



**WEST PIKELAND TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA**

**ACT 537
OFFICIAL SEWAGE FACILITIES PLAN**

**Public Comment Draft
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INTRODUCTION

A. Authority:

“Municipalities are required to develop and implement comprehensive official plans which provide for the resolution of existing sewage disposal problems, provide for the future sewage disposal needs of new land development and provide for the future sewage disposal needs of the municipality.”¹

Administration of the Sewage Facilities Planning Program comes under provisions of the PA Code Title 25, Chapter 71, issued under section 1920-A of the Administrative Code of 1929 (71 P.S. § 510-20); sections 5 and 402 of The Clean Streams Law (35 P.S. §§ 691.5 and 691.402); and section 9 of the Pennsylvania Sewage Facilities Act (35 P.S. § 750.9), also known as Act 537.

B. General:

In response to continuing growth within the Municipality, West Pikeland Township (“Township”) recognizes that its current official Act 537 Plan² is no longer adequate to meet the existing or future sewage disposal needs of the Municipality. This update revision is a comprehensive revision to the existing official plan and will provide guidance on the current and future sanitary sewage disposal needs of the Township.

This update revision will:

- Consider present and future public sewerage service capacity in collection, conveyance, and treatment facilities for those areas of the Township zoned for medium and high density residential, commercial, and industrial development;
- Consider the extension of the public sewer system to service areas with a high rate of existing and potential on-lot sewage system malfunction; and,
- Provide guidance on maintaining the existing public sewerage facilities to protect the health, safety, and welfare of the residents and businesses within the boundaries of the Township.

¹ PA Code 25§71.11

² Master Sewer Plan for Chester County (1968)

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Ultimately, this update revision will provide a comprehensive sewage facility analysis that addresses the sewage disposal needs of the entire Township and outlines how to meet effectively those needs over the next 20 years. This update revision addresses various methods to ensure the proper operation and maintenance of all sewage facilities, including on-lot systems, within the borders of the Township by the development and implementation of a Sewage Management Program.

Currently, the only “public” wastewater treatment facility within the Township is the Twin Hills Wastewater Treatment Plant that services the Twin Hills Development and the Pickering Meadows Development; the sewage facilities are owned and operated by the Little Washington Wastewater Company, an Investor Owned Public Utility Company, regulated by the Pennsylvania Public Utilities Commission.

EXECUTIVE SUMMARY

A. Major problems evaluated:

Existing concerns regarding failing and aged on-lot systems, particularly in the Residential Development (RD) zoning district of the Township where building lots are 2 acres and less. This was evidenced by the fact that many homes have had difficulty in being re-certified for real estate transfers. In certain subdivisions, many of the homes are served with on-lot sewage disposal systems that have come to the end of their useful life and the lots lack a suitable area for a replacement soil adsorption component. This has led to questions regarding the long-term sustainability of existing on-lot sewage disposal systems within these subdivisions.

B. Alternatives chosen to solve these problems:

In the Residential and Conservation (RC) zoning district, building lots typically average greater than 2 acres and generally have sufficient suitable area for a replacement soil absorption system should the primary system fail, malfunction, or need major repair. For this area of the Township, with proper operation and maintenance, the continued use of on-lot sewage disposal systems is a viable long-term method of sewage disposal.

In the RD zoning district, building lots can be less than 2 acres and have limited area for a replacement soil absorption system. Initially, it was believed that providing public sewer service for this entire area was the best long-term method of sewage disposal. However, after further review of County records³ and field inspections of much of the area, it was determined that area in need was greatly reduced. Properties not in immediate need will continue to be served with their current systems: and with proper operation and maintenance, the existing on-lot sewage disposal systems should provide satisfactory service.

The Township will establish a Sewage Management Program by adopting a municipal ordinance to assure that all individual property owners properly operate and maintain their own sewerage facilities. This requires educational programs for residents as well as establishing the correct regulatory environment.

Within the RD area there are two general service areas that are in need of improved sewage facilities totaling 80 equivalent dwelling units:

³ See Map 7 – Septic System Pump Activity

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Pickering Estates: There are approximately 64 existing residential homes just east of Route 113 along the southwestern municipal boundary. This area is identified as Pickering Estates. These homes will be served with individual Advanced Wastewater Treatment and Effluent Pump systems, connected to a common Pressure Sewer Collection System with final disposal by a community Subsurface Drip Distribution System. The Walnut Lane Groundwater Recharge Facility will be located a portion of the White Tract on Walnut Lane.

Opperman's Corner: The Village Commercial District of Opperman's Corner at the intersection of Route 113 and 401, has four commercial properties which account for approximately 14 equivalent dwelling units (EDU's). The Mill at Anselma and one other residential property on Conestoga Road is included in the general service area. These properties will also connect to the pressure sewer system from Pickering Estates and dispose of treated wastewater at the Walnut Lane Groundwater Recharge Facility.

The Township will adopt a municipal ordinance to establish the Pickering Estates Sewer District; and then by municipal resolution cause the sewage facilities to be designed, permitted, constructed and put into operation. The Township will own, operate and maintain the sewage facilities with either their own employees or by contracted services. The Township may, in a future revision to this Official Plan, consider the transfer of the facilities to a Public Utility or municipal authority.

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C. Costs:

The total costs for the chosen alternative are broken out into three components:

- Capital Public Works costs representing the one-time shared costs associated with the collection and disposal system;
- Individual Onsite Facility costs representing the one-time estimated costs to each property owner for the facilities on their lot that will replace their failing systems; and
- Operating costs representing the annual costs for the operation and maintenance of the system.

1. Pickering Estates Area:

Total Capital Public Works Project Estimate:

• Pressure Sewer Collection System -	\$ 911,983
• Drip Distribution System -	\$ 500,000
Total	\$ 1,411,983

Proposed funding for the capital public works portion of the project will be by combination of a municipal secured loan and an assessment on each property. The manner and amount of the assessment shall be determined by the Board of Supervisors in accordance with Section 2508 of the Pennsylvania Second Class Township Code.

