | 11 DU'S | Single-Family | 320 GPD/DU | 3,520 |
| | 20-49-37 | Service | 3 DU'S | Single-Family | 320 GPD/DU | 960 |
| | 20-49-36 | Service | 7 DU'S | Single-Family | 320 GPD/DU | 2,240 |
| | 20-49-34-2 | Service | 6 DU'S | Single-Family | 320 GPD/DU | 1,920 |
| | 20-49-34 | Service | 3 DU'S | Single-Family | 320 GPD/DU | 960 |
| | 20-41-1 | Service | 2 DU'S | Single-Family | 320 GPD/DU | 640 |
| | 20-41-32 | Service | 3 DU'S | Single-Family | 320 GPD/DU | 960 |
| | 20-34-128 | Service | 9 DU'S | Single-Family | 320 GPD/DU | 2,880 |
| | 20-34-129 | Service | 23 DU'S | Single-Family | 320 GPD/DU | 7,360 |
| TOTAL OF 10-YEAR FLOW PROJECTIONS | | | | | | 47,360 |

5.5 ANALYSIS OF EXISTING FACILITIES AND SELECTION OF ALTERNATIVES TO SOLVE INADEQUACIES

5.5.1 General

The Township's existing sewerage facilities and current Capacity Agreements must be evaluated to determine their adequacy to accommodate the future projected sewage flows. If portions of the existing system prove inadequate, then these portions should be expanded, replaced or an alternative method of addressing the excess wastewater flows must be determined.

5.5.2 Capacity Agreements

Table 5-11 presents a summary of the existing Capacity Agreements with adjacent municipalities and a comparison with future needs to determine the adequacy of the current agreements.

As can be seen from this table, the existing Morrisville, Middletown, Falls and BCWSA agreements are adequate to serve the ultimate needs within their associated Service Area. The agreement with the Borough of Yardley does not currently provide for the additional ten-year flow anticipated in the Service Area, however, an upgrade to the Yardley Borough Sewage Pumping Station is currently underway, which may allow for an increase in allocated capacity.

5.5.3 Wastewater Treatment Plant Capacities

Table 5-11 also presents a summary of the permitted capacities of The City of Philadelphia, Northeast Wastewater Treatment Plant and the Borough of Morrisville Wastewater Treatment Plant. These facilities are used by Lower Makefield Township for sewage treatment, and a comparison of future flows to determine the adequacy of their capacities is also presented in the table. As can be seen, both plants appear to have sufficient capacity to handle the future flow projected for Lower Makefield Township.

**TABLE 5-11
ADEQUACY OF EXISTING CAPACITY AGREEMENTS
AND PERMITTED TREATMENT PLANT CAPACITIES
LOWER MAKEFIELD TOWNSHIP**

| AGREEMENTS | | | | | |
|---|---|-------------------------------|---------------------------------------|--|------------------------------|
| SERVICE AREA | CAPACITY ALLOCATED (MGD) | PAST 5-YR. AVERAGE FLOW (MGD) | 5-YR. PROJECTED ADDITIONAL FLOW (MGD) | 10-YR. PROJECTED ADDITIONAL FLOW (MGD) | ANTICIPATED TOTAL FLOW (MGD) |
| LMT and Borough of Morrisville | 3.097 | 2.232 (5) | 0.158 | 0.334 | 2.724 |
| LMT and Borough of Yardley (1) | 1,008 | 0.677 | 0.101 | 0.305 | 1.083* |
| LMT and Falls Township (Contract Area) (2) | 0.331 | 0.228 | 0.022 | 0.026 | 0.276 |
| LMT and Falls Township (Service Area) (3) | None Specified | 0.006 | 0.003 | 0.021 | 0.030 |
| LMT and Middletown Township | 0.535 | 0.143 | 0.170 | 0.014 | 0.327 |
| LMT and BCWSA (4) | None Specified (4) | 0.254 (5) | 0.149 | 0.226 | 0.629 |
| BCWSA and City of Philadelphia for Discharge of Neshaminy Interceptor | 20.0 | 18.68 | 0.345 (6) | 0.287 (6) | 19.31 (7) |
| PERMITTED TREATMENT PLANT CAPACITIES | | | | | |
| TREATMENT PLANT | PERMITTED CAPACITY (MGD) | PAST 5-YR. AVERAGE FLOW (MGD) | 5-YR. PROJECTED ADDITIONAL FLOW (MGD) | 10-YR. PROJECTED ADDITIONAL FLOW (MGD) | ANTICIPATED TOTAL FLOW (MGD) |
| City of Philadelphia, Northeast Wastewater Treatment Plant | 210.0 | 206.19 | 0.345 (6) | 0.287 (6) | 206.82 (7) |
| Borough of Morrisville Wastewater Treatment Plant | 7.1 | 4.55 (5) | 0.158 (6) | 0.334 (6) | 5.042 (7) |
| NOTES: | | | | | |
| (1) | Agreement for capacity in sewers and pumping station only. A portion of Township flows are transported through Yardley. | | | | |
| (2) | Agreement for Falls Township "Contract Area" only. | | | | |
| (3) | Falls Township "Service Area" only. No allocated capacity specified. | | | | |
| (4) | No capacity limits are specified. Service must be provided to all EDU's in Service Area. | | | | |
| (5) | Only 1995 and 1996 flows used to account for present discharge point of Heacock Road Sewage Pumping Station. | | | | |
| (6) | Reflects Lower Makefield Township flows only. | | | | |
| (7) | Reflects increase to past 5-year average flows resulting from Lower Makefield Township flow projections. | | | | |
| * | Potential capacity deficit. | | | | |

5.5.4 Pumping and Ejector Stations

The Township currently owns and maintains seven pumping stations and two ejector stations which are critical to the overall operation of the wastewater collection system. Table 5-12 lists these facilities and, with the exception of the Sherwood Park and Black Rock Road Sewage Pumping Stations, illustrates a theoretical capacity analysis of each facility, based upon existing operational records. The capacity of the Sherwood Park and Black Rock Road Sewage Pumping Stations has been based on a field flow study performed by CKS Engineers, Inc., dated May 27, 1998. This table also lists the projected flows which must be accommodated by each station. From this table, it can be seen that the Black Rock Road Sewage Pumping Station does not appear to have capacity adequate to accommodate future flows; moreover, the Black Rock Road Station does not appear to have capacity adequate for present flows. Based on the field flow study of this station, it appeared that the capacity problem with this station may be due to infiltration in the collection sewers tributary to the station. Correction of this problem could be performed by either increasing the capacity of the station's pumps or performing repairs on the collection sewers. For the purpose of this Plan Update, we have selected increasing the capacity of the station's pumps, however, further consideration of each of these alternatives should be given prior to initiating any work. It appears that the capacity of these pumps can be sufficiently increased by installing larger impellers and larger horsepower motors. This should also be further evaluated to confirm that this is all that will be needed to increase the capacity of this station.

It is important to mention that the Yardley Borough Pumping Station is utilized to pump the combined wastewater flows of the northern section of Lower Makefield and all of Yardley Borough and is owned and operated by the Yardley Borough Authority. This station is currently in the process of being upgraded in capacity from 1.44 mgd to 1.72 mgd to primarily address infiltration and inflow problems in the Yardley Borough collection system. Previous evaluations have determined the current capacity of this station to be capable of handling the future flow of the Service Area.

It is also important to mention that four new sewage pumping stations are proposed to be added to the existing Township sanitary sewer system. These facilities include: the Farmview Sewage Pumping Station and the Villages at the Makefields Sewage Pumping Station, which are in operation but have not yet been dedicated to the Township; the Clearview Estates Sewage Pumping Station and the Mill Road Estates Sewage Pumping Station, which are currently proposed.

All four of these stations have been sized to address the projected future flow of their potential Service Area.

| TABLE 5-12 ADEQUACY OF EXISTING SEWAGE PUMPING AND EJECTOR STATIONS | | | | | |
|--|--------------------|--------------------------------|---------------------------------------|--|------------------------------|
| FACILITY | CAPACITY (MGD) (1) | PRESENT AVERAGE FLOW (MGD) (2) | 5-YR. PROJECTED ADDITIONAL FLOW (MGD) | 10-YR. PROJECTED ADDITIONAL FLOW (MGD) | ANTICIPATED TOTAL FLOW (MGD) |
| Silver Lake Pumping Station | 0.484 | 0.435 | 0.030 | ----- | 0.465 |
| Sherwood Park Pumping Station | 0.199 | 0.199 (4) | ----- | ----- (3) | 0.199 |
| Black Rock Road Pumping Station | 0.200 | 0.329 (4) | ----- | 0.003 | 0.332 (*) |
| Yardley Oaks Pumping Station | 0.085 | 0.056 | ----- | ----- | 0.056 |
| Fox Hill Pumping Station | 0.209 | 0.089 | 0.030 | 0.055 | 0.174 |
| Yardley Estates Pumping Station | 0.081 | 0.030 | 0.005 | 0.012 | 0.047 |
| Heacock Road Pumping Station | 0.703 | 0.436 | 0.026 | 0.022 | 0.484 |
| Stackhouse Ejector Station | 0.030 | 0.012 | ----- | ----- | 0.012 |
| Maple Vale Ejector Station | 0.030 | 0.016 | ----- | ----- | 0.016 |

(1) Based upon current pump rating and an appropriate diurnal peaking factor.
 (2) Based upon existing operational records, unless otherwise noted.
 (3) Flow too insignificant to note.
 (4) Based on field flow study performed by CKS Engineers, Inc., dated May 27, 1998.
 (*) Potential capacity deficiency.

5.5.5 Collection System

The critical portions of the existing sewerage collection system must be analyzed to determine the amount of additional flow these sewers can accommodate. Most new developments will be served by extensions to the existing system and, therefore, available capacity in the existing collection sewers, trunk lines, and interceptors will be consumed with each new extension.

Table 5-13 evaluates those sections of sewers within the Township which are critical points for serving future wastewater flows. The average capacity of these sewer lines is listed along with the estimated existing flow. The ultimate flow to each sewer section is then listed and added to the estimated present flow to determine if the capacity will be adequate to accommodate projected flows. This table shows that the existing collection sewers, trunk lines, and interceptors within the Township are adequate to accommodate the projected ultimate flows.

Further evaluation of these sewer runs, based upon actual field flow studies, is recommended to confirm this determination. If a problem is found, a parallel relief sewer or the replacement of a line may be required to correct the problem.

It is important to mention that the Township does have some infiltration and inflow problems in their system and intends to rehabilitate two trunk lines in accordance with their ten-year capital improvements program. These lines are the Buck Creek Trunk Line and the Derbyshire Trunk Line.

| TABLE 5-13 ADEQUACY OF EXISTING COLLECTION/CONVEYANCE SEWERS | | | | | | |
|---|--------------|--------------------------------|--------------------------|--|---|---------------------------------------|
| SEWER RUN (MANHOLE TO MANHOLE) | SIZE (IN) | AVE. FLOW CAPACITY (MGD) | PRESENT FLOW (MGD) | 5-YR. PROJECTED AVE. FLOW (MGD) | 10-YR. PROJECTED AVE. FLOW (MGD) | PROJECTED TOTAL AVE. FLOW (MGD) |
| CANAL AND DELMORR INTERCEPTORS | | | | | | |
| 53-45 | 30 | 6.50 | 2.613 | .161 (1) | 1.083 (2) | 3.857 |
| 45-35 | 30 | 7.00 | 2.613 | .161 (1) | 1.083 (2) | 3.857 |
| 35-28 | 30 | 7.20 | 2.613 | .161 (1) | 1.083 (2) | 3.857 |
| 28-26 | 30 | 7.50 | 2.613 | .161 (1) | 1.083 (2) | 3.857 |
| 26-19 | 30 | 12.88 | 2.613 | .161 (1) | 1.083 (2) | 3.857 |
| 19-1A | 27 | 4.07 | 2.613 | .161 (1) | 1.083 (2) | 3.857 |
| 1A-T1A | 30 | 3.88 | 2.613 | .161 (1) | 1.083 (2) | 3.857 |
| HILLTOP ROAD EXTENSION TO BUCK CREEK TRUNK LINE | | | | | | |
| F260-F248 | 8 | 0.20 | 0.045 | 0.036 | 0.092 | 0.173 |
| F248-F545 | 8 | 0.24 | 0.045 | 0.036 | 0.092 | 0.173 |
| F545-F244 | 8 | 0.20 | 0.045 | 0.036 | 0.092 | 0.173 |
| F244-F237 | 8 | 0.20 | 0.045 | 0.036 | 0.092 | 0.173 |
| F237-F210 | 8 | 0.20 | 0.045 | 0.036 | 0.092 | 0.173 |
| BUCK CREEK TRUNK LINE | | | | | | |
| F217-F214 | 8 | 0.300 | 0.166 | 0.031 | 0.103 | 0.300 |
| F214-F211 | 10 | 0.36 | 0.220 | 0.031 | 0.103 | 0.354 |
| F211-F210 | 10 | 0.41 | 0.265 | 0.031 | 0.103 | 0.399 |
| F210-MCF201 | 12 | 0.62 | 0.310 | 0.067 | 0.210 | 0.587 |
| MCF201-YB181 | 12 | 0.66 | 0.310 | 0.067 | 0.210 | 0.587 |
| SANDY RUN ROAD/BROCK CREEK TRUNK LINE | | | | | | |
| F113-F112 | 8 | 0.20 | 0.115 | 0.030 | 0.055 | 0.200 |
| F112-F110 | 8 | 0.70 | 0.115 | 0.030 | 0.055 | 0.200 |

| TABLE 5-13 (CONT'D) ADEQUACY OF EXISTING COLLECTION/CONVEYANCE SEWERS | | | | | | |
|--|---|--------------------------------|--------------------------|--|---|---------------------------------------|
| SEWER RUN (MANHOLE TO MANHOLE) | SIZE (IN) | AVE. FLOW CAPACITY (MGD) | PRESENT FLOW (MGD) | 5-YR. PROJECTED AVE. FLOW (MGD) | 10-YR. PROJECTED AVE. FLOW (MGD) | PROJECTED TOTAL AVE. FLOW (MGD) |
| F110-F105 | 8 | 0.20 | 0.115 | 0.030 | 0.055 | 0.200 |
| F105-F104 | 8 | 0.45 | 0.115 | 0.030 | 0.055 | 0.200 |
| F104-F103 | 8 | 0.20 | 0.115 | 0.030 | 0.055 | 0.200 |
| F103-F102 | 10 | 0.32 | 0.213 | 0.030 | 0.055 | 0.300 |
| F102-F101A | 10 | 0.32 | 0.213 | 0.030 | 0.055 | 0.300 |
| F101A-MCF101 | 10 | 0.32 | 0.213 | 0.030 | 0.055 | 0.300 |
| YERKES INTERCEPTOR | | | | | | |
| MCBP-10 - BP-9 | 10 | 0.460 | 0.143 | 0.170 | 0.014 | 0.327 |
| BP-9 - BP-8 | 10 | 0.327 | 0.143 | 0.170 | 0.014 | 0.327 |
| BP-8 - BP-5 | 10 | 0.344 | 0.143 | 0.170 | 0.014 | 0.327 |
| BP-5 - BP-3 | 15 | 0.676 | 0.143 | 0.170 | 0.014 | 0.327 |
| BP-3 - BP-1 | 15 | 0.760 | 0.143 | 0.170 | 0.014 | 0.327 |
| CORE CREEK - NORTH SHORE INTERCEPTOR | | | | | | |
| 83-1 - NC-93 | 18 | 0.875 | 0.248 | 0.085 | 0.076 | 0.409 |
| NC-93 - NC-106 | 15 | 0.620 | 0.248 | 0.085 | 0.076 | 0.409 |
| NC-106 - NC-109 | 15 | 0.620 | 0.248 | 0.085 | 0.076 | 0.409 |
| NOTES: | | | | | | |
| (1) | Includes projected flow from Yardley Borough and Morrisville Borough Service Areas only. | | | | | |
| (2) | Includes projected flow from Yardley Borough and Morrisville Borough Services Areas, as well as projected ultimate flow from Yardley Borough. | | | | | |
| * | Potential capacity deficiency. (None found) | | | | | |

5.6 ANALYSIS AND SELECTION OF PUBLIC SEWER EXTENSIONS NEEDED TO SERVE MALFUNCTIONING ON-LOT DISPOSAL SYSTEM AREAS

Section 5.3 of this Plan Update determined that the extension of public sewers to existing on-lot disposal system problem areas would be of greater benefit in correcting malfunctioning systems than the upgrade and continued maintenance of these systems. Fortunately, the Township has previously evaluated serving each of the identified areas with public sewers and has recently updated estimated project costs. Table 5-14 below provides a brief description of each selected system and the estimated total project cost.

| TABLE 5-14 PUBLIC SEWER EXTENSIONS NEEDED TO SERVE ON-LOT DISPOSAL SYSTEM PROBLEM AREAS | | | |
|--|---|--|--|
| LOCATIONS | LATEST STUDY DATE | PROJECT DESCRIPTION | 1997 ESTIMATED TOTAL PROJECT COST (\$) |
| Edgewood Village Historic District | 03/17/95, however updated for this plan | To serve 29 residential, commercial and institutional units by either extending gravity sewers down Yardley-Langhorne and Stony Hill Roads, or installation of a low pressure sewer system. Each of the alternatives considered are as follows: | |
| | | 1. Extension of gravity sewers installed within cartway of roads. | \$469,863 |
| | | 2. Extension of gravity sewers installed outside cartway of roads in unimproved areas. | \$382,938 |
| | | 3. Low pressure system with individual sewage grinder pumps and common force main. | \$401,625 |
| River Road/Robinson Place | 01/14/98 | To serve 28 residential properties through either a low pressure sewer system or gravity sewer system. The two most cost-effective alternatives studied include installing these systems in unimproved easement areas. A description of the two most cost-effective alternatives considered is as follows: | |
| | | 1. Low pressure system with individual sewage grinder pumps and common force main. | \$394,035 |
| | | 2. Gravity collection system with single pumping station and force main for conveyance. | \$481,650 |
| Hillside and Spring Lanes | 10/21/88 | To serve 45 residential properties by extending approximately 4,660 L.F. of 8 inch gravity sewers throughout Hillside and Spring Lanes' area. Connection to existing system to be made at Core Creek Interceptor Manhole No. NC-90 of the Township. | \$488,000 |
| Delaware Rim Drive and Sunnyside Lane | 06/11/97 | To serve 61 residential properties by extending approximately 7,435 L.F. of 8 inch gravity sewers throughout Delaware Rim Drive and Sunnyside Lane area. | \$1,081,500 |
| West Afton Avenue | 05/02/94 | To serve 8 residential properties by extending approximately 1,220 L.F. of 8 inch gravity sewers down Yardley-Langhorne Road. Connection to existing system to be made at Manhole No. F103E4 of the Township in Lehigh Drive. | \$146,000 |
| Yardley-Newtown Road near Cultipacker Road | 05/20/91 | To serve 8 residential properties by extending approximately 1,550 L.F. of 8 inch gravity sewer along Yardley-Newtown Road. Connection to existing system to be made at stub manhole located near the intersection of Cultipacker Road. | \$212,850 |

5.7 COST ESTIMATE OF SELECTED NEW OR IMPROVED SEWERAGE FACILITIES TO SERVE FIVE-YEAR NEEDS

The cost to implement the selected alternatives to solve inadequacies in the existing sewer system to serve planned and future development, as well as the public sewer extensions required to serve on-lot disposal system problem areas included in the five-year needs of the plan, are detailed in Table 5-15. These estimates include construction cost plus contingency, engineering, surveying, inspection and legal/administrative costs.