Individual Onsite Sewage Facilities Estimate⁴:

• Replacement Septic Tank -	\$ 1,000
• Furnish AX20-RT System -	\$ 9,075
• Effluent pump upgrade package -	\$ 1,100
• Service Connection -	\$ 500
• Installation -	\$ 4,000
Total	\$ 15,675

The Township will furnish the major onsite sewage facility components at its cost to the property owners obtained through a publically advertized procurement contract. Individual property owners will be responsible to complete the installation of their onsite sewage facility using a Township Authorized Installer. The installation estimate also factors in the decommissioning of the old septic

⁴ Costs presented are for a typical four (4) bedroom home with daily peak sewage flows not exceeding 500 gallons.

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tank and seepage pit including pumping out of the old tank and pit, fracturing the bottom and backfilling with soil from the new tanks.

Annual Operation and Maintenance Cost Estimate⁵:

- Service contract for onsite facilities \$ 350
 - Municipal Service Fee (Collection and Disposal) \$ 175
- Total Annual Cost Estimate per property owner \$ 525

The cost for operation and maintenance of both the onsite and offsite facilities plus any debt service for capital portion of the project will be included in a Sewer Rental Fee. The Sewer Rental Fee shall be determined by the Board of Supervisors in accordance with Section 2511 of the Pennsylvania Second Class Township Code.

Estimated Total First Year Costs per Equivalent Dwelling Unit⁶

Component	Cost per e.d.u.
Capital Public Works ⁷	\$17,650
Individual Onsite Sewage Facilities	\$15,675
Annual O & M	\$525
Total	\$33,850

Please note that this is a general estimate. Individual property owner costs may increase based upon residential/commercial use, actual gallons disposed of, and final construction costs once the project is fully engineered and bid. The Township is making every effort to keep the costs for each residential property below a threshold of \$40,000.

D. Municipal commitments necessary to implement the plan:

1. Future Implementation of a Sewage Management Program:

The Township will consider enacting a Municipal Ordinance that will require:

- All systems to be inspected by the Property Owner or a Responsible Management Entity on a three year cycle including removal solids from

⁵ Typical residential service contract includes semiannual visits; commercial properties may require more frequent visits at an additional cost.

⁶ First year costs are estimated based upon the total component costs divided by the 80 e.d.u.s in the Pickering Estates Sewer District.

⁷ Represents \$1,411,983 divided by 80 e.d.u.'s.

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tanks when the solids are in excess of manufacturers recommendations or other regulatory requirements.

- All property owners shall routinely inspect soil absorption areas to assure that storm water is properly diverted away from the area, to assure the area is protected from physical damage and to report any problems or suspected concerns to a Responsible Management Entity.
- All property owners with sewage facilities that require electrical power will have additional requirements depending on the specific type of sewage facility.

2. Pickering Estates Area:

The Township as has the authority under the Article 25 of the Second Class Township Code to enact an ordinance that will:

- Establish a sewer district for the Pickering Estates Area requiring all property owners to connect and use the sanitary sewer system, and proportionally pay for the costs of constructing, operating and maintaining the system.
- The Township will construct, own, operate, and maintain the sanitary sewer system until such time as determined by the Board of Supervisors that the system can be dedicated to another entity in accordance with a future revision to this Official Plan.

E. Schedule for implementation – Major Milestones:

(Duration Times are from date of Pa DEP Approval of the Official Plan)

- | | | |
|---|---|----------|
| • Pa DEP approval | – | 0 |
| • Adoption of Sewage Management Ordinance | – | 30 days |
| • Adoption of Pickering Estates Sewer Ordinance | – | 30 days |
| • Notify Residents | – | 60 days |
| • Prepare engineering plans for bidding and permits | – | 90 days |
| • Expect DEP permits | – | 120 days |
| • Advertise for Bids | – | 150 days |
| • Open Bids, finalize and secure financing | – | 180 days |
| • Notice of Award | – | 210 days |
| • Notice to Proceed & Start Construction | – | 240 days |
| • Complete Construction (season depended) | – | 420 days |
| • Send notices to connect within 60 days | – | 450 days |
| • Project complete and operational | – | 510 days |

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F. Preferred Alternative Types of Wastewater Systems by Zoning District

This list represents the preferred types of wastewater systems for new development within the indicated zoning district.

Residential Development Zoning District

Collection

The preferred collection method will be low pressure effluent or grinder pump systems. The alternate collection method will be gravity, conventional or effluent sewer systems. These collection systems will be owned and operated by a public utility, municipality or municipal authority.

Treatment

The preferred treatment method for those areas with currently failing, individual on-lot systems (Pickering Estates area) will be using individual, on-site treatment systems such as the AdvanTex® system. These treatment systems shall be owned by individual lot owners, but subject to a maintenance and operation agreement with a public utility, municipality or a municipal authority.

The preferred treatment method for new development will be the use of existing public utility systems where capacity exists. The alternate treatment method will be the use of individual, on-site treatment systems such as the AdvanTex® system. These individual, advanced treatment systems shall be owned by individual lot owners, but subject to a maintenance and operation agreement with a public utility, municipality or a municipal authority.

Dispersal

The preferred dispersal method for treated water will be subsurface using gravity, low pressure, or drip dispersal systems. These dispersal systems will be owned and operated by a public utility, municipality or a municipal authority.

Residential and Conservation Zoning District

In the RC Zoning District the preferred method for wastewater treatment and dispersal will continue to be individual, on-site septic systems owned, maintained and operated by the user.

Village Zoning Districts – Opperman’s Corner and Anselma (V1 and V2) includes higher density / intensity uses in all other districts)

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These zoning districts will use the same preferred collection, treatment, and dispersal methods as those outlined in the Residential Development Zoning District.

Village Zoning District – Yellow Springs (V3)

Collection

The preferred collection method will be gravity, conventional or effluent sewer systems. The alternate collection method will be low pressure effluent or grinder pump systems. These collection systems will be owned and operated by the existing community association.

Treatment

The preferred treatment method will be the use of the existing, community primary treatment system. The alternate treatment method will be individual, on-site septic systems owned and operated by the user.

Dispersal

The preferred dispersal method for treated water will continue to be subsurface using the existing community dispersal system. The dispersal system will be owned and operated by the present community association.

PREVIOUS WASTEWATER PLANNING

A. Chester County Master Sewer Plan:

West Pikeland Township was a participant in the Chester County Planning Commission's comprehensive area-wide sewerage plan for Chester County Pennsylvania, entitled "Master Sewer Plan – Chester County". This plan was conceptualized in 1966, was completed in June 1968, and was subsequently presented to all the Municipalities in the County for adoption.