It should be noted that the size and capacity of proposed sewage pumping station upgrades, force mains and gravity sewers addressed by this estimate will be capable of accommodating the ultimate or ten-year wastewater needs of the Township. Gravity sewers to extend throughout planned and future development areas are anticipated to be constructed by each development project and are not included in the cost estimate.

| TABLE 5-15 COST ESTIMATE OF SELECTED NEW OR IMPROVED SEWERAGE FACILITIES | |
|--|----------------------------------|
| PUBLIC SEWER EXTENSIONS NEEDED TO SERVE MALFUNCTIONING ON-LOT DISPOSAL SYSTEMS INCLUDED IN THE 5-YEAR NEEDS OF THE TOWNSHIP. | |
| AREA TO BE SEWERED | TOTAL CAPITAL COST (\$) |
| Edgewood Village Historic District | \$382,938* |
| River Road/Robinson Place | \$394,035* |
| SUBTOTAL | \$776,973 |
| REQUIRED SEWERAGE FACILITY IMPROVEMENTS | |
| PROJECT | ESTIMATED CONSTRUCTION COST (\$) |
| Black Rock Road Sewage Pumping Station Increase Pump Capacity (+ 230 gpm) | \$50,000** |
| CONSTRUCTION SUBTOTAL | \$50,000 |
| Contingency (10%) | \$5,000 |
| Engineering (10%) | \$5,000 |
| Surveying (5%) | \$2,500 |
| Inspection (15%) | \$7,500 |
| Legal/Administrative (5%) | \$2,500 |
| CAPITAL COST SUBTOTAL | \$72,500 |
| TOTAL CAPITAL COST | \$849,473 |
| * Lowest alternative cost utilized | |
| ** Includes pump impellers and motors replacement only | |

5.8 CONSISTENCY DETERMINATION OF SELECTED ALTERNATIVES

Consistency determinations between the selected sewage facility alternatives and other programs have been performed and are outlined in Table 5-16. Consistency with other programs assures the selection of the most appropriate alternatives which could be implemented. In addition, proposed sewage facilities will be constructed so as to be consistent with the existing programs. As indicated in the table, review requests will be submitted to the Pennsylvania Natural Diversity Inventory and the Pennsylvania Historical and Museum Commission during the Draft Plan Update review period.

| TABLE 5-16 CONSISTENCY DETERMINATION FOR SELECTED ALTERNATIVES | | | |
|--|-------------|----|---|
| POLICY | CONSISTENCY | | COMMENTS |
| | YES | NO | |
| 1 Comprehensive Water Quality Management Plans (COWAMP/208) | X | | Plan meets the overall management plan goals of this area of the region. |
| 2 Municipal Wasteload Management Plans (PA Code, Title 25, Chapter 94) | X | | Capacity availability in the sewage treatment plant, pump station(s) and interceptor proposed to handle additional wasteload as a result of this plan have been evaluated and addressed. |
| 3 Title II Act 201 Plans | X | | Lower Makefield Township has not undertaken any 201 studies. Increases in flows to selected treatment facility from planning area will not affect treatment technologies. |
| 4 Municipal Comprehensive Plans | X | | This Plan Update was prepared in accordance with the Township Comprehensive Plan and land use objectives. |
| 5 Chapters 93, 95 and 102 Antidegradation Requirements | X | | No discharge to special protection waters is proposed. Appropriate erosion and sedimentation control measures will be enforced. |
| 6 State Water Plan | X | | No significant water quantity or quality problems have been identified within the planning area. Well contamination incidents influenced by on-lot disposal problems will be mitigated through public sewer service to problem areas. |
| 7 Prime Agricultural Land | X | | Exhibit 3-2 identifies prime agricultural soils. A number of strategies have been implemented by the Township for farmland preservation in accordance with their Comprehensive Plan. |
| 8 Stormwater Management Plans | X | | Allowable discharge of selected wastewater treatment plant will not be increased. |
| 9 Wetland Protection | X | | Exhibit 3-3 identifies wetland areas throughout the planning area. Encroachment permits will be obtained, if necessary, prior to construction of any new sewerage facilities. |
| 10 PA Natural Diversity Inventory | X | | See attached Draft Plan Update review. |
| 11 Archaeological Protection | X | | See attached Draft Plan Update review. |

SECTION VI

PLAN IMPLEMENTATION

6.1 ABILITY TO IMPLEMENT PLAN

The Township of Lower Makefield is a Bucks County Township of the Second Class in the Commonwealth of Pennsylvania. The Township has the ability to create and adopt this Plan Update.

Implementation of the public sewage facility alternatives planned herein shall be implemented by the Township's Sewer Authority. The Authority owns the existing sewage collection system serving Lower Makefield Township and has the capability of expanding their collection system throughout the Township. With the exception of the Yardley Borough Capacity Agreement, the Township's existing agreements evaluated herein provide the additional capacity needed to convey and treat the projected wastewater to be generated by the Township. The Yardley Borough agreement will sufficiently handle the projected five-year flows anticipated, however, future development, or ten-year flows, may require additional capacity to be allocated.

6.2 FUNDING

Funding for the public sewage facility upgrades needed to serve planned and future development and provide public sewer service to on-lot disposal system problem areas identified in the five-year needs of this Plan Update is anticipated to be as follows:

- o Planned and Future Development Areas - Within planned development areas, funding for public sewage facilities will likely include developer financing and/or tapping fees.

Developer financed projects would include the construction of pump stations, force mains and sewage collection lines. Implementation of this method of funding would place all up front costs on the developer, with an opportunity to recapture part, or most, of the cost from future development connections to the sewer system.

The collection of tapping fees is also a method of funding public facility projects required to solve inadequacies in the existing sewer system. This method requires prospective users of the facilities to pay for the portion of the facilities they will utilize in the upgrade.

- o Public Sewer Service to Malfunctioning On-Lot Disposal System Areas - previous public sewerage facility projects within Lower Makefield Township which served malfunctioning on-lot disposal system areas have been funded through Benefit Assessments. This method of funding requires the property owners being served by the project to pay for the project. Assessment of costs to each property owner is equal for each

property owner served. In the past, Lower Makefield Township has contributed in part to the cost of these projects, thereby reducing the amount to be assessed to each property owner.

Another funding option to consider to fund the construction of facilities to malfunctioning on-lot disposal system areas is a Front-Foot Assessment. This method of funding also requires the property owners being served to pay for the project, however, assessment is based on the amount of road frontage they own.

- o Upgrade of Existing Sewerage Facilities to Address Existing Capacity Deficiencies - funding for upgrade to existing facilities to address existing deficiencies may be by Sewer Revenue Reserve Funds or General Obligation and Revenue Bonds.

Sewer Revenue Reserve Funds are monies collected through sewer fees which have been set aside for use in maintenance or upgrades to the sanitary sewer system.

General Obligation and Revenue Bonds are municipal bonds which are usually tax-exempt and are generally issued to finance construction and operation of public works projects. The General Obligation Bond carries low risks to the investor and a low interest rate. Revenue Bonds are paid from revenues collected from the use of public facilities such as publicly owned wastewater collection and treatment systems. The major advantages of these bonds are that they are tax-exempt and provide long-term fixed rate financing.

6.3 IMPLEMENTATION SCHEDULE

Table 6-1 outlines the proposed implementation schedule. Construction activities will begin once planning approval is obtained for the 537 Plan Update. All required permits will also be obtained prior to actual construction.

| TABLE 6-1 IMPLEMENTATION SCHEDULE | |
|---|-------------------------------|
| ACTIVITY | (PROJECTED) COMP. DATE |
| 537 PLAN UPDATE | |
| Preliminary Draft Completed for Informal Review by Lower Makefield Township Sewer Authority. | October 1997 |
| Preliminary Draft Comments Received from Authority and Revised Draft Completed and Presented to Lower Makefield Sewer Authority. | January 1998 |
| Present Revised Drawings to Lower Makefield Township Board of Supervisors for Review/Comment. | February 1998 |
| Comments Received from Township Board of Supervisors and Final Draft Completed. Make Available for Public Comment and Reviewing Agencies. | April 1998 |
| Local Review, Review by the Borough of Morrisville, Borough of Yardley, Middletown Township, Falls Township, the City of Philadelphia and the BCWSA. | June 1998 |
| Lower Makefield Township Planning Commission Review Lower Makefield Township Sewer Authority Review | June 1998 |
| Bucks County Planning Agency Review | June 1998 |
| Bucks County Health Department Review | June 1998 |
| PA Natural Diversity Inventory Search | June 1998 |
| PA Historical and Museum Commission Review | June 1998 |
| Final Document Completed | September 1998 |
| Approval/Adoption by Board of Supervisors | February 1999 |
| PA DEP Review Approval | June 1999 |
| CONSTRUCTION OF PUBLIC SEWERAGE FACILITIES | |
| Construction Completion | June 2004 |
| It should be noted that the time frame for the construction of sewerage facility upgrades and public sewer extensions required to serve various development or problem areas will vary, however, completion of these facilities is expected within the next five years. | |

APPENDIX A

MUNICIPAL ADOPTING RESOLUTION

RESOLUTION NO.

1023

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE TOWNSHIP OF LOWER MAKEFIELD ADOPTING AND SUBMITTING OFFICIAL SEWAGE FACILITIES PLAN (ACT 537) TO PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION FOR APPROVAL AS AN UPDATE AND REVISION TO THE OFFICIAL PLAN OF THE TOWNSHIP OF LOWER MAKEFIELD.

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

WHEREAS, CKS Engineers, Inc. has prepared a Sewage Facilities Plan Update which provides for sewage facilities throughout the Township, and

WHEREAS, LOWER MAKEFIELD TOWNSHIP finds that the Facilities 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 Lower Makefield hereby adopt and submit to the Department of Environmental Protection for its approval as an update and revision to the "Official Plan" of the municipality, the above-referenced Facilities 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.)

The alternative of choice to be implemented is as follows:

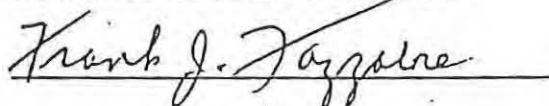
The extension of public sewer service to all planned and future development within the Township, as well as the extension of public sewer service to certain areas identified as having problems with malfunctioning on-lot disposal systems (OLDS).

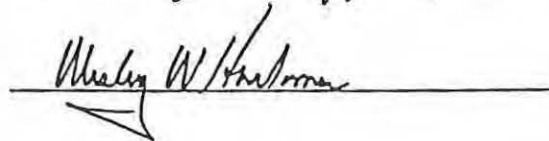
The OLDS problem areas identified in the five-year needs of the Township include: Edgewood Village Historic District and the River Road/Robinson Place area. The OLDS problem areas identified in the ten-year needs of the Township include: Hillside and Spring Lanes area, Delaware Rim Drive and Sunnyside Lane area, West Afon Avenue area, and the Yardley-Newtown Road area near Cultipacker Road.

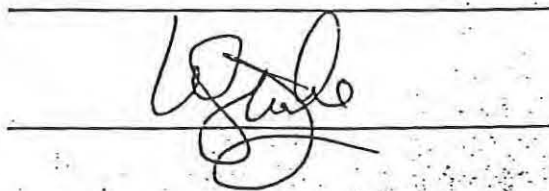
In order to implement this alternative, inadequacies in the existing sewer system will need to be corrected. These corrections include potentially increasing the pumping capacity of Black Rock Road Sewage Pumping Station, and potentially increasing the capacity allocated to Lower Makefield Township in their agreement with Yardley Borough.

This resolution was passed at a regular meeting of the Board of Supervisors, Lower Makefield Township on February 1, 1999.

BOARD OF SUPERVISORS
LOWER MAKEFIELD TOWNSHIP







CERTIFICATION

I, Secretary, Lower Makefield Board of Supervisors, hereby certify that the foregoing is a true and correct copy of the Township's Resolution No. 1023, adopted February 1, 1999.



APPENDIX B

PROOF OF PUBLIC NOTICE

Bucks County, ss.

RECEIVED
LOWER MAKEFIELD TWP
1998 JUN 12 AM 11:43

PUBLIC NOTICE
 Public Notice is hereby given that the Township of Lower Makefield, Bucks County, Pennsylvania, proposes to adopt an Official Sewage Facilities Plan Update in accordance with Pennsylvania Act 537. This Plan Update provides the planning for new sewage facilities and the upgrade of existing sewage facilities to accommodate planned future growth and development in the Township.
 Key features of the plan as currently proposed include the extension of public sewers to all future large scale development as well as the extension of public sewer service to six areas within the Township identified to have malfunctioning on-lot disposal systems. Also proposed by the Plan is the potential upgrade to two existing sewage pumping stations.
 A copy of the sewage facilities plan update can be reviewed at the Township Administration Building, 1100 Edgewood Road, Yardley, Pennsylvania, 8:00 A.M. to 4:30 P.M., Monday through Friday (excluding holidays) from June 3 to July 2, 1998.
 Written comments from the public regarding the Sewage Facilities Plan Upgrade will be received by the Township at the above address for 30 days following the first date of publication of this notice. All comments should be sent to the attention of the Township Board of Supervisors.
 Terry Fedorchak
 Township Manager
 Lower Makefield Township
 OT, June 2, 1998

Kathleen M. Schussler

.....being duly affirmed according to law, deposes and says that she is the

Billing Manager

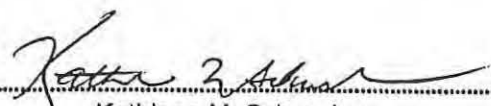
(Manager or designated Agent)

of the COURIER TIMES INC. Publisher of the Bucks County Courier Times, daily newspapers of general circulation, printed and published and having its place of business at Levittown, Bucks County, Pa.; that said newspaper was established in 1910; that securely attached hereto is a printed notice which is exactly as printed and published in said newspaper on

.....June 2, 7, 1998.....

and is a true copy of the original. Affiant is not interested in said subject matter or advertising; and that all of the allegations in this place and character of publication are true.

Affirmed and subscribed to before me
this 9th day of June
A.D. 1998


.....
Kathleen M. Schussler
Billing Manager



Notarial Seal
Maryellen McCann, Notary Public
Tullytown Boro, Bucks County
My Commission Expires Dec. 12, 1999
Member, Pennsylvania Association of Notaries

**"NO PUBLIC COMMENTS WERE RECEIVED AS A
RESULT OF THE PUBLIC ADVERTISEMENT, OR
THE PUBLIC MEETINGS WHERE THE PLANS
WERE DISCUSSED."**



Township of Lower Makefield

BOARD OF SUPERVISORS

Grace M. Godshalk, Chairman
William M. Strahle, Vice Chairman
Wesley W. Hackman, Jr., Secretary/Treasurer
Frank J. Fazzalore, Supervisor
Scott I. Fegley, Supervisor

September 10, 1998

Mr. Thomas Zarko, P.E.
CKS Engineers, Inc.
88 S. Main Street
Doylestown, PA 18901

Re: Act 537 Update

Dear Tom:

This is to advise you that no comments were received from the public during the thirty (30) day period terminating July 2, 1998 addressing the referenced document.

As discussed, the manuscript will be re-addressed at the September 24, 1998 Sewer Authority meeting prior to presentation to the Supervisors at their October 5, 1998 session.

Contact me if you have any questions.

Very truly yours,

Henry G. Hoffmeister
Sewer Administrator

HGH/dms

cc: Terry Fedorchak, Township Manager
Sewer Authority
John Koopman, Esq.
Jeffrey Garton, Esq.