The Chester County Master Sewer Plan (herein referred to as 'The County Plan') was developed in concert with the Pennsylvania Sewage Facilities Act (Act 537), which was enacted on January 24, 1966, and became effective on January 1, 1968. The scope of the County Plan was revised to incorporate newly adopted guidance from state's Sewage Advisory Committee in 1967. The County Plan was later approved by the Pennsylvania Department of Health⁸ on July 30, 1969 to satisfy the planning requirements of Act 537 for all the Municipalities in Chester County. The Revised Edition 1970 was a reprinting of the Master Sewer Plan but with some amendments unrelated to West Pikeland Township.

The Plan presented a Stage Development Program for two 10-year periods, 1968 to 1978 and 1978 to 1988. The county plan projected West Pikeland would "...likely develop at lower densities than the rest of the (Phoenixville) sub-region because of poor access and because of the presence of much land with excessive slope and poor drainage." Planning for West Pikeland Township was not included in any of the regional sewer service areas, resulting in the Township dependence on "...on-site sewage disposal methods...for many years to come."

B. Major Land Developments with Public/Community Sewage Facilities:

1. Twin Hills Residential Development (Phase I&II):

In 1989, a Revision for new land development was approved by the Township and DEP for construction of a wastewater collection, treatment, and disposal facility in West Pikeland Township. The planning area serviced by this system is the Twin Hills Development, which is located to the north of the Byers Road and Eagle Farms Road intersection. This development consists of 250 residential dwelling units. The sewerage facility was designed to provide tertiary treatment

⁸ In 1971 the Pennsylvania Department of Environmental Resources (DER) was formed and assumed responsibility for Sewage Facilities Planning Program, then in 1995 DER was split into two departments and the Pennsylvania Department of Environment Protection (DEP) assumed responsibility for the Sewage Facilities Planning Program.

with sequencing batch reactors (SBR's) and filtration for ultimate disposal to a Seepage Bed soil absorption system.

The residential development was constructed in two (2) phases, as was the treatment and disposal facility. Phase I corresponded with the construction of 156 units - 48,000 gallons per day (GPD). During this phase, all mechanical equipment was installed in the treatment facility for the ultimate design flow. The remaining 104 residential units were constructed in the early 1990's, including three additional Seepage Beds for Phase II. This resulted in the expansion of the facilities to a permitted flow of 73,500 GPD.

2. 1999 Update Revision – Twin Hills Sewerage Facilities:

Twin Hills Wastewater Facilities was initially privately owned and operated by the Twin Hill Sewage Corporation under a permit issued to West Pikeland Township. This Update Revision provided for an institutional change for the Twin Hills System, whereby the ownership and permits were transferred to Little Washington Wastewater Company, a subsidiary of Aqua PA - an investor owned public utility company regulated by the Pennsylvania Public Utilities Commission (PUC).

The planning area for this Update Revision consisted of the 250 single-family residential homes of the Twin Hills Development and three additional properties along Byers Road.

3. Pickering Meadows-Windermere Residential Development:

In 1996, a Revision for new land development for the Windermere Development was submitted to the DEP. This Revision provided for a new treatment and disposal facility to service the Windermere Development currently known as Pickering Meadows. This planning area consisted of 78 new residences and two existing dwellings. The plan was to serve the individual homes with grinder pumps with a pressure sewer collection system. The pressure sewers would convey the sewage to a Spray Irrigation Surface Land Application System consisting of an aerated treatment lagoon a storage lagoon with spray fields, all within open space of the development. On November 17, 1997 permit number 1597407 was issued to the Township the sewage facilities.

In 2000, a revision to the 1996 plan submitted to the DEP proposing that the Twin Hills Wastewater Facility provide sewage services for Pickering Meadows by conveying the sewage from the 80 homes to the existing Byers Road Pump Station for treatment at the Twin Hills facility. The developer for Pickering Meadows conveyed an easement to Little Washington Wastewater Company for a future disposal system. This easement as a restriction in that the disposal method be a subsurface system and not use a Spray Irrigation System a surface land application system.

4. Anselma Crossing (Pa Code 1-15968-136-3):

The Anselma Crossing project is a commercial redevelopment located in the V-2 Village Commercial zoning district along Conestoga Road near Walnut Lane, consisting of three adjacent parcels totaling approximately 8 acres. There are several existing commercial and light industrial buildings along with a recently removed mobile home all served with onsite water and sewage facilities. The redeveloped site will be served with two grinder pump systems, sewage from the individual buildings will flow by gravity to the grinder pump systems. Both grinder pumps will connect to a common force main which will be placed within the right of way of Conestoga Road and connect to the existing force main at Byers Road for conveyance to and treatment at the Twin Hills Wastewater Treatment Plant (Permit No. 1584409). The Anselma Crossing development will be organized as a Condominium Association who responsibilities will include management of the onsite sewer collection system and grinder pump systems. The force main will be dedicated to the Little Washington Wastewater Company. The sewage flows for this subdivision are estimated to be 2,930 GPD (11 EDUs).

PHYSICAL AND DEMOGRAPHIC CHARACTERISTICS

The demographic and physical characteristics of the Township are important considerations in sewage facilities planning. Physical features determine the feasibility of collecting and conveying the sewage to treatment facilities and the suitability of areas for disposal. Demographic characteristics, such as the concentration of older communities with malfunctioning on-lot sewage systems, determine the need for expansion of centralized systems into an area.

Demographic and physical characteristics of West Pikeland Township are evaluated in the following sections. Issues presented in these sections begin to form the basis for determining the sewage facilities necessary to address both the Township's existing and future sewage service needs.

A. Location and Description of Planning Area:

West Pikeland Township is an ex-urban, small-sized township located in the north-central region of Chester County. The Township forms a nearly perfect 10 square mile and is bordered by East Pikeland Township and Charlestown Township to the east; West Vincent Township to the north and west; and Uwchlan and Upper Uwchlan to the south. Since this is a comprehensive update revision, the planning area is the entire township of West Pikeland. Map 1 shows a general map of the Township with study areas, major developments, villages and other places of interest.

The Pennsylvania Turnpike runs through the southern corner of the Township (there are no points of access or exit from the Turnpike within the Township). State Route 113, an arterial road, bisects the Township from the northeast to the southwest boundaries. State Route 401, also an arterial road, passes through the Township, from the northwest to southeast, intersecting with Route 113 at Opperman's Corner. Byers and Newcomen Roads run parallel with Route 113 to the north and south of Route 401, respectively. Byers and Newcomen Roads have been identified as collectors. Clover Mill Road, intersecting with Route 113 along the northeast boundary, is also considered a collector.

B. Physical Characteristics:

West Pikeland Township can be divided into three (3) drainage basins; Pine Creek, Pickering Creek and Pigeon Creek all are tributary to the main branch of Pickering Creek, designated as High Quality Waters.

Pickering Creek and its tributary streams run through the northern and western portions of the Township and have created low-lying valleys over time. The Pine

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Creek and its tributary enter the Township from the south and have created, over time, less prominent valleys with steeper embankments. The Pine Creek converges with the Pickering Creek slightly north east of the center of the Township. Pigeon Run is mainly located in Charlestown Township however it partially runs through the northeastern portion of West Pikeland Township. Pigeon Run continues northeast into East Pikeland where it converges with the Pickering Creek. The Pickering Creek then continues northeast into East Pikeland Township, ultimately reaching the Schuylkill River.

All of the streams within West Pikeland Township are classified as High Quality, Trout Stocked streams. This is one class below the most pristine streams classified as Exceptional Value by Pennsylvania Code Title 25 Chapter 93 Water Quality Standards. Therefore, higher quality standards apply to any point source discharge proposed, so as not to affect the current uses of the protected waters.

C. Soils:

Soils are a critical factor affecting the suitability of a site for soil absorption areas. Because the majority of West Pikeland Township residents utilize soil absorption areas for effluent disposal, analysis of soil suitability is an important consideration. Proper siting of soil absorption areas is important in helping to reduce groundwater and surface water pollution. Floodplains, wet soils, shallow soils, and areas with fractured rock are more susceptible to pollution because the contaminants can reach the water table before they are treated by the natural microbes and the soil structure in the ground.

Field work for the “Soil Survey for Chester and Delaware Counties, Pennsylvania” was completed in 1959. The report was issued in May 1963 by the United States Department of Agriculture. This report provides information to estimate the suitability of sites for the infiltration of wastes from septic tanks. This report clearly states, however, that the mapping and descriptions are “somewhat generalized and should be used only in planning more detailed field surveys”. The original mapping has been transcribed to a Geographic Information System (GIS) by the Chester County GIS Department. According to the 1997 version of the Soil Survey Geographic Database for Chester County, Pennsylvania, there are twelve major soil series in West Pikeland Township. The soil characteristics from the original 1959 Soil Survey has been analyzed to classify the soils within West Pikeland Township into four general categories relating to soil absorption area suitability. Information regarding the soil suitability for on-lot sewage disposal is given in Table 1 and shown on Map 3.

<p>Table 1 - Soil Suitability for On-lot Sewage Disposal</p>

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Soil Type	Category
Chester, Neshaminy	Generally Suitable (Moderate)
Brandywine, Edgemont, Glenelg, Manor, Penn	Provisionally Suitable (Moderate to Severe)
Glenville, Udorthents, Urban Land	Marginally Suitable (Variable)
Chewacla, Wehadkee, Worsham	Provisionally Unsuitable (Severe)

Generally Suitable: Soils that are deep well drained with slopes less than 15% generally have minimal limitations for on-lot soil absorption areas.

Provisionally Suitable: Soils that are moderately well drain with slopes less than 15% could have limitations for use with on-lot soil absorption areas.

Marginally Suitable: Soils that are shallow or somewhat poorly drained, have high seasonal water tables, or slopes that are greater than 15% but less than 25%, such soils may require pretreatment prior application to an on-lot soil absorption area.

Provisionally Unsuitable: Soils that are classified as Floodplain soils or with slopes in excess of 25%.

Soil properties and site characteristics vary with location. Areas depicted as having limitations may still be suitable for subsurface disposal. The adequacy of the surface soils and underlying strata for the intended disposal method must always be field verified and is a prerequisite to the permitting process. Alternate and/or experimental methods, as identified by the DEP, may be available for areas where conventional subsurface disposal methods are not suitable. Any disposal method, however, will be subject to the requirements of the Department of Environmental Protection and the Chester County Health Department.

D. Geology:

As shown on the Geology Map, Map 4, most of the Township is comprised of granodiorite gneiss and graphitic gneiss. Although graphitic gneiss can yield an adequate water supply, neither geologic formation is classified as a regional aquifer. The Township also contains diabase, which is an extremely dense formation that is a poor source of water. The median yields for domestic wells in these geologic formations range from twelve (12) to fifteen (15) gpm, per the Pennsylvania Water Resources Compendium. This is usually sufficient for low density development of the type prevalent throughout a majority of the Township.

E. Topography:

The terrain within the Township generally consists of rolling hills with moderate to steep slopes. The highest elevation in the Township is approximately 550 feet above sea level, in the areas of Art School Road, Dunsinane Hill Road and Horseshoe Trail Road in the northwestern section of the Township. The lowest elevation in the Township is approximately 250 feet above sea level in the area of Clover Mill Road, slightly west of PA Route 113 in the east/northeaster section of the Township.

The topography, or slope, of the land is an important factor when considering sewage facilities. Whether the facilities are individual on-lot sewage systems or a large community sewage system, the topography must be considered. On-lot sewage systems require a suitable slope for their soil absorption areas and the design of collection and conveyance systems must consider the slope and the costs to pump wastewater to a point of sewage treatment and discharge.

The degree of slope provides an indication of site suitability for on-lot sewage systems. Any slope encountered is an important consideration and must be considered when evaluating sewage disposal alternatives. Soil absorption systems generally have the least constraints when they are in areas with slopes of less than 15 percent. Areas with slopes between 15 and 25 percent slopes pose moderate constraints for the use as soil absorption areas. Slopes over 25 percent are typically not suitable for soil absorption areas. "On-lot Sewage Systems" permitted under Pa Code Title 25§73 are prohibited on slopes over 25 percent, except under §73.71 "Experimental Sewage Systems" or for systems permitted under the Clean Stream Law.