APPENDIX C

CORRESPONDENCE REGARDING LOCAL AND COUNTY PLANNING AGENCY REVIEWS; COUNTY HEALTH DEPARTMENT REVIEW; STATE AGENCY REVIEWS; UTILITY AUTHORITY REVIEWS; AND APPLICABLE CORRESPONDENCE

APPENDIX C INDEX

**CORRESPONDENCE REGARDING LOCAL AND COUNTY
PLANNING AGENCY REVIEWS; COUNTY HEALTH
DEPARTMENT REVIEW; STATE AGENCY REVIEWS; UTILITY
AUTHORITY REVIEWS; AND APPLICABLE CORRESPONDENCE**

Bucks County Planning Commission

Review Letter of May 6, 1998
Response Letter of August 24, 1998

Bucks County Health Department

Review Letter of April 9, 1998

Lower Makefield Township Planning Commission

Recommendation Letter of June 23, 1998

Pennsylvania Department of Conservation and Natural Resources-PNDI
Search

Pennsylvania Natural Diversity Inventory (PNDI)
Review of June 1, 1998

Pennsylvania Historical and Museum Commission

Review Letter of April 16, 1998

Lower Makefield Township Municipal Authority

Minutes from Sewer Authority Meeting of September 24, 1998

Bucks County Water and Sewer Authority

Review Letter of August 4, 1998

City of Philadelphia, Water Department

Review Letter of May 6, 1998
Response Letter of August 24, 1998

Yardley Borough Sewer Authority

Request for Review Letter of March 27, 1998 - No Response

Morrisville Municipal Authority

Request for Review Letter of March 27, 1998 - No Response

Middletown Township Water and Sewer Department

Request for Review Letter of March 27, 1998 - No Response

Falls Township Water and Sewer Department

Request for Review Letter of March 27, 1998 - No Response



Robert E. Moore, *Executive Director*

May 6, 1998
BCPC #20-98-WS1

COUNTY COMMISSIONERS:
Chairman, CHARLES H. MARTIN
MICHAEL G. FITZPATRICK, Esq.
SANDRA A. MILLER

PLANNING COMMISSION:
Chairman, Robert H. Grunmeier
Vice Chairman, Geryl D. McMullin
Secretary, Clifford J. Worthington
Joseph J. Bonargo
Alan R. Fetterman
Susanne McKeon
James J. Stoekherth
Joseph G. Szafran, Jr.
Harold W. Tesno, Sr.

MEMORANDUM

TO: Lower Makefield Township Board of Supervisors
Lower Makefield Township Planning Commission

FROM: Bucks County Planning Commission

SUBJECT: Proposed Act 537 Sewerage Facilities Plan Update
Applicant: Board of Supervisors
Received: March 30, 1998
Hearing Date: Not Set

In accordance with the provisions of Sections 304 of the Pennsylvania Municipalities Planning Code, this proposal has been sent to the Bucks County Planning Commission for review. The review which follows was prepared by the staff and endorsed by the Bucks County Planning Commission at a meeting held on May 6, 1998.

GENERAL INFORMATION

Requested Action: To update the township's Act 537 Sewage Facilities Plan to be consistent with township policies regarding sewage facilities as outlined in the township's Comprehensive Master Plan Update 1992.

RECOMMENDATION: Adoption.

The Bucks County Planning Commission recommends that the township adopt the proposed Act 537 Sewerage Facilities Plan Update dated January 1998, based on its consistency with the sewage facilities objectives in the township's comprehensive plan. The Act 537 plan update, which provides a detailed analysis of the township's current and future wastewater needs, states that the main objectives of the plan are: (1) the servicing of all future (large-scale) development by public sewers, and (2) the extension of public sewers to service areas having existing malfunctioning on-lot disposal systems. To achieve these objectives, public sewer service has been planned for the entire township, except for some scattered parcels that may continue to use on-lot disposal systems.

We note that the plan acknowledges that some scattered parcels may continue to use on-lot disposal systems. Given the potential for failure of on-lot systems due to inadequate care and maintenance, it is recommended that the township consider adopting an on-lot disposal system (OLDS) management program which would contain an OLDS maintenance educational program. The township's Comprehensive Master Plan Update, adopted in 1992, recommends consideration of such a program (p. 57), however, the proposed Act 537 Plan update does not address this issue for those lots that are not intended to be connected to public sewers.

We would appreciate being notified of the Board of Supervisors' decision regarding this Act 537 plan update.

LMW:jam

cc: Begley, Carlin, & Mandio, William Carlin
CKS Engineers, Inc.
Terry Fedorchak, Manager
Henry Hoffmeister, Administrator, Township Sewer Authority

C**K****S**

CKS Engineers, Inc.
88 South Main Street
Doylestown, PA 18901
215/340-0600 • FAX 215/340-1655

David W. Connell, P.E.
Joseph J. Nolan, P.E.
Thomas F. Zarko, P.E.

August 24, 1998
Ref: #2478

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Bucks County Planning Commission
Neshaminy Manor Center
Doylestown, PA 18901

Attention: Robert E. Moore, Executive Director

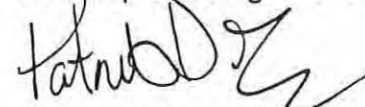
Reference: Township of Lower Makefield, Bucks County
Act 537 Sewage Facilities Plan Update

Dear Mr. Moore:

We are in receipt of your office's letter dated May 6, 1998 commenting on the Township of Lower Makefield's Act 537 Plan Update. This letter recommended adoption of the Plan Update provided that the Township consider adopting an on-lot disposal system (OLDS) management program for the scattered parcels throughout the Township which are not planned to be served by public sewers. In response to this comment, please note that the Township had discussed an OLDS management program with PADEP officials at the onset of this project, and it was decided that such a program was not necessary. This decision was noted in the approved PADEP checklist of requirements for the Plan Update.

Thank you for your input and cooperation on the Plan. If you have any questions, or any clarifications on this issue, please do not hesitate to call our office.

Very truly yours,
CKS ENGINEERS, INC.
Township Sewerage Consultants



Patrick P. DiGangi, EIT, AICP

PPD/ec

cc: Terry Fedorchak, Lower Makefield Township
Henry G. Hoffmeister, Lower Makefield Township
Thomas F. Zarko, CKS Engineers, Inc.
File



COUNTY OF BUCKS

DEPARTMENT OF HEALTH

Health Building, Neshaminy Manor Center, Doylestown, PA 18901 - 215 - 345 - 3318

FIELD OFFICES

Bucks County Government Services Center, 7321 New Falls Road, Levittown, PA 19055 -215- 949 - 5805

Bucks County Government Services Center 515 West End Blvd., Quakertown, PA 18951 -215- 536- 6500

County Commissioners

CHARLES H. MARTIN, Chairman

MICHAEL G. FITZPATRICK, ESQ.

SANDRA A. MILLER

Director

LEWIS D. POLK, M.D., M.P.H.

April 9, 1998

Mr. Patrick P. DiGangi, AICP

CKS engineers, Inc.

88 S. Main Street

Doylestown, PA 18901

SUBJECT: January 1988
Revised Draft
Act 537 Facilities Plan Update
Lower Makefield Township

Dear Mr. DiGangi:

We have reviewed the subject plan update transmitted to us by your letter March 27, 1998.

The plan was well prepared and we are glad to see that all areas with existing on-lot systems will be served with public sewers.

The Department would encourage the Township to give first priority to serving the Village of Edgewood. This area has a long history of on-site problems and cesspools/seepage pits are still utilized in the Village.

Sincerely yours,

Albert W. Wills, P.E., Chief

Division of Environmental Engineering

Aww/jvs

cc: Terry Fedorchak, Manager Township of Lower Makefield



Township of Lower Makefield

To: Terry S. Fedorchak, Township Manager

From: Nancy R. Frick, Director - Zoning, Inspections & Planning

Date: June 23, 1998

Re: Act #537 - Sewage Facilities Plan Update

At the Planning Commission meeting held on Monday, June 22, 1998 the Board moved (Deborah Gould, absent) to recommend to the Board of Supervisors approval of the Act #537 - Sewage Facilities Plan Update, dated January, 1998.

NRF/js

cc: Planning Commission Members

Duke Doherty, PC & S, Twp. Engr.

John Koopman,, Twp. Sol.

Jeff Garton, Twp. Sol.

Hank Hoffmeister, Sewer Administrator

Tom Zarko, CKS Engineers



Rachel Carson State Office Building
P.O. Box 8552
Harrisburg, PA 17105-8552
June 1, 1998

717-787-3444
fax 717-783-5109

Bureau of Forestry

Patrick P. DiGangi, AICP
CKS Engineers, Inc.
88 South Main Street
Doylestown, PA 18901

RE: PNDI Review for Act 537 Plan, Township of Lower Makefield, Bucks County, PA
PER reference no.: 006394

Dear Mr. DiGangi:

In response to your request of April 14, 1998, the Pennsylvania Natural Diversity Inventory (PNDI) information system was used to gather information regarding the presence of resources of special concern within the referenced site. There are **historic** occurrences within a mile and a half of the project area.

There are five **historic** occurrences within a mile and a half of the project area.

| <i>Scientific Name, Common Name</i> | PA Status | Proposed Stat. | Last observed | Habitat |
|--|--------------|----------------|---------------|---------------------------------------|
| <i>Panicum Longifolium</i> , Long -leaf Panic-Grass | Undetermined | --- | 1978 | Peaty and sandy bogs and shores |
| <i>Eleocharis Olivacea</i> , Captitate Spike-Rush | Rare | --- | 1925 | Wet pond margins and exposed peat |
| <i>Gentiana Saponaria</i> , Soapwort Gentian | Undetermined | Endangered | 1978 | Bogs, moist, open woods and roadsides |
| <i>Gentiana Saponaria</i> , Soapwort Gentian | Undetermined | Endangered | 1924 | Bogs, moist, open woods and roadsides |
| <i>Panicum Lucidum</i> , Shining Panic-Grass | Undetermined | Endangered | 1927 | Bogs, swamps, and , boggy swales |

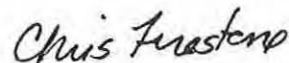
Please contact this office when the scope and boundaries of the project are more clearly defined. A more exact plan may reveal that these species will not be impacted and eliminate the need for a field examination of the site.

This response represents the most up-to-date summary of the PNDI data files and is applicable for one year. However, an absence of recorded information does not necessarily imply actual conditions on site. A field survey of any site may reveal previously unreported populations. Should project plans change or additional information on listed or proposed species become available this determination may be reconsidered.

PNDI is a site specific information system which describes significant natural resources of Pennsylvania. This system includes data descriptive of plant and animal species of special concern, exemplary natural communities and unique geological features. PNDI is a cooperative project of the Department of Conservation and Natural Resources, The Nature Conservancy and the Western Pennsylvania Conservancy.

Legal authority for Pennsylvania's biological resources resides with three administrative agencies. The enclosure titled PNDI Management Agencies, outlines which species groups are managed by these agencies. If information provided by the PNDI system is to be published in any form, the Inventory should be informed at the outset and credited as the source. Please phone this office if you have questions concerning this response or the PNDI system.

Sincerely,



Chris Firestone
Plant Program Specialist
Pennsylvania Natural Diversity Inventory

Enclosures

cc: file

PENNSYLVANIA BIOLOGICAL RESOURCE

MANAGEMENT AGENCIES

The statutory authority for Pennsylvania's animals and plants resides with three separate agencies. The Pennsylvania Department of Conservation and Natural Resources has the responsibility for management of the Commonwealth's native wild plants. The Pennsylvania Fish and Boat Commission is responsible for management of fish, reptiles, amphibians and aquatic organisms within the Commonwealth. The Pennsylvania Game Commission has the responsibility for managing the state's wild birds and mammals.

For information on current species status, please consult the appropriate agency. Requests for information should be directed to:

PLANTS and PNDI - general Plant Program Manager
PA Department of Conservation and Natural Resources
Bureau of Forestry
Forest Advisory Services
P.O. Box 8552
Harrisburg, PA 17105-8552
(717) 787-3444

**FISH, REPTILES,
AMPHIBIANS,
AQUATIC ORGANISMS** Endangered Species & Herpetology Coordinator
Pennsylvania Fish & Boat Commission
Bureau of Fisheries and Engineering
450 Robinson Lane
Bellefonte, PA 16823
(814) 359-5113

BIRDS and MAMMALS Pennsylvania Game Commission
Bureau of Wildlife Management
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
(717) 787-5529

For information on species listed under the federal Endangered Species Act of 1973 occurring in Pennsylvania, contact:

Endangered Species Biologist
U.S. Fish and Wildlife Service
315 South Allen Street, Suite 322
State College, PA 16801
(814) 234-4090



Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission

Bureau for Historic Preservation
Post Office Box 1026
Harrisburg, Pennsylvania 17108-1026
April 16, 1998

Patrick P. DiGangi, AICP
CKS Engineers, Inc.
88 South Main Street
Doylestown, PA 18901

TO EX: [unclear] 36
BHP REFERENCE NUMBER

Re: File No. ER 98-1381-017-A
PV, Act 537 Sewerage Facilities
Plan Update, Lower Makefield
Twp., Bucks Co.

Dear Mr. DiGangi:

The Bureau for Historic Preservation (the State Historic Preservation Office) has reviewed the above named project in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980 and 1992, and the regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation. These requirements include consideration of the project's potential effect upon both historic and archaeological resources.

This project is a planning study, therefore this office cannot assess the effects on specific historic and archaeological resources at this time. During the project planning stages, provisions should be made for the identification of historic and archaeological resources listed in or eligible for the National Register of Historic Places and for the assessment of the effects on these resources. The Bureau for Historic Preservation maintains records of National Register listed and eligible resources as well as archaeological surveys (P.A.S.S. files) and historic resource survey files. These surveys vary in their scope and methodology, therefore we recommend that you contact local historical societies and consult tax and deed records for additional information regarding your project area.

If you need further information regarding archaeological survey please contact Mark Shaffer at (717) 772-0924. If you need further information concerning historic structures please consult Ann Safley at (717) 787-9121.

Sincerely,

Kurt W. Carr, Chief
Division of Archaeology &
Protection

KC/tmw

*The Municipal Sewer Authority
of the Township of Lower Makefield*

*1100 Edgewood Road
Yardley, Pennsylvania 19067*

TO: Terry Fedorchak, Township Manager

FROM: Henry G. Hoffmeister, Sewer Administrator *H. Hoffmeister*

DATE: September 25, 1998

SUBJECT: Sewer Authority Meeting, 9/24/98

1. The Authority received the results of the Sewage Disposal Needs study done by CKS in June, 1998 and provided to the township thereafter. The study showed that 68% of the on-lot systems in the River Road/Robinson Place area are considered failing. This study was completed to be used in the submittal for Penn Vest funding.
2. CKS presented the results of the topographic study showing the two (2) potential rear yard routes for sewerling River Road/Robinson Place. The Authority endorsed the concept of the "new" rear yard route as being of benefit to the residents and township. The "new" route is more toward the rear of the River Road properties and contained within a 20 foot easement, thus addressing two concerns the residents had about a rear yard route. Tom Oliver was present, and is to present the route depictions to the residents the weekend of 9/26/98. He will obtain their thoughts, including easement grants at no costs, then forward those to you. Additionally, the Authority approved recommending to the Board of Supervisors that another joint meeting be held with the residents in the near future to move the project along.
3. The Authority recommends to the Board of Supervisors that the final draft of the Act 537 revision be reviewed and approved, approval preferably on October 5, 1998 for submittal to DEP.
4. The Authority directed the engineer and solicitor to inquire of Yardley Sewer Authority the remaining aspects of the pump station reconstruction project and the relationship to the intermunicipal agreement governing the work, and township's participation.

cc: Sewer Authority
Wesley Hackman
John Koopman, Esq.
Thomas Zarko, CKS



Bucks County Water and Sewer Authority

1275 ALMSHOUSE ROAD • WARRINGTON, PENNSYLVANIA 18976
215-343-2538 • 1-800-222-2068 • FAX 215-343-5089
EMAIL: email@buckswater—sewer.org

August 4, 1998

Patrick P. DiGangi
CKS Engineers, Inc.
88 South Main Street
Doylestown, PA 18901

Re: Lower Makefield Township - 537 Plan Update

Dear Mr. DiGangi:

We have reviewed the subject plan and have the following comments:

1. We have no objection to the material contained in the 537 Plan Update.
2. The City of Philadelphia Water Department (in their letter dated May 6, 1998) has expressed concerns regarding the impact of future projected flows on treatment capacity in the Northeast Philadelphia Sewage Treatment Plant, reserved by their agreement with BCWSA. We expect that these concerns will be sufficiently addressed as a result of the 1997 conversion of the Neshaminy billing system from an EDU basis, and the combined efforts of Municipal and Authority forces to eliminate Infiltration and Inflow (I/I).

If you have any questions, please contact this office.

Regards,

Glenn Argue
Engineering Manager

GA:pb

c: Andrew Samuelson, VP, P.E.
file

ga336





The ARAMARK Tower
1101 Market Street
Philadelphia, Pennsylvania 19107-2994

Kumar Kishinchand, P.E.
Commissioner

May 6, 1998

Patrick P. DiGangi, AICP
CKS Engineers, Inc.
88 South Main Street
Doylestown, PA 18901

SUBJECT: **Act 537 Sewage Facilities Plan Update
Township of Lower Makefield, Bucks County**

Dear Mr. DiGangi:

I have reviewed the draft copy of the Township's Act 537 Sewage Facilities Plan Update dated January 1998 you submitted to me and offer the following comments:

- A portion of the flow from Lower Makefield Township, as well as from several other municipalities in Bucks County, is conveyed to the City of Philadelphia through the Bucks County Water and Sewer Authority (BCW&SA) under the terms of an intermunicipal service agreement. This agreement provides for the treatment by the Philadelphia Water Department of an annual average sewage flow of 20.0 mgd through the Neshaminy Interceptor from BCW&SA. Table 5-11 lists the past five-year average flow from the BCW&SA to the Philadelphia Water Department to be 18.68 mgd. Our flow figures for the period January 1, 1995, to March 31, 1998, show that BCW&SA averaged 19.433 mgd with flows ranging from a low of 10.840 mgd on July 16, 1996, to a high of 42.985 mgd on December 14 and 15, 1996.
- We question conclusions reached in Sections 5.5.2 and 5.5.3 dealing with the adequacy of capacity to serve the future flow anticipated for Lower Makefield Township. Your flow analysis is based on adding the projected 10-year flow of 0.632 mgd from Lower Makefield to the five-year average for BCW&SA. However, there appears to be no consideration being given to additional future flows from other municipalities tributary to the Neshaminy Interceptor based on their Act 537 Plan revisions. For instance, in July 1996, the Township of Northampton revised its Act 537 Plan by proposing that an additional 0.56 mgd from the Township would be conveyed through the BCW&SA to the City's Northeast Water Pollution Control Plant. Based on our figures, sufficient capacity is not presently available for the proposed flow from Northampton or Lower Makefield.