Topographic Map, Map 2, displays the various slope categories as related to soil absorption area constraints. Approximately 87 percent of the land in the Township is within the category of 0 to 15 percent slope category; approximately 10 percent of the land in the Township is within the 15 to 25 percent slope category; and nearly 3 percent of the land in the Township has slopes greater than 25 percent.

F. Potable Water Supplies:

1. Public Water Supply:

The majority of the Township obtains their potable water supply from private individual wells. Aqua America, Inc., an investor owned public utility company regulated by the Pennsylvania Public Utility Commission, provides public water service area to developments along the southwestern boundary of the Township. Aqua America's local subsidiary, Aqua PA, provides public water to the developments listed in Table 2.

Table 2 - Developments with Public Water Supply	
Subdivision	Number of Connections
Bridlewood	62
Chantilly Farms	34
Fairfields	71
Pickering Meadows	79
Twin Hills	250

Aqua America's service territory, according to records, generally includes the area southwest of PA Route 401 and the Pickering Meadows Development. The primary sources of water supply for the service area are the Uwchlan, Bell Tavern, and Shoen Road Wells. The system pressure is governed by the Lionville Booster Station. Water to the Twin Hills and Pickering Meadows Subdivisions is supplied by a 12" ductile iron supply main located along Lionville Station Road (Byers Road). Water to the Bridlewood Subdivision is provided by a 12" supply main along East Uwchlan Avenue and an 8" supply main along Davis Road. System pressure and supply are adequate for this system and there are no reported problems.

It is likely that the extension of this public water system will continue in conjunction with further development within the Township. Map 6 shows Aqua America's service territory. The future availability of public water within the Township remains limited to the service territory.

2. Community Water Supply:

Community onsite water systems exist in the Montgomery School and Yellow Springs areas. These facilities are institutional or commercial in nature. Map 6 shows the location and Table 5 describes the average daily usages of these water systems.

Table 3 - Community On-Site Water Systems	
Name	GPD
Montgomery School	4,080
Yellow Springs and Community Center	6,927

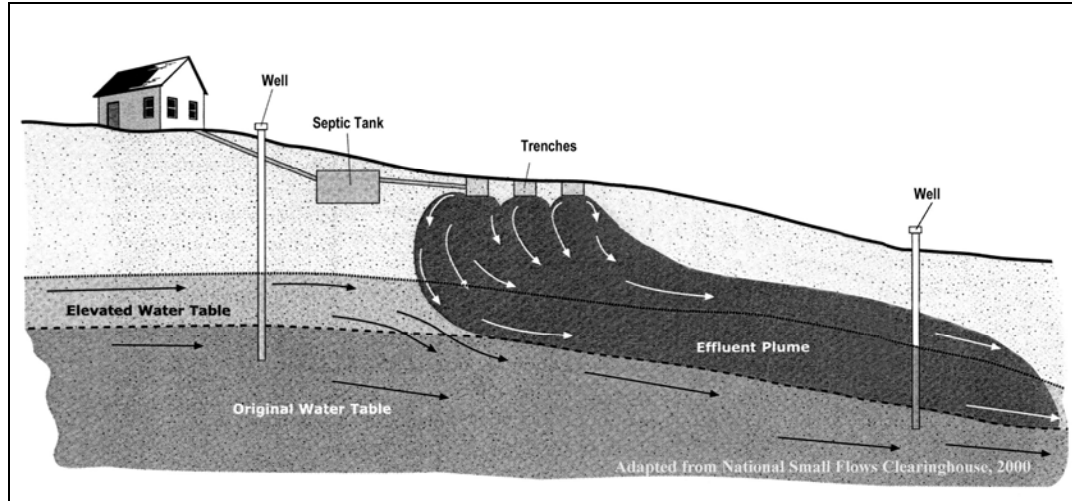
3. Private Water Supply:

There are approximately 890 private wells in West Pikeland Township located outside the existing public water service area, utilized for residential potable water supply. There are also some private wells within the public water service area that that are still utilized. West Pikeland Township does not require that all properties adjacent to waterlines connect to the public water supply system.

4. Groundwater Quality Assurance:

The high quality of the Township's groundwater is a very valuable resource. Due to the reliance on this resource for individual water supplies, a major reason to establish functioning sewage facilities is to protect the general health and safety of the Township's residents. To protect this valuable resource, the Chester County Health Department maintains records of private drinking water well tests results as part of the well permitting requirements. Total coliform and nitrate-nitrogen levels were compiled from these records to estimate the quality of the groundwater in those areas of the Township dependent on private wells for a potable water supply.

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When the detected presence of total coliform bacteria exceeds certain standards it is indicative of fecal contamination (sewage pollution). This may be the result of improperly functioning on-lot disposal systems or surface water entering the aquifer without receiving adequate natural treatment.

Within the total coliform group, there are organisms such as E-coli commonly found in the human feces, as well as bacteria that are naturally occurring in soil and vegetation. The presence of total coliform is an indication, but not conclusive evidence of fecal contamination or potential on-lot sewage disposal problem. Water from wells that test positive for coliform should not be consumed until further testing shows the absence of such fecal contaminating bacteria.

Ammonia is a form of nitrogen and is a common component of both animal and human waste. When applied to the ground surface or within the upper layers of the soil horizon, the nitrogen is utilized by plant life. However, if too much ammonia is applied to the ground, as in over fertilization with animal manure, the excess ammonia is nitrified as it is passed through the soil into nitrate. These nitrates migrate through the soil into the groundwater. All groundwater eventually comes to the surface in a spring, stream, or lake; then the nitrates volatilize into nitrogen gas and enter the atmosphere.

Nitrates in the groundwater, under certain conditions, can create health risks. The United States Environmental Protection Agency's established maximum contamination limit (MCL) of 10 milligrams per liter (mg/L) of nitrate for the upper limit for safe drinking water.

Land developments proposing to utilize on-lot sewage disposal that are within a quarter of a mile radius of documented groundwater concentrations of nitrogen above 5 mg/L are required to conduct additional hydrogeologic studies.