- Notwithstanding the above, the figures presented in Table 5-11 indicate that the proposed additional flow from Lower Makefield limits future expansion in the areas of Bucks County served by the BCW&SA and the Philadelphia Water Department. This needs to be verified by and coordinated with the BCW&SA and the Bucks County Planning Commission.
- The Philadelphia Water Department has projected the average flow to the Northeast Plant in five years to be 197.0 mgd.

We appreciate the opportunity to comment on the Township of Lower Makefield Act 537 Plan Update. We look forward to being given the opportunity to comment on any revisions to the Update resulting from these and any other comments you may have received.

You may reach me by telephone (215-685-6367) or e-mail (*Leonard.Bernstein@phila.gov*) if you have any questions or if you wish to discuss our comments further.

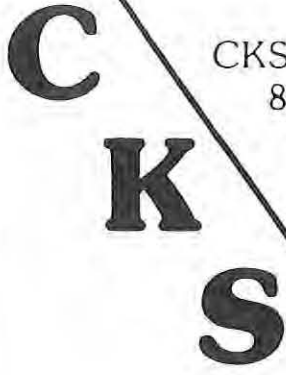
Sincerely,



LEONARD K. BERNSTEIN, P.E.
Special Projects Coordinator

lib/537/bucks/lower makefield/537 plan update comments

cc: Glenn K. Stinson, PADEP
Glenn Argue, BCW&SA
Lower Makefield Township
Bucks County Planning Commission
Bucks County Department of Health



CKS Engineers, Inc.
88 South Main Street
Doylestown, PA 18901
215/340-0600 • FAX 215/340-1655

David W. Connell, P.E.
Joseph J. Nolan, P.E.
Thomas F. Zarko, P.E.

August 24, 1998
Ref: #2478

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Philadelphia Water Department
The Aramark Tower
1101 Market Street
Philadelphia, PA 19107-2994

Attention: Leonard K. Bernstein, P.E.
Special Projects Coordinator

Reference: Township of Lower Makefield, Bucks County
Act 537 Sewerage Facilities Plan Update

Dear Mr. Bernstein:

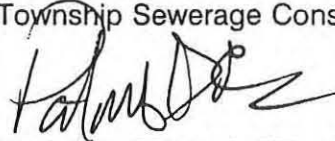
We are in receipt of your letter dated May 6, 1998 commenting on the Township of Lower Makefield's Act 537 Plan Update. After careful consideration of your comments we offer the following response. This response is in the same order as the comments contained in your letter.

1. We recognize that the average flow through the Bucks County Water and Sewer Authority (BCWSA), Neshaminy Interceptor calculated for a three-year, three-month period may differ slightly than the average flow calculated for a five-year period as presented in the Plan Update.. However, we believe this five-year period better demonstrates the average flow through the Interceptor by including a greater amount of wet and dry periods to be averaged.
2. & 3. These comments outlined your concerns regarding the impact of future projected flows on the treatment capacity of the Northeast Philadelphia Sewage Treatment Plant reserved by the agreement with BCWSA. Those concerns are best addressed by BCWSA's letter dated August 4, 1998, which indicates that these concerns should be sufficiently addressed as a result of the 1997 conversion of the Neshaminy billing system from an EDU basis, and combined efforts of the Municipal and Authority forces to eliminate Infiltration and Inflow (I-I). Attached for your convenience is a copy of the BCWSA letter.
4. We acknowledge that the Philadelphia Water Department has projected the average flow to the Northeast Plant to be 197.0 mgd in five years. The flow projected by the Plan Update in five years is somewhat higher than the Philadelphia Water Department

projection, therefore, if the Department's projection comes true, it should be to everyone's advantage.

Thank you for your input and cooperation on the plan. If you have any questions or require any clarification of the above issues, please do not hesitate to call our office.

Very truly yours,
CKS ENGINEERS, INC.
Township Sewerage Consultants



Patrick P. DiGangi, EIT, AICP

PPD/ec

Enclosure: BCWSA letter dated August 4, 1998

cc: Terry Fedorchak, Township Manager
Henry G. Hoffmeister, Sewer Administrator
Thomas F. Zarko, CKS Engineers
✓File

APPENDIX D

**ACT 537 PLAN CONTENT AND
ENVIRONMENTAL ASSESSMENT CHECKLIST**



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

Instructions for Completing Act 537 Plan Content and Environmental Assessment Checklist

Remove and recycle these instructions prior to submission

CHECKLIST INSTRUCTIONS

These instructions are designed to assist the applicant in completing the Act 537 Plan Content and Environmental Assessment Checklist.

This checklist is composed of three parts: one for "General Information," one for "Administrative Completeness," and one for "General Plan Content". A plan must be "administratively complete" in order to be formally reviewed by DEP. The General Plan Content portion of the checklist identifies each of the issues that must be addressed in your Act 537 Plan Update based on the pre-planning meeting between you and/or your consultant and DEP.

Use the right-hand column blanks in the checklist to identify the page in the plan on which each planning issue is found or to 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.

When information required as part of an official plan update revision has been developed separately or in a previous update revision, incorporate the information by reference to the planning document and page.

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

Wastewater projects proposing funding through the following sources must prepare an "Environmental Report" as described in the Uniform Environmental Review Process (UER) and include it with the plan submission designated as "Plan-Appendix A". The following funding programs use the UER process.

- The Clean Water State Revolving Loan Fund (PENNVEST, DEP, EPA)
- The RUS Water and Waste Disposal Grant and Loan Program (USDA-RD)
- The Community Development Block Grant Program (DCED, HUG)
- Other Federal Funding Efforts (EPA)

The checklist items or portions of checklist items required in the Act 537 Plan Update revision and that are also included in the UER process are indicated by shading. Most of the "Environmental Report" document may be constructed from the Act 537 Official Plan Update revision by using "copy & paste" techniques. The technical guidance document *Uniform Environmental Review Process* (UER) (DEP ID. 381-5511-111) is available electronically on DEP's website at www.depweb.state.pa.us.

After Municipal Adoption by Resolution, submit three copies of the plan, any attachments or addenda and this checklist to DEP.

A copy of this completed checklist must be included with your Act 537 plan. DEP will use the "DEP USE ONLY" column during the completeness evaluation of the plan. This column may also be used by DEP during the pre-planning meeting with the municipality to identify planning elements that are not required to be included in the plan.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

Act 537 Plan Content and Environmental Assessment Checklist

PART 1 GENERAL INFORMATION

A. Project Information

1. Project Name
2. Brief Project Description

B. Client (Municipality) Information

| | | | | |
|---|----------------|--------------------------|--------------------------|--------------------------|
| Municipality Name | County | City | Boro | Twp |
| | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Municipality Contact Individual - Last Name | First Name | MI | Suffix | Title |
| Additional Individual Last Name | First Name | MI | Suffix | Title |
| Municipality Mailing Address Line 1 | | Mailing Address Line 2 | | |
| Address Last Line -- City | | State | ZIP+4 | |
| Phone + Ext. | FAX (optional) | Email (optional) | | |

C. Site Information

| | |
|------------------------|-------------------------------|
| Site (or Project) Name | (Municipal Name) Act 537 Plan |
| Site Location Line 1 | Site Location Line 2 |

D. Project Consultant Information

| | | | |
|--------------------------|----------------------|------------------------|---------|
| Last Name | First Name | MI | Suffix |
| Title | Consulting Firm Name | | |
| Mailing Address Line 1 | | Mailing Address Line 2 | |
| Address Last Line - City | State | ZIP+4 | Country |
| Email | Phone + Ext. | FAX | |

PART 2 ADMINISTRATIVE COMPLETENESS CHECKLIST

| DEP Use Only | Indicate Page #(s) in Plan | In addition to the main body of the plan, the plan must include items one through eight listed below to be accepted for formal review by the department. Incomplete Plans will be returned unless the municipality is clearly requesting an advisory review. |
|--------------|----------------------------|--|
| _____ | <u>✓</u> | 1. Table of Contents |
| _____ | <u>✓</u> | 2. Plan Summary |
| _____ | <u>✓</u> | A. Identify the proposed service areas and major problems evaluated in the plan. (Reference - Title 25, §71.21.a.7.i). |
| _____ | <u>✓</u> | B. Identify the alternative(s) chosen to solve the problems and serve the areas of need identified in the plan. Also, include any institutional arrangements necessary to implement the chosen alternative(s). (Reference Title 25 §71.21.a.7.ii). |
| _____ | <u>✓</u> | C. Present the estimated cost of implementing the proposed alternative (including the user fees) and the proposed funding method to be used. (Reference Title 25, §71.21.a.7.ii). |
| _____ | <u>✓</u> | D. Identify the municipal commitments necessary to implement the Plan. (Reference Title 25, §71.21.a.7.iii). |
| _____ | <u>✓</u> | E. Provide a schedule of implementation for the project that identifies the MAJOR milestones with dates necessary to accomplish the project to the point of operational status. (Reference Title 25, §71.21.a.7.iv). |
| _____ | <u>✓</u> | 3. Municipal Adoption: Original, signed and sealed Resolution of Adoption by the municipality which contains, at a minimum, alternatives chosen and a commitment to implement the Plan in accordance with the implementation schedule. (Reference Title 25, §71.31.f) Section V.F. of the Planning Guide. |
| _____ | <u>✓</u> | 4. Planning Commission / County Health Department Comments: Evidence that the municipality has requested, reviewed and considered comments by appropriate official planning agencies of the municipality, planning agencies of the county, planning agencies with area wide jurisdiction (where applicable), and any existing county or joint county departments of health. (Reference-Title 25, §71.31.b) Section V.E.1 of the Planning Guide. |
| _____ | <u>✓</u> | 5. Publication: Proof of Public Notice which documents the proposed plan adoption, plan summary, and the establishment and conduct of a 30 day comment period. (Reference-Title 25, §71.31.c) Section V.E.2 of the Planning Guide. |
| _____ | <u>✓</u> | 6. Comments and Responses: Copies of ALL written comments received and municipal response to EACH comment in relation to the proposed plan. (Reference-Title 25, §71.31.c) Section V.E.2 of the Planning Guide. |
| _____ | <u>✓</u> | 7. Implementation Schedule: A complete project implementation schedule with milestone dates specific for each existing and future area of need. Other activities in the project implementation schedule should be indicated as occurring a finite number of days from a major milestone. (Reference-Title 25, §71.31.d) Section V.F. of the Planning Guide. Include dates for the future initiation of feasibility evaluations in the project's implementation schedule for areas proposing completion of sewage facilities for planning periods in excess of five years. (Reference Title 25, §71.21.c). |
| _____ | <u>✓</u> | 8. Consistency Documentation: Documentation indicating that the appropriate agencies have received, reviewed and concurred with the method proposed to resolve identified inconsistencies within the proposed alternative and consistency requirements in 71.21.(a)(5)(i-iii). (Reference-Title 25, §71.31.e). Appendix B of the Planning Guide. |

PART 3 GENERAL PLAN CONTENT CHECKLIST

| DEP Use Only | Indicate Page #(s) in Plan | Item Required |
|--------------|----------------------------|--|
| _____ | <u>✓</u> | I. Previous Wastewater Planning |
| _____ | <u>✓</u> | A. Identify, describe and briefly analyze all past wastewater planning for its impact on the current planning effort: |
| _____ | <u>✓</u> | 1. Previously undertaken under the Sewage Facilities Act (Act 537). (Reference-Act 537, Section 5 §d.1). |
| _____ | <u>✓</u> | 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. |
| _____ | <u>✓</u> | 3. Is anticipated or planned by applicable sewer authorities or approved under a Chapter 94 Corrective Action Plan. (Reference-Title 25, §71.21.a.5.i.A&B). Section V.D. of the Planning Guide. |
| _____ | <u>✓</u> | 4. Through planning modules for new land development, planning "exemptions" and addenda. (Reference-Title 25, §71.21.a.5.i.A). |
| _____ | <u>✓</u> | 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). |
| _____ | <u>✓</u> | A. Identification of planning area(s), municipal boundaries, Sewer Authority/Management Agency service area boundaries. (Reference-Title 25, §71.21.a.1.i). |
| _____ | <u>✓</u> | 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). |
| _____ | <u>✓</u> | C. Soils - Analysis with description by soil type and soils mapping for areas not presently served by sanitary sewer service. Show areas suitable for in-ground onlot 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). |
| _____ | <u>(5) ✓</u> | D. Geologic Features - (1) Identification through analysis, (2) mapping and (3) their relation to existing or potential nitrate-nitrogen pollution and drinking water sources. Include areas where existing nitrate-nitrogen levels are in excess of 5 mg/L. (Reference-Title 25, §71.21.a.1.iii). |
| _____ | <u>✓</u> | E. Topography - Depict areas with slopes that are suitable for conventional systems; slopes that are suitable for elevated sand mounds and slopes that are unsuitable for onlot systems. (Reference-Title 25, §71.21.a.1.ii). |
| _____ | <u>✓</u> | F. Potable Water Supplies - Identification through mapping, description and analysis. Include public water supply service areas and available public water supply capacity and aquifer yield for groundwater supplies. (Reference-Title 25 §71.21.a.1.vi). Section V.C. of the Planning Guide. |

- | | | |
|-------|-----|---|
| _____ | ✓ | G. Wetlands-Identify wetlands as defined in Title 25, Chapter 105 by description, analysis and mapping. Include National Wetland Inventory mapping and potential wetland areas per USDA, SCS mapped hydric soils. Proposed collection, conveyance and treatment facilities and lines must be located and labeled, along with the identified wetlands, on the map. (Reference-Title 25, §71.21.a.1.v). Appendix B, Section II.I of the Planning Guide. |
| _____ | ✓ | III. Existing Sewage Facilities in the Planning Area - Identifying the Existing Needs |
| _____ | ✓ | A. Identify, map and describe municipal and non-municipal, individual and community sewerage systems in the planning area including: |
| _____ | ✓ | 1. Location, size and ownership of treatment facilities, main intercepting lines, pumping stations and force mains including their size, capacity, point of discharge. Also include the name of the receiving stream, drainage basin, and the facility's effluent discharge requirements. (Reference-Title 25, §71.21.a.2.i.A). |
| _____ | NA | 2. A narrative and schematic diagram of the facility's basic treatment processes including the facility's NPDES permitted capacity, and the Clean Streams Law permit number. (Reference-Title 25, §71.21.a.2.i.A). |
| _____ | ✓ | 3. A description of problems with existing facilities (collection, conveyance and/or treatment), including existing or projected overload under Title 25, Chapter 94 (relating to municipal wasteload management) or violations of the NPDES permit, Clean Streams Law permit, or other permit, rule or regulation of DEP. (Reference-Title 25, §71.21.a.2.i.B). |
| _____ | NA | 4. Details of scheduled or in-progress upgrading or expansion of treatment facilities and the anticipated completion date of the improvements. Discuss any remaining reserve capacity and the policy concerning the allocation of reserve capacity. Also discuss the compatibility of the rate of growth to existing and proposed wastewater treatment facilities. (Reference-Title 25, §71.21.a.4.i & ii). |
| _____ | NA | 5. A detailed description of the municipality's operation and maintenance requirements for small flow treatment facility systems, including the status of past and present compliance with these requirements and any other requirements relating to sewage management programs. (Reference-Title 25, §71.21.a.2.i.C). |
| _____ | NA | 6. Disposal areas, if other than stream discharge, and any applicable groundwater limitations. (Reference-Title 25, §71.21.a.4.i & ii). |
| _____ | (✓) | B. Using DEP's publication titled <i>Sewage Disposal Needs Identification</i> , identify, map and describe areas that utilize individual and community onlot 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 onlot systems in use. (Reference-Title 25, §71.21.a.2.ii.A). |
| _____ | (✓) | 2. A sanitary survey complete with description, map and tabulation 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 onlot 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). |

(3 parameters).

____ (✓)

4. An individual water supply survey to identify possible contamination by malfunctioning onlot sewage disposal systems consistent with DEP's *Sewage Disposal Needs Identification* publication. (Reference-Title 25 §71.21.a.2.ii.B).

____ (NA)

5. Detailed description of operation and maintenance requirements of the municipality for individual and small volume community onlot systems, including the status of past and present compliance with these requirements and any other requirements relating to sewage management programs. (Reference-Title 25, §71.21.a.2.i.C).

____ NA

C. Identify wastewater sludge and septage generation, transport and disposal methods. Include this information in the sewage facilities alternative analysis including:

____ NA

1. Location of sources of wastewater sludge or septage (Septic tanks, holding tanks, wastewater treatment facilities). (Reference-Title 25 §71.71).

____ NA

2. Quantities of the types of sludges or septage generated. (Reference-Title 25 §71.71).

____ NA

3. Present disposal methods, locations, capacities and transportation methods. (Reference-Title 25 §71.71).

____ ✓

IV. Future Growth and Land Development

A. Identify and briefly summarize all municipal and county planning documents adopted pursuant to the Pennsylvania Municipalities Planning Code (Act 247) including:

____ ✓

1. All land use plans and zoning maps that identify residential, commercial, industrial, agricultural, recreational and open space areas. (Reference-Title 25, §71.21.a.3.iv).

____ ✓

2. Zoning or subdivision regulations that establish lot sizes predicated on sewage disposal methods. (Reference – Title 25§71.21.a.3.iv).

____ ✓

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.

B. Delineate and describe the following through map, text and analysis.

____ ✓

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 EDU's remaining to be developed (include time schedule for EDU's remaining to be developed). (Reference-Title 25, §71.21.a.3.i).

____ ✓

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).

____ ✓

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).

_____ ✓

4. Zoning, and/or subdivision regulations; local, county or regional comprehensive plans; and existing plans of any other agency relating to the development, use and protection of land and water resources with special attention to: (Reference-Title 25, §71.21.a.3.iv).

- public ground/surface water supplies
- recreational water use areas
- groundwater recharge areas
- industrial water use
- wetlands

_____ NA

5. Sewage planning necessary to provide adequate wastewater treatment for five and ten year future planning periods based on projected growth of existing and proposed wastewater collection and treatment facilities. (Reference-Title 25, §71.21.a.3.v).

V. Identify Alternatives to Provide New or Improved Wastewater Disposal Facilities

A. Conventional collection, conveyance, treatment and discharge alternatives including:

_____ NA

1. The potential for regional wastewater treatment. (Reference-Title 25, §71.21.a.4).

_____ ✓

2. The potential for extension of existing municipal or non-municipal sewage facilities to areas in need of new or improved sewage facilities. (Reference-Title 25, §71.21.a.4.i).

_____ ✓

3. The potential for the continued use of existing municipal or non-municipal sewage facilities through one or more of the following: (Reference-Title 25, §71.21.a.4.ii).

_____ ✓

a. Repair. (Reference-Title 25, §71.21.a.4.ii.A).

_____ ✓

b. Upgrading. (Reference-Title 25, §71.21.a.4.ii.B).

_____ ✓

c. Reduction of hydraulic or organic loading to existing facilities. (Reference-Title 25, §71.71).

_____ ✓

d. Improved operation and maintenance. Reference-Title 25, §71.21.a.4.ii.C).

_____ ✓

e. Other applicable actions that will resolve or abate the identified problems. (Reference-Title 25, §71.21.a.4.ii.D).

_____ ✓

4. Repair or replacement of existing collection and conveyance system components. (Reference-Title 25, §71.21.a.4.ii.A).

_____ ✓

5. The need for construction of new community sewage systems including sewer systems and/or treatment facilities. (Reference-Title 25, §71.21.a.4.iii).

_____ NA

6. Use of innovative/alternative methods of collection/conveyance to serve needs areas using existing wastewater treatment facilities. (Reference-Title 25, §71.21.a.4.ii.B).

_____ NA

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).

_____ |

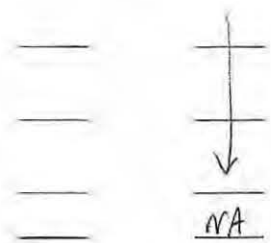
2. Preliminary hydrogeologic evaluation. (Reference-Title 25, §71.21.a.2.ii.C).

_____ |

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

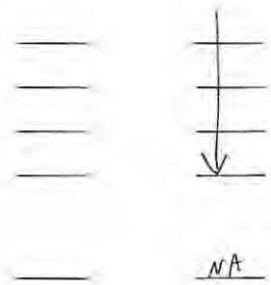


areas suitable for onlot disposal considering: (Reference-Title 25, §71.21.a.4).

- 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).

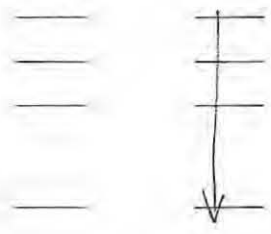
C. The use of small flow sewage treatment facilities or package treatment facilities to serve individual homes or clusters of homes with consideration of: (Reference-Title 25, §71.64.d).

- 1. Treatment and discharge requirements. (Reference-Title 25, §71.64.d).
- 2. Soil suitability. (Reference-Title 25, §71.64.c.i).
- 3. Preliminary hydrogeologic evaluation. (Reference-Title 25, §71.64.c.2).
- 4. Municipal, Local, Agency or other controls over operation and maintenance requirements through a Sewage Management Program. (Reference-Title 25, §71.64.d). See Part "F" below.



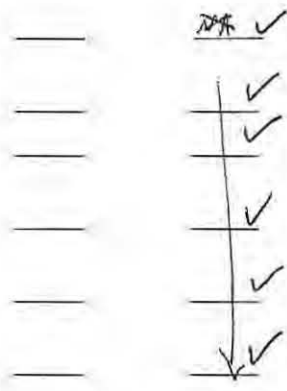
D. The use of community land disposal alternatives including:

- 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. Municipality, Local Agency or Other 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.



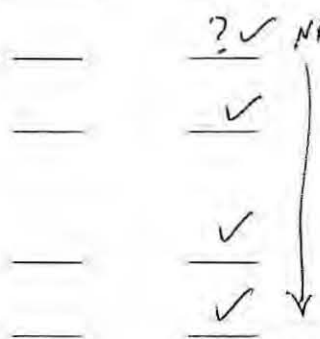
E. The use of retaining tank alternatives on a temporary or permanent basis including: (Reference- Title 25, §71.21.a.4).

- 1. Commercial, residential and industrial use. (Reference-Title 25, §71.63.e).
- 2. Designated conveyance facilities (pumper trucks). (Reference-Title 25, §71.63.b.2).
- 3. Designated treatment facilities or disposal site. (Reference-Title 25, §71.63.b.2).
- 4. Implementation of a retaining tank ordinance by the municipality. (Reference-Title 25, §71.63.c.3). See Part "F" below.
- 5. Financial guarantees when retaining tanks are used as an interim sewage disposal measure. (Reference-Title 25, §71.63.c.2).



F. Sewage Management Programs to assure the future operation and maintenance of existing and proposed sewage facilities through:

- 1. Municipal ownership or control over the operation and maintenance of individual onlot sewage disposal systems, small flow treatment facilities, or other traditionally non-municipal treatment facilities. (Reference-Title 25, §71.21.a.4.iv).
- 2. Required inspection of sewage disposal systems on a schedule established by the municipality. (Reference-Title 25, §71.73.b.1.).
- 3. Required maintenance of sewage disposal systems including septic and aerobic treatment tanks and other system components on a schedule



- | | | |
|-------|------------------|---|
| _____ | ✓ | established by the municipality. (Reference-Title 25, §71.73.b.2). |
| _____ | ✓ | 4. Repair, replacement or upgrading of malfunctioning onlot sewage systems. (Reference-Title 25, §71.21.a.4.iv) and §71.73.b.5 through: |
| _____ | ✓ | a. Aggressive pro-active enforcement of ordinances that require operation and maintenance and prohibit malfunctioning systems. (Reference-Title 25, §71.73.b.5). |
| _____ | ✓ | b. Public education programs to encourage proper operation and maintenance and repair of sewage disposal systems. |
| _____ | ✓ | 5. Establishment of joint municipal sewage management programs. (Reference-Title 25, §71.73.b.8). |
| _____ | ✓ | 6. Requirements for bonding, escrow accounts, management agencies or associations to assure operation and maintenance for non-municipal facilities. (Reference-Title 25, §71.71). |
| _____ | XXX ✓ | G. Non-structural <u>comprehensive planning</u> 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 that 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). |
| _____ | ✓ | 1. Water Quality/Public Health. (Reference-Title 25, §71.21.a.4). |
| _____ | ✓ | 2. Growth potential (residential, commercial, industrial). (Reference-Title 25, §71.21.a.4). |
| _____ | ✓ | 3. Community economic conditions. (Reference-Title 25, §71.21.a.4). |
| _____ | ✓ | 4. Recreational opportunities. (Reference-Title 25, §71.21.a.4). |
| _____ | ✓ | 5. Drinking water sources. (Reference-Title 25, §71.21.a.4). |
| _____ | ✓ | 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.). |
| _____ | ✓ | 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.
2. **Municipal wasteload management Corrective Action Plans or Annual Reports** developed under PA Code, Title 25, Chapter 94. (Reference-Title 25, §71.21.a.5.i.B). The municipality's recent Wasteload Management (Chapter 94) Reports should be examined to determine if the proposed alternative is consistent with the recommendations and findings of the report. Appendix B, Section II.B of the Planning Guide.
 3. Plans developed under **Title II of the Clean Water Act** (33 U.S.C.A. 1281-1299) or **Titles II and VI of the Water Quality Act of 1987** (33 U.S.C.A. 1251-1376). (Reference-Title 25, §71.21.a.5.i.C). Appendix B, Section II.E of the Planning Guide.
 4. **Comprehensive plans** developed under the Pennsylvania Municipalities Planning Code. (Reference-Title 25, §71.21.a.5.i.D). The municipality's comprehensive plan must be examined to assure that the proposed wastewater disposal alternative is consistent with land use and all other requirements stated in the comprehensive plan. Appendix B, Section II.D of the Planning Guide.
 5. **Antidegradation requirements** as contained in PA Code, Title 25, Chapters 93, 95 and 102 (relating to water quality standards, wastewater treatment requirements and erosion control) and the Clean Water Act. (Reference-Title 25, §71.21.a.5.i.E). Appendix B, Section II.F of the Planning Guide.
 6. **State Water Plans** developed under the Water Resources Planning Act (42 U.S.C.A. 1962-1962 d-18). (Reference-Title 25, §71.21.a.5.i.F). Appendix B, Section II.C of the Planning Guide.
 7. **Pennsylvania Prime Agricultural Land Policy** contained in Title 4 of the Pennsylvania Code, Chapter 7, Subchapter W. Provide narrative on local municipal policy and an overlay map on prime agricultural soils. (Reference-Title 25, §71.21.a.5.i.G). Appendix B, Section II.G of the Planning Guide.
 8. **County Stormwater Management Plans** approved by DEP under the Storm Water Management Act (32 P.S. 680.1-680.17). (Reference-Title 25, §71.21.a.5.i.H). Conflicts created by the implementation of the proposed wastewater alternative and the existing recommendations for the management of stormwater in the county Stormwater Management Plan must be evaluated and mitigated. If no plan exists, no conflict exists. Appendix B, Section II.H of the Planning Guide.
 9. **Wetland Protection.** Using wetland mapping developed under Checklist Section II.G, identify and discuss mitigative measures including the need to obtain permits for any encroachments on wetlands from the construction or operation of any proposed wastewater facilities. (Reference-Title 25, §71.21.a.5.i.I) Appendix B, Section II.I of the Planning Guide.
 10. **Protection of rare, endangered or threatened plant and animal species** as identified by the Pennsylvania Natural Diversity Inventory (PNDI). (Reference-Title 25, §71.21.a.5.i.J). Provide DEP with a copy of the completed Request For PNDI Search document. Also provide a copy of the response letter from the Department of Conservation and Natural Resources' Bureau of Forestry regarding the findings of the PNDI search. Appendix B, Section II.J of the Planning Guide.
 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

§71.61.d.2).

- _____ ✓
- _____ ✓
- _____ NA
- _____ |
- _____ |
- _____ ↓
- _____ NA
- _____ |
- _____ |
- _____ |
- _____ |
- _____ |
- _____ ↓
- _____ ✓
- _____ ✓

- e. Negotiate agreements with other parties. (Reference-Title 25, §71.61.d.2).
- f. Raise capital for construction and operation and maintenance of facilities. (Reference-Title 25, §71.61.d.2).

- B. Provide an analysis and description of the various institutional alternatives necessary to implement the proposed technical alternatives including:
 - 1. Need for new municipal departments or municipal authorities. (Reference-Title 25, §71.61.d.2).
 - 2. Functions of existing and proposed organizations (sewer authorities, onlot maintenance agencies, etc.). (Reference-Title 25, §71.61.d.2).
 - 3. Cost of administration, implementability, and the capability of the authority/agency to react to future needs. (Reference-Title 25, §71.61.d.2).
- C. Describe all necessary administrative and legal activities to be completed and adopted to ensure the implementation of the recommended alternative including:
 - 1. Incorporation of authorities or agencies. (Reference-Title 25, §71.61.d.2).
 - 2. Development of all required ordinances, regulations, standards and inter-municipal agreements. (Reference-Title 25, §71.61.d.2).
 - 3. Description of activities to provide rights-of-way, easements and land transfers. (Reference-Title 25, §71.61.d.2).
 - 4. Adoption of other municipal sewage facilities plans. (Reference-Title 25, §71.61.d.2).
 - 5. Any other legal documents. (Reference-Title 25, §71.61.d.2).
 - 6. Dates or timeframes for items 1-5 above on the project's implementation schedule.
- D. Identify the proposed 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. Implementation Schedule and 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:
 - 1. Existing wastewater disposal needs. (Reference-Title 25, §71.21.a.6).
 - 2. Future wastewater disposal needs. (five and ten years growth areas). (Reference-Title 25, §71.21.a.6).
 - 3. Operation and maintenance considerations. (Reference-Title 25, §71.21.a.6).
 - 4. Cost-effectiveness. (Reference-Title 25, §71.21.a.6).
 - 5. Available management and administrative systems. (Reference-Title 25, §71.21.a.6).
 - 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).

B. Designate and describe the capital financing plan chosen to implement the selected alternative(s). Designate and describe the chosen back-up financing plan. (Reference-Title 25, §71.21.a.6)

C. Designate and describe the implementation schedule for the recommended alternative, including justification for any proposed phasing of construction or implementation of a Sewage Management Program. (Reference – Title 25 §71.31d)

IX. Environmental Report (ER) generated from the Uniform Environmental Review Process (UER)

_____ NA

A. Complete an ER as required by the UER process and as described in the DEP Technical Guidance 381-5511-111. Include this document as "Appendix A" to the Act 537 Plan Update Revision. Note: *An ER is required only for Wastewater projects proposing funding through any of the funding sources identified in the UER.*

ADDITIONAL REQUIREMENTS FOR PENNVEST PROJECTS

Municipalities that propose to implement their official sewage facilities plan updates with PENNVEST funds must meet six additional requirements to be eligible for such funds. See A Guide for Preparing Act 537 Update Revisions (362-0300-003), Appendix N for greater detail or contact the DEP regional office serving your county listed in Appendix J of the same publication.

| DEP Use Only | Indicate Page #(s) in Plan | Item Required |
|--------------------|----------------------------------|---|
| _____ | _____ | 1. Environmental Impact Assessment. (Planning Phase) The Uniform Environment Review (UER) replaces the Environmental Impact Assessment that was a previous requirement for PENNVEST projects. |
| _____ | _____ | 2. Cost Effectiveness (Planning Phase) The cost-effectiveness analysis should be a present-worth (or equivalent uniform annual) cost evaluation of the principle alternatives using the interest rate that is published annually by the Water Resources Council. Normally, for PENNVEST projects the applicant should select the most cost-effective alternative based upon the above analysis. Once the alternative has been selected the user fee estimates should be developed based upon interest rates and loan terms of the selected funding method. |
| _____ | | 3. Second Opinion Project Review. (Design Phase) |
| _____ | | 4. Minority Business Enterprise/Women's Business Enterprise (Construction Phase) |
| _____ | | 5. Civil Rights. (Construction Phase) |
| _____ | | 6. Initiation of Operation/Performance Certification. (Post-construction Phase) |

I/A TECHNOLOGIES

PARTIAL LISTING OF INNOVATIVE AND ALTERNATIVE TECHNOLOGIES

TREATMENT TECHNOLOGIES

Aquaculture
Aquifer Recharge
Biological Aerated Filters
Constructed Wetlands
Direct Reuse (NON-POTABLE)
Horticulture
Overland Flow
Rapid Infiltration
Silviculture
Microscreens
Controlled Release Lagoons
Swirl Concentrator

SLUDGE TREATMENT TECHNOLOGIES

Aerated Static Pile Composting
Enclosed Mechanical Composting (In vessel)
Revegetation of Disturbed Land
Aerated Windrow Composting

ENERGY RECOVERY TECHNOLOGIES

Anaerobic Digestion with more than 90 percent
Methane Recovery
Cogeneration of Electricity
Self-Sustaining Incineration

**INDIVIDUAL & SYSTEM-WIDE
COLLECTION TECHNOLOGIES**

Cluster Systems
Septage Treatment
Small Diameter Gravity Sewers
Step Pressure Sewers
Vacuum Sewers
Variable Grade Sewers
Septic Tank Effluent Pump with
Pressure Sewers

ACT 537 PLAN CONTENT AND ENVIRONMENTAL ASSESSMENT CHECKLIST

For specific details covering the ACT 537 Planning Requirements, refer to Chapters 71 and 73 of the Department's Regulations.

A COPY OF THIS COMPLETED CHECKLIST MUST BE INCLUDED WITH YOUR ACT 537 PLAN. THE DEPARTMENT WILL USE THE "DER USE ONLY" COLUMN DURING THE COMPLETENESS EVALUATION OF THE PLAN. THIS COLUMN MAY ALSO BE USED BY THE DEPARTMENT DURING THE PREPLANNING MEETING WITH THE MUNICIPALITY TO IDENTIFY PLANNING ELEMENTS WHICH WILL NOT BE REQUIRED TO BE INCLUDED IN THE PLAN. ALL THE PLANNING ELEMENTS REQUIRED BY THE DEPARTMENT MUST BE ADDRESSED IN YOUR PLAN OR THE PLAN WILL BE RETURNED AS INCOMPLETE. THE PAGE NUMBER OR OTHER REFERENCE MUST BE LISTED IN COLUMN 2 OF THE CHECKLIST PRIOR TO PLAN SUBMITTAL. IF THE MUNICIPALITY DETERMINES THAT ANY ITEMS LISTED IN THIS CHECKLIST DO NOT APPLY, OR CONDITIONS STATED IN A CERTAIN PART OF THIS CHECKLIST DO NOT EXIST IN AN AREA, A COMMENT MUST BE INCLUDED IN COLUMN 2 WHICH STATES THAT THE PARTICULAR CHECKLIST ITEM WILL HAVE NO IMPACT ON THE PLAN OR THAT IT DOES NOT EXIST IN THE PLANNING AREA. WHEN INFORMATION REQUIRED AS PART OF AN OFFICIAL PLAN UPDATE REVISION HAS BEEN DEVELOPED SEPARATELY OR IN A PREVIOUS UPDATE REVISION, INCORPORATE THE INFORMATION BY REFERENCE TO THE PLANNING DOCUMENT AND PAGE. THREE COPIES OF THE COMPLETED PLAN WITH ALL ATTACHMENTS MUST BE SUBMITTED TO THE DEPARTMENT.