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Approximately 1.4 acres is needed to isolate each onsite sewage disposal system before the nitrate nitrogen dilution is raised above the 10 mg/l limit.⁹

There are several possible methods of prohibiting the present and potential use of contaminated groundwater within the mixing and buffer zones for drinking water purposes:

- a) Sewage Facilities Planning that limits the installation of treatment facilities in high nitrate-nitrogen zones. This typically requires an advance treatment process that provides nitrogen reduction.
- b) Land use zoning, established by local government agencies which prohibits development using on-site wells in high nitrate nitrogen zones (this would eliminate drinking water use).
- c) Use of alternative water supplies. For example, provide public water to all properties within the high nitrate-nitrogen zone.
- d) Deed restrictions, easements, or other legal mechanism limiting use of affected groundwater areas.
- e) Ownership of all property affected.

G. Wetlands and Floodplains:

Wetlands are a restrictive feature to site planning, not only because of State and Federal laws protecting this resource, but also because of the elevated water level associated with them.

Floodplains are areas associated with streams that are subject to flooding during storm events. Flood plains and wetlands represent areas that are considered, therefore, provisionally unsuitable for on-lot sewage disposal systems. Areas of wetlands and floodplains and streams within the Township are shown on the Water Resource Map in Map 5. The wetlands and floodplains shown are reproduced from the National Wetlands Inventory Mapping and FEMA Mapping. Although wetlands do not represent a major portion of the Township, there are concentrated areas of wetlands interspersed throughout West Pikeland Township. The largest wetlands areas are found in areas adjacent to the Pickering and Pine Creek. Most of these wetlands are in the Palustrine Ecological system and are classified as Open Water, Forested, or Emergent. The Riverine wetlands,

⁹ Pa DEP Doc. No. 362-2207-004 *Impact of the Use of Subsurface Disposal Systems on Groundwater Nitrate Nitrogen Levels*, last revised March 31, 2003

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composed of the intermittent and perennial streams and creeks, are also found along the Pickering Creek and one of its tributaries.

II. Existing Sewage Facilities:

A. Municipal and non-municipal, individual and community sewerage systems:

West Pikeland Township does not presently own or operate any community sewage systems. The Township borders municipalities with existing sewerage facilities: Uwchlan Township conveys sewage to the Downingtown Area Regional Authority; Charlestown Township conveys sewage to the Valley Forge Sewer Authority; and Upper Uwchlan Township is served by the Upper Uwchlan Municipal Authority. Each of these Authorities was contacted and capacity is not presently available (see Figure 4, Figure 5 & Figure 6).

1. Pine Creek Pumping Station:

Uwchlan Township owns and maintains the Pine Creek Pumping Station. This pumping station is located within West Pikeland Township along its southern border with Uwchlan Township, near the intersection of Davis and Upper Pine Creek Road. This pumping station was constructed in 1975 and was later upgraded in 2003. Capacity is not available to West Pikeland Township.

2. Charlestown Meadows Pumping Station:

Valley Forge Regional Sewer Authority owns and operates the Charlestown Meadows Pumping Station. This pumping station is located in Charlestown Township along Conestoga Road (SR 401) approximately 1,600 feet east of Newcomen Road adjacent to Hillsover Lane. The pumping station serves the Charlestown Meadows Development and conveys sanitary sewage through East Whiteland Township with ultimate disposal at the Valley Forge Sewer Authority Treatment Plant in Schuylkill Township. Capacity is not procurable for West Pikeland Township at the treatment plant.

3. Twin Hills Community Treatment Facility:

The Twin Hills Wastewater Treatment Plant is located within the Twin Hill Development in the western portion of the Township, as shown in Map 6. This plant was permitted by Pa DEP on May 4, 1992 under WQM Permit No. 1591409 in the name of West Pikeland Township to initially to serve the Twin Hills Development. On July 23, 1998, WQM permit 1584409 was issued to add a 5,000 gallon equalization tank, and on May 11, 2000 WQM permit No. 1598409A1 was issued to increase the capacity of the equalization tank from 5,000 gallons to 22,500 gallons and also transfer the ownership to Little Washington Wastewater Company. The transfer in ownership allowed for the connection several existing single-family homes along Byers Road, which borders the development. The Little Washington Wastewater Company is a subsidiary of Aqua Pennsylvania.

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May 25, 2001, WQM permit No. 1598409A2 was issued to accommodate the peak flow from the Pickering Meadows Development and to meet year round total nitrogen limit of 10 mg/l.

The plant is an advanced secondary treatment facility using a Sequencing Batch Reactor system, also known as the SBR process, with sand filtration and chlorine disinfection. Ultimate disposal of the treated effluent is to eight subsurface seepage beds. A permit application was submitted on May 14, 2002 (Authorization ID 383919) for the construction additional seepage beds; this permit is listed as "Pending".

The facility's original design and permitted capacity was 73,500 gallons per day. The 2002 permit amendment effectively de-rated permitted capacity to 59,000 gallons per day, with a Maximum monthly flow of 68,000 gallons per day. The combined maximum hydraulic loading of the eight existing seepage beds is 73,500 gallons per day.

4. Twin Hills Collection System:

Sewage from the Twin Hills Development is collected by eight inch diameter sewers constructed throughout the development. The majority of the development is conveyed by gravity to the influent lift station of the treatment plant. Approximately 50 units from the Twin Hills Development flow into the Byers Road Pump Station.

5. Byers Road Pumping Station:

The Byers Road Pumping Station serves 50 of the 250 homes in the Twin Hills Development and 82 homes of the Pickering Meadows Development. The pumping station is owned and operated by the Little Washington Wastewater Company. It was upgraded when the Pickering Meadow Development was connected and presently has a pumping conveyance capacity of 190 gallons per minute.

6. Pickering Meadows Collections Systems:

The raw sewage from the Pickering Meadows Development is conveyed by individual residential grinder pumps and a pressure sewer system that conveys to the Byers Road Pumping Station. The pressure sewer system within the community is owned, operated, and maintained by the Little Washington Wastewater Company. The individual grinder pumps are owned and maintained by the private residents.

7. Twin Hills/Pickering Meadows Disposal Facilities:

As part of the original design, eight seepage beds were constructed, which provide 73,500 gallons per day of disposal capacity. When the Pickering Meadows Development was connected to the Twin Hills facility, two additional seepage beds were planned, but not constructed. If constructed, the disposal capacity could increase by 5,200 gallons per day. However, additional hydrogeological studies will be required to assure that the increase in applied water will not cause a groundwater mounding problem.