Municipality: Lower Makefield Township County: Bucks
 Local Municipal Contact Official: Terry Fedorchak Telephone Number of Official: (215) 493-3646
Township Manager
 Consultant: CKS Engineers, Inc. Consultant's Telephone Number: (215) 340-0600
 Consultant's Contact Person: Thomas F. Zarko, P.E./
Patrick P. DiGangi, EIT, AICP
 Title of Submission: Township of Lower Makefield Date Submitted: _____
Act 537 Sewerage Facilities
Plan Update

3 copies of Plan submitted to the Department (including supporting documentation)

| COMPLETENESS CHECKLIST | | | NOTES: |
|-------------------------------|----------------------------|---|---|
| DER Use Only | Indicate Page #(s) in Plan | Item Required | NA-Not applicable, as determined at Pre-Planning Meeting of February 27, 1996 with PADEP. |
| _____ | <u>i-iv</u> | 1. Table of Contents | |
| _____ | _____ | 2. Plan Summary | |
| _____ | <u>1-2</u> | A. Identify the proposed service areas and major problems evaluated in the plan. (Reference-Title 25, § 71.21.a.7.i) | |
| _____ | <u>1-2</u> | B. Identify the alternative(s) chosen to solve the problems and serve the areas of need identified in the plan. Also, include any institutional arrangements necessary to implement the chosen alternative(s). (Reference-Title 25, § 71.21.a.7.ii) | |
| _____ | <u>2</u> | C. Include the cost of implementing the proposed alternative (including the user fees) and the proposed funding method to be used. (Reference-Title 25, § 71.21.a.7.ii) | |
| _____ | <u>2</u> | D. Identify the municipal commitments necessary to implement the plan. (Reference-Title 25, § 71.21.a.7.iii) | |

| Only | in Plan | Item Required |
|------|-------------------|---|
| | <u>2, 52</u> | E. Provide a schedule of implementation for the project which identifies the major milestones with dates necessary to accomplish the project to the point of operational status. Other milestones in the project implementation schedule should be indicated as occurring a finite number of days from a major milestone. (Reference-Title 25, § 71.21.a.7.iv) |
| | <u>52</u> | F. Include dates for the future initiation of feasibility evaluations in the project's implementation schedule for areas proposing completion of sewage facilities for planning periods in excess of five years. (Reference-Title 25, § 71.21.b) |
| | <u>Appendix A</u> | 3. Original, signed and sealed Resolution of Adoption by the Municipality which contains, at a minimum, alternatives chosen and a commitment to implement plan as stated in the implementation schedule. (Reference-Title 25, § 71.31.D) Section V.F of Guidance. |
| | <u>Appendix C</u> | 4. Evidence that the municipality has requested, reviewed, and considered comments by appropriate official: planning agencies of the municipality, planning agencies of the county, planning agencies with areawide jurisdiction (where applicable), and existing county or joint county departments of health. (Reference-Title 25, § 71.31.b) Section V.E.1. of guidance. |
| | <u>Appendix B</u> | 5. Proof of Public Notice which documents proposed plan adoption, plan summary, and the establishment of a 30 day comment period. (Reference-Title 25, § 71.31.c) Section V.E.2 of guidance. |
| | <u>Appendix C</u> | 6. Copy of ALL written comments received and municipal response to each comment in relation to the proposed plan. (Reference-Title 25, 71.31.c) Section V.E.2 of guidance. |
| | <u>52</u> | 7. Project Implementation Schedule. (Provide projected milestone dates and be detailed for each existing and future needs area). (Reference - Title 25, § 71.31.d) Section F of Guidance. |
| | <u>NA</u> | 8. Project Implementation Ordinances (Provide existing ordinances or include the development of new ordinances in the schedule of implementation.) (Reference-Title 25, § 71.21.a.5.vi.D) Section V.F of guidance. |
| | <u>Appendix C</u> | 9. Written documentation indicating that the appropriate agencies have received, reviewed and concurred with the method proposed to resolve identified inconsistencies within the proposed alternative and consistency requirements in 71.21.(a)(5)(i)-(iii). (Reference-Title 25, § 71.31.e) Appendix B of guidance. |

GENERAL PLAN

I. Previous Wastewater Planning

A. Identify and analyze all existing wastewater planning that:

| | | |
|--|------------|---|
| | <u>4-6</u> | 1. Has been previously undertaken under the Sewage Facilities Act (Act 537). (Reference-Act 537, Section 5, § d.1) |
| | <u>4-6</u> | 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 Guidance. |

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Item Required

_____ 4-6 _____

3. Is anticipated or planned by applicable sewer authorities. (Reference-Title 25, § 71.21.a.5.i.A) Section V.D. of Guidance.

_____ 4-6 _____

4. Has been done through official plan revisions (planning modules) and addenda. (Reference-Title 25, § 71.21.a.5.i.A)

B. Identify all municipal and county planning documents adopted pursuant to the Pennsylvania Municipalities Planning Code (Act 247) including:

_____ 7, 8 _____

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)

_____ 7, 8 _____

2. A comparison of proposed land use as allowed by zoning and existing sewage facility planning. (Reference-Title 25, § 71.21.a.3.iv)

_____ 3, 7, 8 _____

3. Zoning or in the absence of zoning subdivision regulations that establish lot sizes predicated on sewage disposal methods. (Reference-Title 25, § 71.21.a.3.iv)

_____ 3, 7, 8 _____

4. All limitations and plans related to floodplain and stormwater management and special protection areas. (Reference-Title 25, § 71.21.a.3.iv) Appendix B, Section II.F.

_____ 3, 7, 8 _____

5. An analysis of land use planning and zoning and its consistency with protecting environmentally sensitive areas, with special attention to: (Reference-Title 25, § 71.21.a.3.iv)

- public ground/surface water supply sources
- recreational water use areas
- groundwater recharge areas
- industrial water use
- wetlands

II. Physical and Demographic Analysis utilizing written description and mapping:

A. Base line mapping (All maps should show all current lots and structures).

_____ 9, 14-18 _____

1. Identification of Planning Area(s), Municipal Boundaries, Sewer Authority/ Management Agency service area boundaries. (Reference-Title 25, § 71.21.a.1.i)

_____ 9 _____

2. Identification and Mapping of Physical Characteristics (streams, lakes, impoundments, natural conveyance channels, drainage basins in the planning area). (Reference-Title 25, § 71.21.a.1.ii)

_____ 10, 11 _____

3. Soils - Analysis with description by soil type and soils mapping (with any topographic limitations) showing areas suitable for conventional on-lot systems, elevated sand mounds, and areas unsuitable for on-lot systems. (Reference-Title 25, § 71.21.a.1.iii). Mapping of Prime Agricultural Soils and locally protected agricultural soils. (Reference - Title 25, § 71.21.a.5.i.K)

_____ 10-12 _____

4. Geologic Features - Identification through analysis, mapping and their relation to existing (including areas where existing nitrate-nitrogen levels are in excess of 5 mg/l) or potential nitrate-nitrogen pollution and drinking water sources. (Reference-Title 25, § 71.21.a.1.iii)

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|------|---------|---|
| | 9 | 5. Topography - Showing slopes that are suitable for conventional systems; slopes that are suitable for elevated sand mounds and slopes that are unsuitable for on-lot systems. (Reference-Title 25, § 71.21.a.1.ii) |
| | 10-13 | 6. Potable Water Supplies - Identification through mapping, description and analysis to include available public water supply capacity and aquifer yield for groundwater supplies. (Reference-Title 25, § 71.21.a.1.vi) Section V.C. of the Guidance. |
| | 13 | 7. Wetlands - Identify wetlands as defined in Title 25, Chapter 105 by description, analysis and mapping. Proposed collection, conveyance and treatment facilities and lines must be located and labeled, along with the identified wetlands, on the map. (Reference-Title 25, § 71.21.a.1.v) Appendix B, Section II.I. |
| | 22, 23 | 8. Population - List historical, current and future population figures and projections of the municipality. Discuss and evaluate any discrepancies between municipal, county, state (DER), and federal population projections as they relate to sewage facilities. (Reference-Title 25, § 71.21.a.1.iv) |

III. Existing Sewage Facilities in the Planning Area.

A. Identify, map and describe municipal and nonmunicipal, individual and community sewerage systems in the planning area including:

| | | |
|--|-------|---|
| | 14-21 | 1. Location, size and ownership of treatment facilities, main intercepting lines, pumping stations and force mains including their size, capacity, point of discharge. Also include the name of the receiving stream, drainage basin, and the facility's effluent discharge requirements. (Reference-Title 25, § 71.21.a.2.i.A) |
| | NA | 2. A narrative and schematic diagram of the facility's basic treatment processes including the facility's NPDES permitted capacity, any remaining reserve capacity and the policy concerning the allocation of reserve capacity. (Reference-Title 25, § 71.21.a.2.i) |
| | 14-21 | 3. A description of problems with existing facilities, including existing or projected overload under Title 25, Chapter 94 (relating to municipal wasteload management) or violations of a national pollutant discharge elimination system (NPDES) permit, Clean Streams Law permit, or other permit, rule or regulation of the Department. (Reference-Title 25, § 71.21.a.2.i.B) |
| | NA | 4. Details of scheduled or in-progress upgrading or expansion of treatment facilities and the anticipated completion date of the improvements. Also discuss the compatibility of the rate of growth to existing and proposed wastewater treatment facilities. (Reference-Title 25, § 71.21.a.4.i & ii) |
| | 14-21 | 5. A detailed description of operation and maintenance requirements and the status of past and present compliance with these requirements and any other requirements relating to sewage management programs. (Reference-Title 25, § 71.21.a.2.i.C) |
| | NA | 6. Ultimate disposal areas, if other than stream discharge (land application) and any applicable groundwater limitations. (Reference-Title 25, § 71.21.a.4.i & ii) |

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B. Identify, map and describe areas that utilize individual and community on-lot sewage disposal and retaining tank systems in the planning area including:

_____ 20 _____

1. The type of systems in use. (Reference-Title 25, § 71.21.a.2.ii.A)

_____ 20 _____

2. 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 Streams Law or regulation promulgated thereunder. (Reference-Title 25, § 71.21.a.2.ii.B)

_____ NA _____

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)

_____ NA _____

4. Conducting a well water survey to identify possible contamination by malfunctioning on-lot sewage disposal systems. Approximately 15% of the wells in the study area should be sampled. (Reference-Title 25, § 71.21.a.2.ii.B)

C. Identify wastewater sludge and septage generation, transport, and disposal methods as it relates to sewage facilities alternative analysis including:

_____ NA _____

1. Location of sources of wastewater sludge or septage (Septic tanks, holding tanks, wastewater treatment facilities). (Reference-Title 25, § 71.71)

_____ NA _____

2. Quantities of the types of sludges or septage generated. (Reference-Title 25, § 71.71)

_____ NA _____

3. Present disposal methods, locations, capacities, and transportation methods. (Reference-Title 25, § 71.71)

_____ NA _____

D. Identify, map and describe areas in the municipality where unpermitted collection and disposal systems ("wildcat" sewers, borehole disposal, etc.) are in use. (Reference-Title 25, § 71.21.a.2.i.B)

IV. Future Growth and Development

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

_____ 24-29 _____

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 Equivalent Dwelling Units (EDUs) remaining to be developed (include time schedule for EDU's remaining to be developed). (Reference-Title 25, § 71.21.a.3.i)

_____ 7, 8, 24-29 _____

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)

_____ 24-29 _____

3. Future growth areas and population and EDU projections for these areas. (Reference-Title 25, § 71.21.a.3.iii)

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| | 7, 8, 24-29 | 4. Zoning, subdivision regulations; local, county or regional comprehensive plans; and existing plans of a Commonwealth agency relating to the development, use and protection of land and water resources. (Reference-Title 25, § 71.21.a.3.iv) |
| | 31-40 | 5. Sewage planning required to provide adequate wastewater treatment for areas of the municipality and related to: <ul style="list-style-type: none"> a. Five-year population and growth impacts on existing and proposed wastewater collection and treatment facilities which support the need for expansions of facilities within the five-year time frame. (Reference-Title 25, § 71.21.a.3.v) b. Ten-year population and growth impacts on existing and proposed wastewater collection and treatment facilities which support the need for expansions of facilities within the ten-year time frame. (Reference-Title 25, § 71.21.a.3.v) |
| | 31-40 | |

V. Alternatives to Provide New or Improved Wastewater Disposal Facilities

| | | |
|--|-------|---|
| | NA | A. Identify alternatives available to provide for new or improved sewage facilities for each area of need including, but not limited to: (Reference-Title 25, § 71.21.a.4) |
| | 41-47 | 1. Regional Wastewater Treatment Concepts. (Reference-Title 25, § 71.21.a.4) |
| | 41-47 | 2. The potential for extension of existing municipal or non-municipal sewage facilities to areas in need of new or improved sewage facilities. (Reference-Title 25, § 71.21.a.4.i) |
| | 41-47 | 3. The potential for the continued use of existing municipal or non-municipal sewage facilities through one or more of the following: (Reference-Title 25, § 71.21.a.4.ii) <ul style="list-style-type: none"> a. Repair. (Reference-Title 25, § 71.21.a.4.ii.A) b. Upgrading. (Reference-Title 25, § 71.21.a.4.ii.B) c. Improved operation and maintenance. (Reference-Title 25, § 71.21.a.4.ii.C) d. Other applicable actions that will resolve or abate the identified problems. (Reference-Title 25, § 71.21.a.4.ii.D) |
| | 41-47 | |
| | 41-47 | |
| | 41-47 | |
| | 41-47 | |
| | NA | 4. The need for new community sewage systems. (Reference-Title 25, § 71.21.a.4.iii) |
| | NA | 5. The construction of new wastewater treatment facilities. (Reference-Title 25, § 71.21.a.4.iii) |
| | 41-47 | 6. Repair or replacement of collection and conveyance system components. (Reference-Title 25, § 71.21.a.4.ii.A) |
| | NA | 7. Use of alternative methods of collection/conveyance to serve needs areas using existing wastewater treatment facilities. (Reference-Title 25, § 71.21.a.4.ii.B) |

DER Use Only Indicate Page #(s) in Plan

Item Required

| | | |
|-------|-------|--|
| | | 8. The continual and future use of individual and community subsurface sewage disposal system alternatives based on: |
| _____ | NA | a. Soil suitability. (Reference-Title 25, § 71.21.a.2.ii.C) |
| _____ | NA | b. Preliminary hydrogeological evaluation. (Reference-Title 25, § 71.21.a.2.ii.C) |
| _____ | NA | c. The establishment of a sewage management program. (Reference-Title 25, § 71.21.a.4.iv) |
| | | 9. The repair, replacement or upgrading of existing malfunctioning systems in areas suitable for on-lot disposal considering: (Reference-Title 25, § 71.21.a.4) |
| _____ | 29-31 | a. Existing technology and sizing requirements of Title 25 Chapter 73. (Reference-Title 25, § 73.31 - 73.72) |
| _____ | 29-31 | b. Use of expanded absorption areas or alternating absorption areas. (Reference-Title 25, § 73.16) |
| _____ | 29-31 | c. Use of water conservation devices. (Reference-Title 25, § 71.73.b.2.iii) |
| | | 10. The use of small flow sewage treatment facilities, land treatment alternatives, or package treatment facilities to serve individual homes or clusters of homes based on: (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | a. Discharge Requirements. (Reference-Title 25, § 71.64.d) |
| _____ | NA | b. Soil Suitability. (Reference-Title 25, § 71.64.c.1) |
| _____ | NA | c. Preliminary Hydrogeologic Evaluation. (Reference-Title 25, § 71.64.c.3) |
| _____ | NA | d. Agency or other controls over operation and maintenance requirements. (Reference-Title 25, § 71.64.d) |
| | | 11. The use of retaining tank alternatives including: (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | a. Commercial, residential and industrial use. (Reference-Title 25, § 71.63.e) |
| _____ | NA | b. Designated conveyance facilities (pumper trucks). (Reference-Title 25, § 71.63.b.2) |
| _____ | NA | c. Designated treatment facilities or disposal site. (Reference-Title 25, § 71.63.b.2) |
| _____ | NA | d. Implementation of a retaining tank ordinance by the municipality. (Reference-Title 25, § 71.63.c.3) |
| _____ | NA | e. Financial guarantees when retaining tanks are used as an interim sewage disposal measure. (Reference-Title 25, § 71.63.c.2) |
| _____ | NA | f. Temporary or permanent use. |

12. A no-action alternative which includes both short-term and long-term impacts on: (Reference-Title 25, § 71.21.a.4)

- _____ NA _____
- _____ NA _____
- _____ NA _____
- _____ NA _____
- _____ NA _____
- _____ NA _____

- a. Water Quality/Public Health. (Reference-Title 25, § 71.21.a.4)
- b. Growth potential (residential, commercial, industrial). (Reference-Title 25, § 71.21.a.4)
- c. Community economic conditions. (Reference-Title 25, § 71.21.a.4)
- d. Recreational opportunities. (Reference-Title 25, § 71.21.a.4)
- e. Drinking water sources. (Reference-Title 25, § 71.21.a.4)
- f. Other environmental concerns. (Reference-Title 25, § 71.21.a.4)

13. Discuss the need for and implementation of a sewage management program to assure the future operation and maintenance of existing and proposed sewage facilities through:

- _____ NA _____
- _____ NA _____
- _____ NA _____
- _____ NA _____
- _____ NA _____
- _____ NA _____
- _____ NA _____

- a. Municipal ownership or other management control over the operation and maintenance of individual on-lot sewage disposal systems, small flow treatment facilities, or other non-municipal treatment facilities. (Reference-Title 25, § 71.21.a.4.iv)
- b. Requiring scheduled inspection of on-lot sewage disposal systems. (Reference-Title 25, § 71.73.b.1)
- c. Requiring scheduled maintenance of septic and aerobic treatment tanks and associated system components. (Reference-Title 25, § 71.73.b.2)
- d. Aggressive enforcement of ordinances which require operation and maintenance and prohibit malfunctioning systems. (Reference-Title 25, § 71.73.b.5)
- e. Repair, replacement or upgrading of malfunctioning on-lot sewage systems. (Reference-Title 25, § 71.21.a.4.iv)
- f. Establishment of joint municipal sewage management programs. (Reference-Title 25, § 71.73.b.8)
- g. Reduction of organic or hydraulic loading to existing wastewater treatment facilities. (Reference-Title 25, § 71.71)
- h. Requirements for bonding, escrow accounts, management agencies or associations to assure proper operation and maintenance for non-municipal facilities. (Reference-Title 25, § 71.71)