8. Yellow Springs Community Treatment System:

The Yellow Springs Village is located at the intersection of Art School Road and Yellow Springs Road. This one-time resort consists of five structures currently housing the Chester Springs Library, Historic Yellow Springs, and the Chester Springs Studio. Four privately owned residences and one commercial restaurant surrounding this historic site are also included in this community. The current wastewater treatment and disposal system was upgraded and expanded in 2000 based on a Pennsylvania Infrastructure Investment Authority (PennVest) loan. This system consists of five 2,000 gallon septic tanks, two seepage beds installed in 1979, one seepage bed with infiltrator capacity, a valve box to regulate flows to the seepage beds, and a pump station required to move the effluent from the septic tanks to the seepage fields. This system is permitted for a design flow of 6,927 GPD. The metered flows generated by this community are given in Table 4.

9. Montgomery School Community Treatment System:

The Montgomery School is located on the west side of Route 113, approximately 1 mile north of Route 401. This private school provides learning services for children from preschool thru eighth grade. The school consists of approximately 90 acres and 9 buildings, including a dining hall, a gymnasium, and an indoor swimming pool. The school currently has a student enrollment of 305, with 39 faculty and staff. The Montgomery school is currently served by on-site drinking water and on-lot wastewater disposal. The current wastewater treatment and disposal system was installed in 1989. The system consists of two lift stations, a combination of septic tanks totaling 7,000 gallons, and dosing siphons to two seepage beds. This system has a permitted flow of 4,080 gallons per day. Actual water usage and sewage flows are currently not available.

Table 4 - Historic Yellow Springs Treatment Facility	
METERED AVERAGE FLOW	
Building	Flow – GPD
Yellow Springs Inn	1,640
Fraley House	200*
Studio	200*
Rosato House	250*
Yellow Springs Cultural Center	96
Vaughn House	85
Yeaworth House	172
Lincoln Building	75
Jenny Lind Building	17
Total	2,735

*Estimated Values

10. Individual On-lot Sewage Disposal:

The remaining population within West Pikeland Township is served by individual on-lot sewage disposal systems. While a number of these systems have been reported as failing, or are unable to be certified as satisfactory for the purposes of a Real Estate Transaction¹⁰, with attention, proper operation and routine maintenance, individual on-lot sewage disposal systems will protect the public health and the environment and is often more cost effective than public sewer alternatives.

Systems with a problem within the soil absorption area are of serious concern. Problems other than the soil absorption area can most often be repaired. Soils are the most important component of any on-lot sewage disposal system

¹⁰ Failed Certifications – On-lot system certifications are often preformed prior to a real estate transaction. These “certifications are an objection evaluation of the onlot system based on the experience and expertise of the inspector. In Pennsylvania there are no regulatory requirements for an onlot system certification however there are two recognized associations who do provide training and certification for onlot system evaluators, the Pennsylvania Septage Management Association (PSMA) and the National Sanitation Foundation (NSF).

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because unsaturated soil provides renovation as the water is recycled back into the environment.

The homes in the Pickering Estates area are of particular concern. The original on-lot disposal systems in this area consisted of septic tanks with seepage pits (sometimes referred to as “cesspools”). Cesspools were commonly built before the Act 537 standards for on-site disposal were adopted. Cesspools often permit untreated sewage to enter the ground water. They are now considered non-standard forms of disposal. Many cesspools have continued to function for a long time, but they must be replaced with a modern soil absorption system should they malfunction. This assumes there is adequate soils and room on the site for a proper soil absorption system.

On-lot sewage disposal systems are designed to last the life of the home, with proper maintenance. Problems encountered with on-lot sewage disposal systems are typically due to improper maintenance or a latent defect in the design or installation. Occasionally systems may also be inadequately sized for the use, large families, added bedrooms, or conversions of garages into additional dwelling spaces, apartments, “in-law suites” and such.

All on-lot sewage disposal systems require maintenance. Inspection for and the removal of solids from tanks and the cleaning of distribution lines in the absorption area are part of the required maintenance. Minor repairs include replacement of tank baffles, access risers, pumps and other electrical controls. Minor repairs generally do not require a repair permit when the component is replaced with like or similar components. Major repairs such as a replacement septic tank or repairs to the soil adsorption area require a repair permit. Repairs to the existing soil absorption area are often not possible and a replacement area will be required. Replacing the absorption area requires additional soil testing. Replacement areas can be very expensive and often will require some alternative or innovative technology.

Map 7 also shows the pumped out frequency of the septic systems within the township. Since April 2005, the Chester County Health Department has been requiring all licensed liquid waste haulers to report all pump outs of septic tanks and similar tanks. PA DEP recommends that septic tanks and alike be inspected once every three years and to remove the contents when the solids in the tank exceed 1/3 the liquid volume. The pumping of tanks once every three years is a common practice, once every year is generally considered excessive. Pumping of tanks more than once a year, usually is an indication of a problem.

B. Areas in need of community sewage service:

This update revision began after it was brought the Township’s attention that there were concerns among a number of residents regarding the potential need for

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improved sewage disposal facilities. Initially, the entire RD zoning district was to be considered for public/community sewage service. The need for improved sewage facilities was based mainly on a petition circulated among the property owners and the fact that several homes had unsatisfactory third-party certifications. Properties without a satisfactory septic system certification are not necessarily malfunctioning; many of these on-lot systems just need proper maintenance. Very often malfunctioning systems can be repaired. However, whenever there is a high concentration of malfunctions in an area requiring various alternative repairs, concerns are raised and the benefits of public/community sewer alternatives must be considered.

In October, 2008 a public meeting was held to provide all the residents of the Township an update on this plan revision. The plan, at that time, was that the RC zoning district could continue to be served with individual and small community on-lot sewage disposal systems and the RD zoning district was the only area considered for public/community sewers. The RD zoning district was divided into two further areas of study. The area east of Route 113 was identified as the Windolph Knoll Study Area and the area west of Route 113 was identified as Twin Hills Study Area. The plan was to develop alternatives to provide public/community sewerage facilities for these areas. Since the Township owned land (known as Windolph Knoll), this site would be evaluated for a land application system. Also, other lands would be evaluated as possible disposal sites.

After the October 2008 meeting, soils studies and a preliminary Hydrogeologic Study were performed at the Windolph Knoll site near Route 401 (Conestoga Road) and Upper Pine Creek Road. This site is approximately 25 acres and is mostly all deep well drained soils suitable for the subsurface disposal of domestic sewage. The groundwater mounding was analyzed and found satisfactory for an application rate of 65,000 gallons per day. Two other possible disposal sites were also evaluated, Pickering Meadows and the Elmer White Farm.

- The Pickering Meadows subdivision when originally approved was permitted to be served with a Spray Irrigation system, however, during the land development process, this plan was revised and the sewage from Pickering Meadows would be conveyed to the Twin Hills Facilities. The spray irrigation fields would remain for future use. These spray fields were originally permitted to serve 80 homes.
- The Elmer White Farm was under a development agreement. The developer had performed extensive soils and hydrogeologic testing on 8.59 acres of the 66 acre farm with a disposal capacity of 52,866 gallons per day.

In March, 2009 a second public meeting was held, with the purpose of updating the property owners in the Windolph Knoll study area of the proposed plan. During this meeting, public opinion indicated that the need for public sewers was not as severe as once expressed, at least not for the entire study area. After the meeting,

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representatives of the Township met with officials from the County Health Department and reviewed the needs within the Township. A survey questionnaire was mailed to all the property owners within the Windolph Knoll study area. This was followed by a review of Health Department septic tank pump out records. Then a field survey of individual properties in those neighborhoods that indicated a higher level of concern based on the mail-in surveys and pump out records. The Needs Study is presented in the appendices.

The initial sewer needs survey was completed in July 2009 and it became apparent that the area of need was much smaller than previously thought. Only the Pickering Estates area was in the greatest need for replacement sewage facilities.

Following the conclusion of the initial needs survey, it was determined, based the size and location of the Pickering Estates Subdivision, that conveyance to the Windolph Knoll site was not the most cost effective alternative. Conveyance to the Twin Hills plant area appeared to be a more reasonable alternative.

Since there are other homes and businesses along the conveyance route to Twin Hills, investigation of these homes and businesses was also conducted. Mail-in surveys were collected and a walking survey of this additional area was performed during August 2009. A review of County Septic System pump out records indicated a very high pump frequency in the Opperman's Corner Village District and the field survey indicated very few, if any, options would be available for replacement systems based on lack of suitable area for disposal. The field survey of the homes along Conestoga Road (between Rt 113 and Walnut Lane) and Meadow Creek Lane did not indicate any signs of problems or concern. A single, one acre property on Conestoga Road, with enhanced septic tank pumping, and the Mill at Anselma, which is on a holding tank, are considered to be within the sewer service area.

This update revision identifies the existing homes in the Pickering Estates area that are in immediate need of improved sewer service and the V-1 Opperman's Corner Village District that would also ultimately benefit with a community or public sewer system.

- The homes in the Pickering Estates are on one acre lots with onsite wells. The original on-lot sewage systems do not meet current standards. Permitting replacement systems has been a challenge for the County Health Department requiring very expensive alternative systems. More frequent than typical septic tank pump outs have been documented in this area.
- V-1 Village/Commercial districts are presently having problems with their existing on-lot sewage disposal systems, pump out records for the County Health Department indicate businesses pumping septic tank more the once a year - sometimes 3 to 4 times per year. This is an indication of a problem.

Map 10 shows the areas proposed for public sanitary sewer service.

C. Wastewater Sludge and Septage Generation, Transport and Disposal:

The Chester County Health Department has established minimum standards for the handling, transporting, storage and disposal of solid and liquid waste materials. All haulers of such materials are licensed by Chester County.

III. Future Growth and Land Development:

A. Municipal and County Planning Documents:

- **West Pikeland Comprehensive Plan adopted December 6, 2010.**

The Comprehensive Plan is one of the primary guidance documents for growth and development in the Township of West Pikeland. This plan indicates that the Township "...has transitioned from an agricultural landscape to a primarily exurban bedroom community." Goals and objectives of the Comprehensive Plan related to sewage facilities seek to "Maximize groundwater recharge" and to "Promote effective septic system design/maintenance." This plan also indicates similar concerns with aged and failing on-lot sewage disposal systems in the Pickering Estates and Village Commercial areas of Opperman's Corner and the Mill at Anselma. The Comprehensive Plan also indicates complaints by residents of Twin Hills regarding odors from the wastewater treatment plant, with a recommendation that any additions or upgrade address the issue with odors.

- **Chester County Comprehensive Plan, "Landscapes2", adopted November 2009.**

"We find the proposed areas to be served by sewer service to be consistent with the Livable Landscapes Map (2009). West Pikeland Township is located within areas defined as mostly the Rural Landscape, with roughly one quarter of the township lying in the Suburban Landscape. The majority of the study area is located within this Suburban Landscape, while one area, associated with the Montgomery School, is located in the Rural Landscape. According to the County's Comprehensive Plan, the Act 537 Plan is consistent with the policies of *Landscapes2* as they relate to the Suburban Landscape, including *Landscapes2* Policy LV 1.1 which states: "Promote the urban and suburban landscapes as the designated growth areas of Chester County" and Policy LV 3.2 which states: "Direct development activity to areas with existing and planned infrastructure capacity." As proposed, this Act 537 Plan is consistent with the goals and policies of *Landscapes2*.

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Watersheds, the water resources element of the County comprehensive plan, identifies Objective 7.2 of Goal 7, "concentrate planned utility service areas to support designated growth areas," to be achieved through key strategies such as the extension of community wastewater facilities in Urban and Suburban Landscapes. As such, West Pikeland Township, through its Act 537 Plan, intends to expand the public sewer service area within the designated growth boundary, which coincides primarily with the Suburban Landscape, and to maintain the use of on-lot systems whenever possible in areas not designated for growth. Therefore the goals for wastewater in West Pikeland Township are generally consistent with those of *Watersheds*." (Reference: *The Chester County Planning Commission letter to the Township dated September 13, 2010*)

The Township's Comprehensive Plan is generally consistent with the Chester County Comprehensive Plan. The