14. 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)

- _____ NA _____

- a. Modification of existing comprehensive plans involving:
 - 1. Land use designations. (Reference-Title 25, § 71.21.a.4)

| DER Use Only | Indicate Page #(s) in Plan | Item Required |
|--------------|----------------------------|--|
| _____ | NA | 2. Densities. (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | 3. Municipal ordinances and regulations. (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | 4. Improved enforcement. (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | 5. Protection of drinking water sources. (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | b. Need for a comprehensive plan to assist in producing sound economic and consistent land development. (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | c. Alternatives for creating or changing municipal subdivision regulations to assure long-term use of on-site sewage disposal. (Reference-Title 25, § 71.21.a.4) |
| _____ | NA | d. Evaluation of existing local agency programs and the need for technical or administrative training. (Reference-Title 25, § 71.21.a.4) |

VI. The Evaluation of Alternatives

A. Each technically feasible alternative 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)

| | | |
|-------|----|--|
| _____ | 49 | 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. |
| _____ | 49 | 2. Municipal wasteload management plans developed under PA Code, Title 25, Chapter 94. (Reference-Title 25, § 71.21.a.5.i.B) The municipality's recent Wasteload Management (Chapter 94) Reports should be examined to determine if the proposed alternative is consistent with the recommendations and findings of the report. (Appendix B, Section II.B. |
| _____ | 49 | 3. Plans developed under Title II of the Clean Water Act (33 U.S.C.A. 1281-1299) or Titles II and VI of the Water Quality Act of 1987 (33 U.S.C.A. 1251-1376). (Reference-Title 25, § 71.21.a.5.i.C) Appendix B, Section II.E. |
| _____ | 49 | 4. Comprehensive plans developed under the Pennsylvania Municipalities Planning Code. (Reference-Title 25, § 71.21.a.5.i.D) The municipality's comprehensive plan must be examined to assure that the proposed wastewater disposal alternative is consistent with land use and all other requirements stated in the comprehensive plan. Appendix B, Section II, D. |
| _____ | 49 | 5. Antidegradation requirements as contained in PA Code, Title 25, Chapters 93, 95 and 102 (relating to water quality standards, wastewater treatment requirements and erosion control) and the Clean Water Act. (Reference-Title 25, § 71.21.a.5.i.E) Appendix B, Section II, F. |
| _____ | 49 | 6. State water plans developed under the Water Resources Planning Act (42 U.S.C.A. 1962-1962 d-18). (Reference-Title 25, § 71.21.a.5.i.F) Appendix B, Section II, C. |

| Only | in Plan | Item Required |
|------|-----------------------|---|
| | <u>49</u> | 7. Pennsylvania Prime Agricultural Land Policy contained in Title 4 of the Pennsylvania Code, Chapter 7, Subchapter W. Provide narrative on local municipal policy and an overlay map on prime agricultural soils. (Reference-Title 25, § 71.21.a.5.i.G) Appendix B Section II.G. |
| | <u>49</u> | 8. County Stormwater Management Plans approved by the Department under the Storm Water Management Act (32 P.S. 680.1-680.17). (Reference-Title 25, § 71.21.a.5.i.H) Conflicts created by the implementation of the proposed wastewater alternative and the existing recommendations for the management of stormwater in the County Stormwater Management Plan must be evaluated and mitigated. If no plan exists, no conflict exists. Appendix B, Section II.H. |
| | <u>49</u> | 9. Wetland Protection under PA Code, Title 25, Chapter 105. Map wetland areas using Federal National Wetlands Inventory Mapping and Soils Mapping. (Reference-Title 25, § 71.21.a.5.i.I) Identify and provide mitigative measures for any encroachments on wetlands from the construction or operation of any wastewater facilities proposed by the alternative. Appendix B, Section II.I. |
| | <u>49, Appendix C</u> | 10. Protection of rare, endangered or threatened plant and animal species as identified by the Pennsylvania National Diversity Inventory (PNDI). (Reference-Title 25, § 71.21.a.5.i.J) Provide the Department with a copy of the completed Request For PNDI Search document. Also provide a copy of the response letter from the Department's Bureau of Forestry regarding the findings of the PNDI search. Appendix II. J. |
| | <u>49, Appendix C</u> | 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 Form "A" and its attachments requesting 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. |
| | <u>Appendix C</u> | B. Provide for the resolution of any inconsistencies in any of the points identified in Section VI.A. of this checklist by submitting written documentation that the appropriate agency has received, reviewed, and concurred with the method proposed to resolve identified inconsistencies. (Reference-Title 25, § 71.21.a.5.ii) Appendix B |
| | <u>41-47</u> | C. Evaluate each alternative 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) |
| | <u>30, 47, 48</u> | D. Provide cost estimates using present worth analysis for construction, financing, ongoing administration, operation and maintenance and user fees for each alternative identified in Section V of this checklist. Estimates shall be limited to areas identified in the plan as needing improved sewage facilities within 5 years from the date of plan submission. (Reference-Title 25, § 71.21.a.5.iv) |
| | <u>50-52</u> | E. Provide an analysis of the funding methods available to finance each of 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) |

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Item Required

F. Analyze the ability of the municipality to implement each alternative proposed in Section V of this report including: (Reference-Title 25, § 71.21.a.5.vi)

50-52

1. The activities necessary to abate critical public health hazards pending completion of sewage facilities or sewage management programs. (Reference-Title 25, § 71.21.a.5.vi.A)

50-52

2. The phased development of the facilities or sewage management program. (Reference-Title 25, § 71.21.a.5.vi.B)

50-52

a. Provide time schedules for implementing each phase. (Reference-Title 25, § 71.21.a.5.vi.C)

50-52

3. The administrative organization and legal authority necessary for plan implementation. (Reference-Title 25, § 71.21.a.5.vi.D)

VII. Institutional Evaluation

A. Provide an analysis of all existing wastewater treatment authorities, their past actions and present performance including:

50, 51

1. Financial & debt status. (Reference-Title 25, § 71.61.d.2.)

50

2. Available staff and administrative resources. (Reference-Title 25, § 71.61.d.2.)

50

3. Existing legal authority to:

a. Implement wastewater planning recommendations. (Reference-Title 25, § 71.61.d.2.)

50

b. Implement system-wide operation and maintenance activities. (Reference-Title 25, § 71.61.d.2.)

50

c. Set user fees and take purchasing actions. (Reference-Title 25, § 71.61.d.2.)

50

d. Take actions against adopted ordinance violators. (Reference-Title 25, § 71.61.d.2.)

50

e. Negotiate agreements with other parties. (Reference-Title 25, § 71.61.d.2.)

50

f. Raise capital for construction and operation and maintenance of facilities. (Reference-Title 25, § 71.61.d.2.)

B. Provide an analysis and description of the various institutional alternatives necessary to implement the proposed alternative including:

50

1. Need for new authorities. (Reference-Title 25, § 71.61.d.2.)

50

2. Functions of existing and proposed organizations (sewer authorities, etc.). (Reference-Title 25, § 71.61.d.2.)

50

3. Cost of administration, implementability, and the capability of the authority to react to future needs. (Reference-Title 25, § 71.61.d.2.)

DER USE Only indicate page number(s) in Plan

Item Required

- | | | |
|-------|------------|---|
| | | C. Describe all necessary administrative and legal activities to be completed and adopted to ensure the implementation of the recommended alternative including: |
| <hr/> | 50 | 1. All legal authorities of incorporation. (Reference-Title 25, § 71.61.d.2.) |
| <hr/> | 41, 42, 50 | 2. All required ordinances, regulations, standards, and inter-municipal agreements. (Reference-Title 25, § 71.61.d.2.) |
| <hr/> | 50 | 3. Activities to provide rights-of-way, easements, and land transfers. (Reference-Title 25, § 71.61.d.2.) |
| <hr/> | 41, 42, 50 | 4. Other municipal sewage facilities plan adoptions. (Include the development of Items 1-4 on the project's schedule of implementation). (Reference-Title 25, § 71.61.d.2.) |
| <hr/> | 50 | 5. Any other legal documents. (Reference-Title 25, § 71.61.d.2.) |
| <hr/> | 41, 42, 50 | D. Identify the chosen institutional alternative for implementing the chosen wastewater disposal alternative. Provide justification for choosing the specific alternative. (Reference-Title 25, § 71.61.d.2.) |

VIII. Selected Wastewater Treatment & Institutional Alternatives

- | | | |
|-------|--------|--|
| | | A. Select one technical wastewater disposal alternative which best meets the wastewater treatment needs of each area of the municipality studied. Justify the choices by providing documentation which shows that they are the best alternative(s) based on: |
| <hr/> | 22-49 | 1. Wastewater disposal needs. (Reference-Title 25, § 71.21.a.6.) |
| <hr/> | 22-49 | 2. Technical and administrative needs. (Reference-Title 25, § 71.21.a.6.) |
| <hr/> | 22-49 | 3. Cost-effectiveness. (Reference-Title 25, § 71.21.a.6.) |
| <hr/> | 22-49 | 4. Management and administration systems available. (Reference-Title 25, § 71.21.a.6.) |
| <hr/> | 50, 51 | 5. Financing methods available. (Reference-Title 25, § 71.21.a.6.) |
| <hr/> | 22-49 | 6. 5 and 10 year planned growth areas. (Reference-Title 25, § 71.21.a.6.) |
| <hr/> | 22-49 | 7. Environmental soundness and compliance with natural resource planning and preservation programs. (Reference-Title 25, § 71.21.a.6.) |
| <hr/> | 50, 51 | B. Describe the capital financing plan chosen to implement the selected alternative(s). |

ORDER OF EXHIBITS

| EXHIBIT | TITLE |
|---------|---|
| 2-1 | ZONING MAP |
| 3-1 | TOPOGRAPHY AND DRAINAGE FEATURES |
| 3-2 | SOILS |
| 3-4 | WETLANDS |
| 4-1 | EXISTING SANITARY SEWER SYSTEM |
| 5-1 | PLANNED DEVELOPMENT, FUTURE DEVELOPMENT, AND ON-LOT DISPOSAL SYSTEM PROBLEM AREAS TO BE SERVED BY PUBLIC SEWERS |
| 3-3 | PAWC PUBLIC WATER SUPPLY AND DISTRIBUTION FACILITIES |

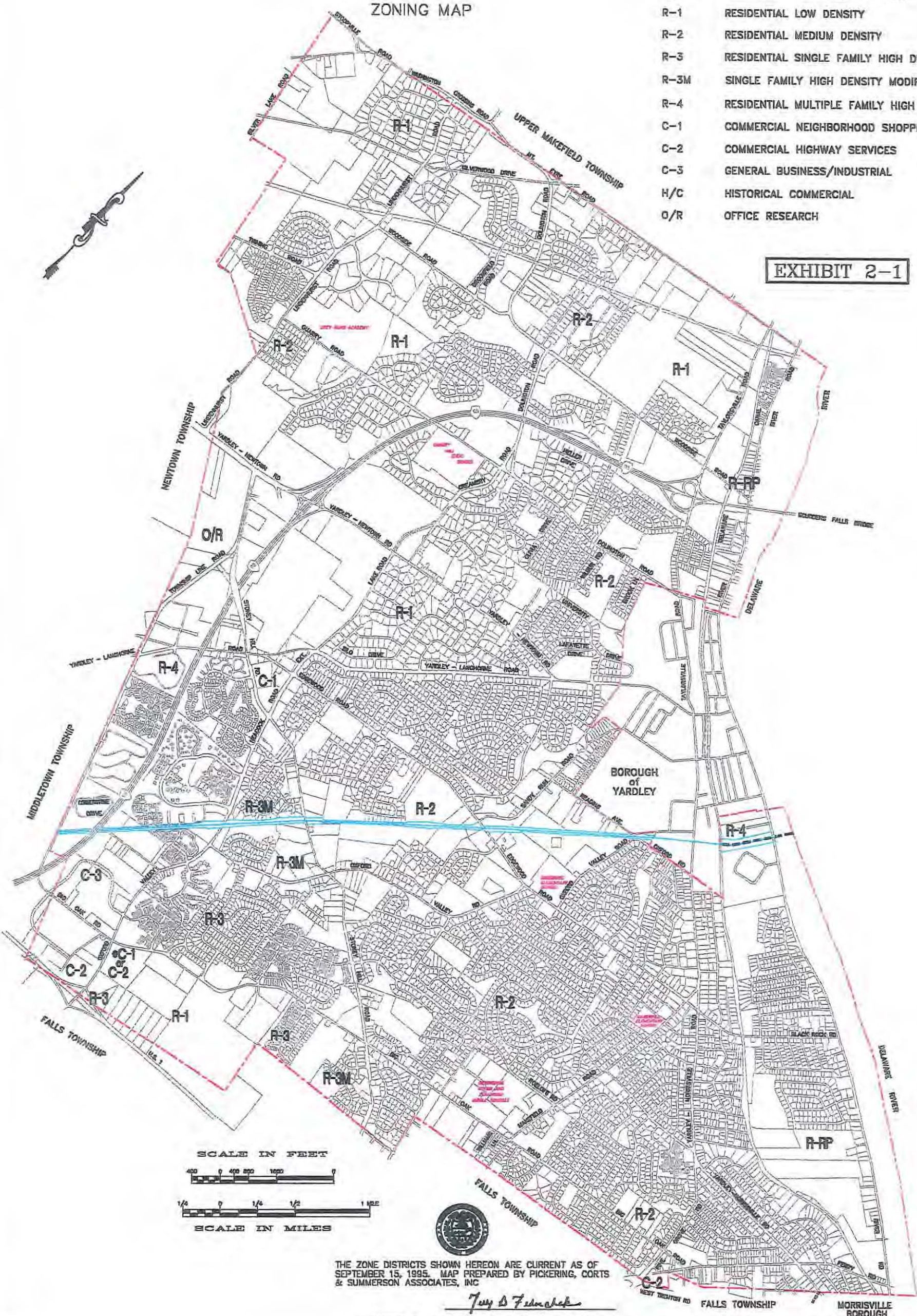
LOWER MAKEFIELD TWP.

ZONING MAP

LEGEND

- DISTRICT BOUNDARY
- R-RP RESIDENTIAL-RESOURCE PROTECTION DISTRICT
- R-1 RESIDENTIAL LOW DENSITY
- R-2 RESIDENTIAL MEDIUM DENSITY
- R-3 RESIDENTIAL SINGLE FAMILY HIGH DENSITY
- R-3M SINGLE FAMILY HIGH DENSITY MODIFIED
- R-4 RESIDENTIAL MULTIPLE FAMILY HIGH DENSITY
- C-1 COMMERCIAL NEIGHBORHOOD SHOPPING
- C-2 COMMERCIAL HIGHWAY SERVICES
- C-3 GENERAL BUSINESS/INDUSTRIAL
- H/C HISTORICAL COMMERCIAL
- O/R OFFICE RESEARCH

EXHIBIT 2-1




THE ZONE DISTRICTS SHOWN HEREON ARE CURRENT AS OF SEPTEMBER 15, 1995. MAP PREPARED BY PICKERING, CORTS & SUMMERSON ASSOCIATES, INC

Judy S. Fedorchak

Attested to by: Terry S. Fedorchak, Township Manager

LEGEND:

-  TOPOGRAPHIC CONTOUR LINE
-  WATERSHED BOUNDARY LINE
-  FLOODPLAIN AREA

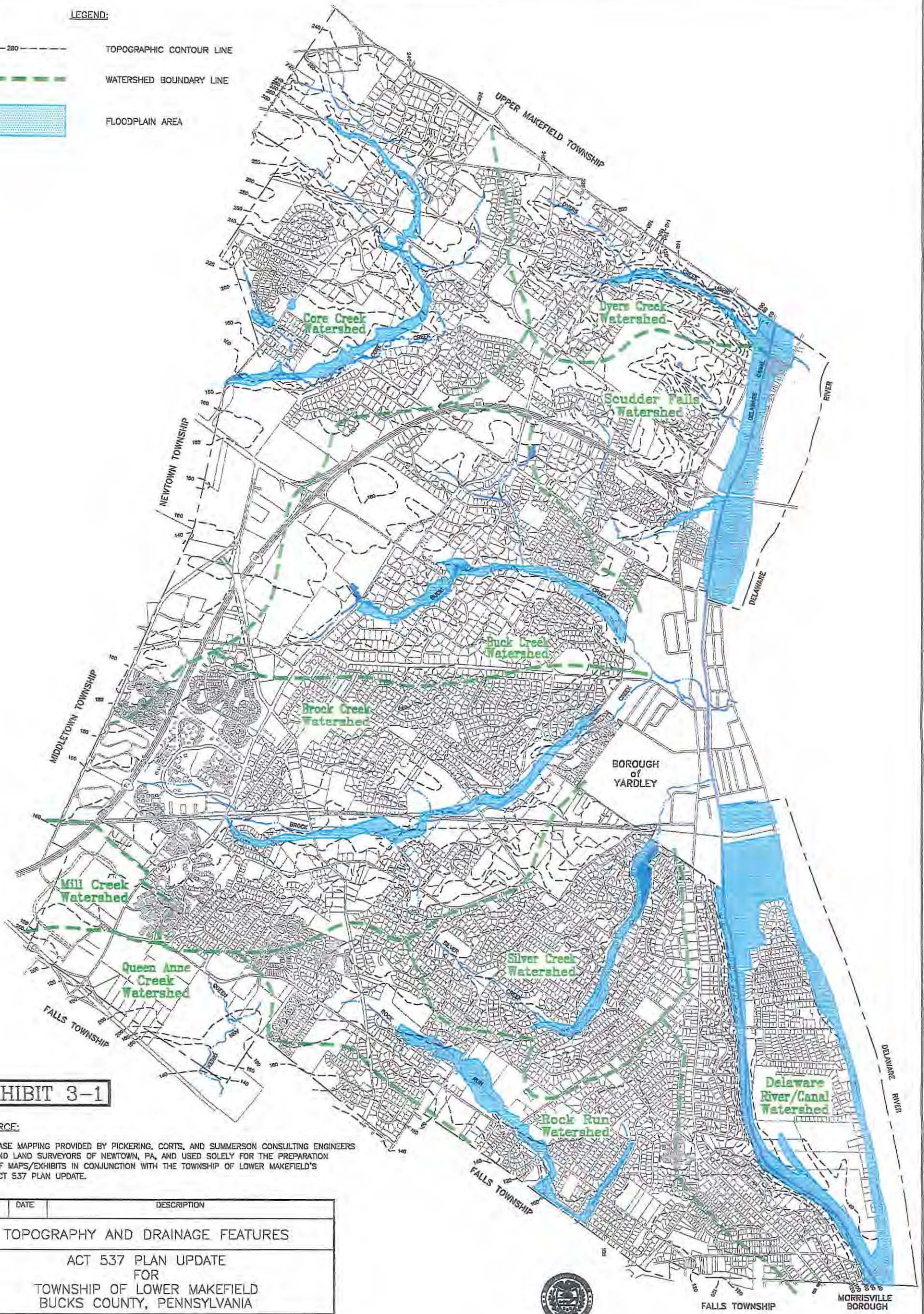



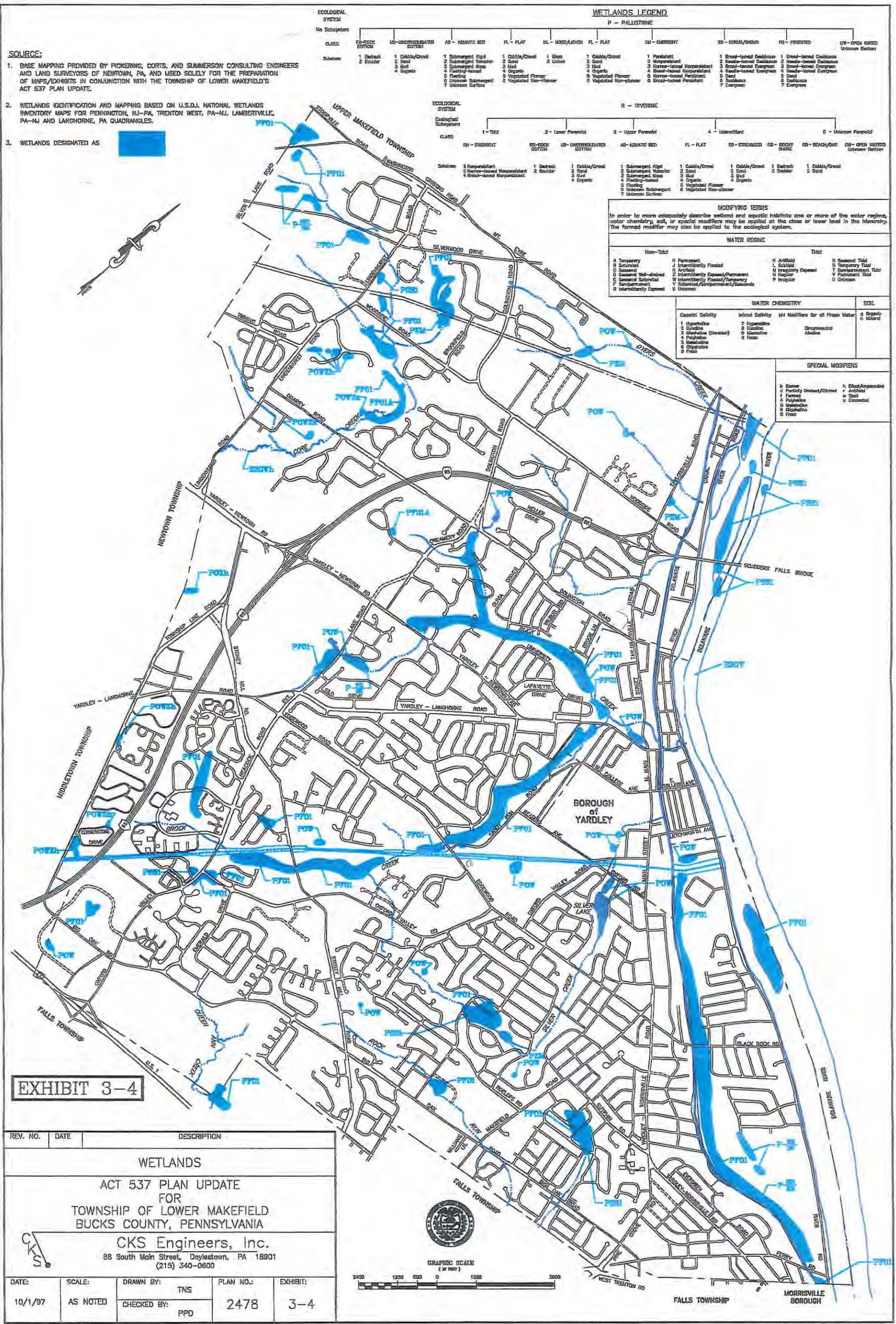
EXHIBIT 3-1

SOURCE:

1. BASE MAPPING PROVIDED BY PICKERING, CORTS, AND SUMMERSON CONSULTING ENGINEERS AND LAND SURVEYORS OF NEWTOWN, PA, AND USED SOLELY FOR THE PREPARATION OF MAPS/EXHIBITS IN CONJUNCTION WITH THE TOWNSHIP OF LOWER MAKEFIELD'S ACT 537 PLAN UPDATE.

| REV. NO. | DATE | DESCRIPTION |
|--|----------|-------------|
| TOPOGRAPHY AND DRAINAGE FEATURES | | |
| ACT 537 PLAN UPDATE FOR TOWNSHIP OF LOWER MAKEFIELD BUCKS COUNTY, PENNSYLVANIA | | |
|  CKS Engineers, Inc. 88 South Main Street, Doylestown, PA 18901 (215) 340-0600 | | |
| DATE: | SCALE: | DRAWN BY: |
| 10/1/97 | AS NOTED | TNS |
| | | CHECKED BY: |
| | | PPD |
| PLAN NO.: | EXHIBIT: | |
| 2478 | 3-1 | |





SOURCE:

1. BASE MAPPING PROVIDED BY PICKERING, CORTIS, AND SUMMERSON CONSULTING ENGINEERS AND LAND SURVEYORS OF NEWTOWN, PA, AND USED SOLELY FOR THE PREPARATION OF MAPS/EXHIBITS IN CONJUNCTION WITH THE TOWNSHIP OF LOWER MAKEFIELD'S ACT 537 PLAN UPDATE.
2. WETLANDS IDENTIFICATION AND MAPPING BASED ON U.S.D.I. NATIONAL WETLANDS INVENTORY MAPS FOR PENNINGTON, NJ-PA, TRENTON WEST, PA-NJ, LAMBERTVILLE, PA-NJ AND LANGHORNE, PA QUADRANGLES.
3. WETLANDS DESIGNATED AS

| ECOLOGICAL SYSTEM | | WETLANDS LEGEND | | | | | | | | | |
|-------------------|---------|------------------|----------------------------|------------------|-----------|-----------------|-----------|---------------|------------------|---------------|------------------|
| No Subsystem | | P - PALUSTRINE | | | | | | | | | |
| CLASS | Subcode | U1 - ROCK BOTTOM | U2 - UNCONSOLIDATED BOTTOM | A0 - AQUATIC BED | FL - FLAT | ML - MOSS/ALGAE | FL - FLAT | EM - EMERGENT | SS - SCRUB/SHRUB | FO - FORESTED | OW - OPEN WATERS |
| 1 | Bedrock | 1 | Cobble/Gravel | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | Boulder | 2 | Sand | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | | 3 | Silt | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 4 | | 4 | Organic | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 5 | | 5 | Vegetated Flatter | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 6 | | 6 | Vegetated Non-Flatter | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 7 | | 7 | Unknown Surface | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |

MODIFYING TERMS
In order to more adequately describe wetland and aquatic habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The formed modifier may also be applied to the ecological system.

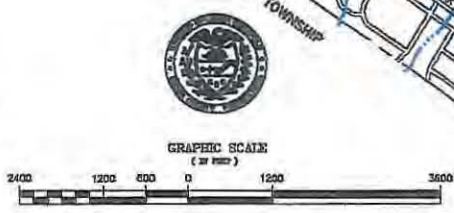
| WATER REGIME | | | |
|--------------|------------------------|-------|----------------------------------|
| Non-Tidal | | Tidal | |
| A | Temporary | H | Permanent |
| J | Intermittently Flooded | K | Artificial |
| L | Submerged | L | Subtidal |
| M | Intermittently Exposed | M | Intermittently Exposed |
| N | Seasonal Wet-Divided | U | Unknown |
| O | Seasonal Scattered | W | Intermittently Flooded/Temporary |
| P | Seasonal Scattered | Y | Saturated/Unpermanent/Seasonal |
| Q | Intermittently Exposed | U | Unknown |

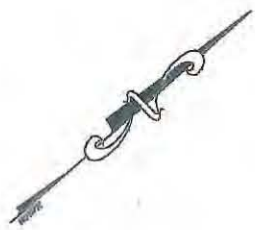
| WATER CHEMISTRY | | SOIL | |
|-----------------|-----------------------|----------------------------------|---------|
| Conductivity | Inland Salinity | pH Modifiers for all Fresh Water | Organic |
| 1 | Hyposaline | 7 | Humic |
| 2 | Eulisaline | 8 | Humic |
| 3 | Supersaline (Archaic) | 9 | Humic |
| 4 | Polysaline | 0 | Humic |
| 5 | Supersaline | 1 | Humic |
| 6 | Polysaline | 2 | Humic |

| SPECIAL MODIFIERS | |
|-------------------|---------------------------|
| 1 | Barren |
| 2 | Partially Drained/Clotted |
| 3 | Farmed |
| 4 | Polysaline |
| 5 | Humic |
| 6 | Organic |
| 7 | Artificial |
| 8 | Shrub |
| 9 | Concentrated |

EXHIBIT 3-4

| REV. NO. | DATE | DESCRIPTION |
|--|-----------|-------------|
| WETLANDS ACT 537 PLAN UPDATE FOR TOWNSHIP OF LOWER MAKEFIELD BUCKS COUNTY, PENNSYLVANIA CKS Engineers, Inc. 88 South Main Street, Doylestown, PA 18901 (215) 340-0600 | | |
| DATE: | SCALE: | DRAWN BY: |
| 10/1/97 | AS NOTED | TNS |
| CHECKED BY: | PLAN NO.: | EXHIBIT: |
| PPD | 2478 | 3-4 |





LEGEND

- MANHOLE AND SEWER CONSTRUCTED—NOT YET DEDICATED
- MANHOLE AND SEWER CONSTRUCTED AND DEDICATED
- ROADWAY CONSTRUCTED—NOT YET DEDICATED
- ROADWAY CONSTRUCTED AND DEDICATED



GRAPHIC SCALE
(in feet)

EXHIBIT 4-1

| REV. NO. | DATE | DESCRIPTION |
|--|-------------|-------------|
| EXISTING SANITARY SEWER SYSTEM | | |
| ACT 537 PLAN UPDATE FOR TOWNSHIP OF LOWER MAKEFIELD BUCKS COUNTY, PENNSYLVANIA | | |
| CKS Engineers, Inc. 88 South Main Street, Doylestown, PA 18901 (215) 340-0600 | | |
| DATE: | SCALE: | DRAWN BY: |
| 10/1/97 | AS NOTED | TNS |
| | CHECKED BY: | PPD |
| PLAN NO.: | EXHIBIT: | |
| 2478 | 4-1 | |

SERVICE AREAS (BASED ON RECEIVING SEWER SYSTEM)

- SEWER SERVICE AREA BOUNDARY
- CORE CREEK INTERCEPTOR
- MIDDLETOWN TOWNSHIP
- YARDLEY BOROUGH
- MORRISVILLE BOROUGH
- FALLS TOWNSHIP

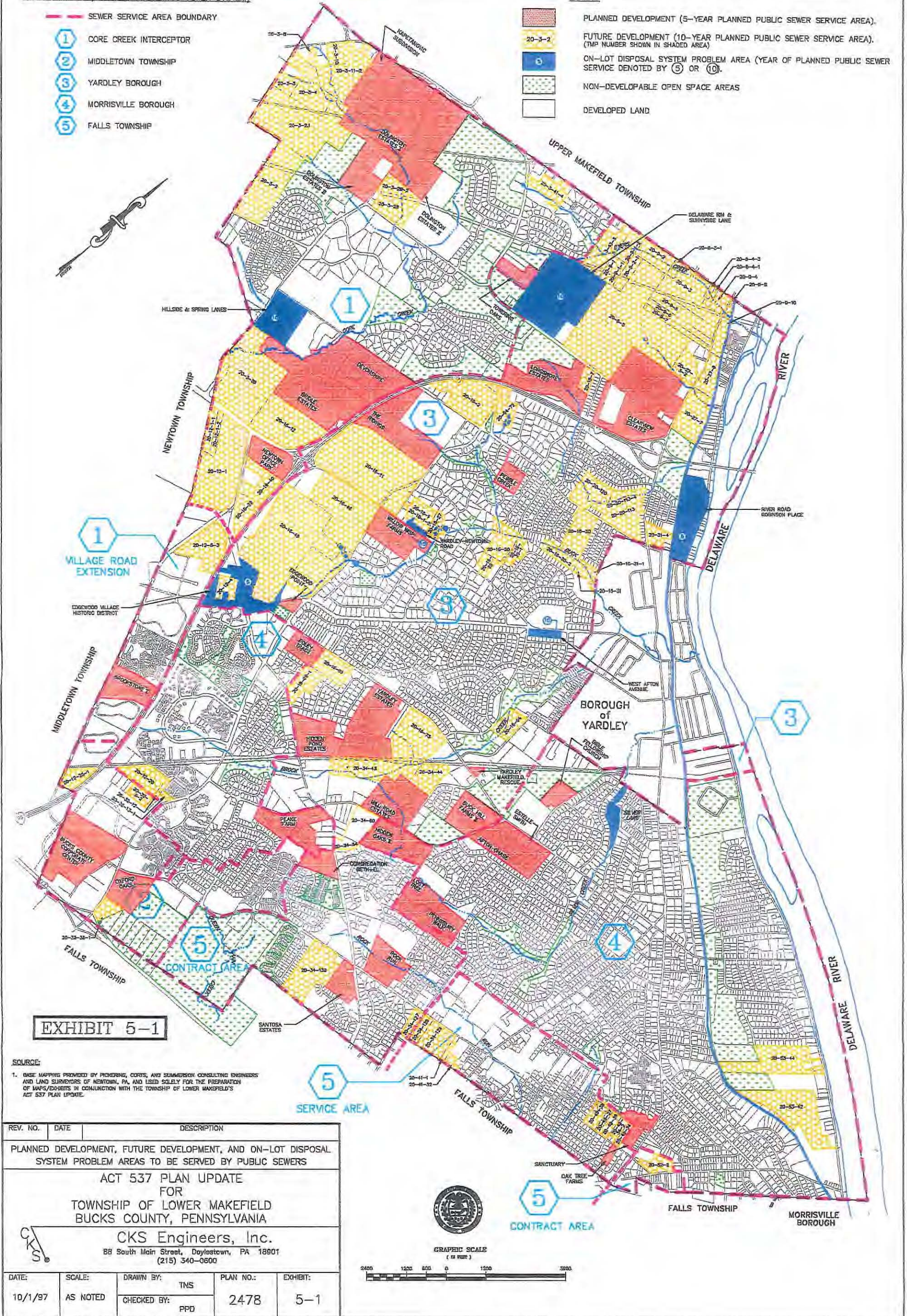
FALLS TWP.
MORRISVILLE BOROUGH

SERVICE AREAS (BASED ON RECEIVING SEWER SYSTEM)

- SEWER SERVICE AREA BOUNDARY
- ① CORE CREEK INTERCEPTOR
- ② MIDDLETOWN TOWNSHIP
- ③ YARDLEY BOROUGH
- ④ MORRISVILLE BOROUGH
- ⑤ FALLS TOWNSHIP

LEGEND

- PLANNED DEVELOPMENT (5-YEAR PLANNED PUBLIC SEWER SERVICE AREA).
- 20-3-2 FUTURE DEVELOPMENT (10-YEAR PLANNED PUBLIC SEWER SERVICE AREA). (TMP NUMBER SHOWN IN SHADED AREA)
- ON-LOT DISPOSAL SYSTEM PROBLEM AREA (YEAR OF PLANNED PUBLIC SEWER SERVICE DENOTED BY ⑤ OR ⑩).
- NON-DEVELOPABLE OPEN SPACE AREAS
- DEVELOPED LAND



① VILLAGE ROAD EXTENSION

EXHIBIT 5-1

SOURCE:

1. BASE MAPPING PROVIDED BY PICKERING, CURTIS, AND SUMMERS CONSULTING ENGINEERS AND LAND SURVEYORS OF NEWTOWN, PA, AND USED SOLELY FOR THE PREPARATION OF MAPS/DIGITIS IN CONJUNCTION WITH THE TOWNSHIP OF LOWER MAKEFIELD'S ACT 537 PLAN UPDATE.

| REV. NO. | DATE | DESCRIPTION |
|---|----------|-------------|
| PLANNED DEVELOPMENT, FUTURE DEVELOPMENT, AND ON-LOT DISPOSAL SYSTEM PROBLEM AREAS TO BE SERVED BY PUBLIC SEWERS | | |
| ACT 537 PLAN UPDATE FOR TOWNSHIP OF LOWER MAKEFIELD BUCKS COUNTY, PENNSYLVANIA | | |
| CKS Engineers, Inc. 88 South Main Street, Doylestown, PA 18901 (215) 340-0600 | | |
| DATE: | SCALE: | DRAWN BY: |
| 10/1/97 | AS NOTED | TNS |
| | | CHECKED BY: |
| | | PPD |
| PLAN NO.: | EXHIBIT: | |
| 2478 | 5-1 | |

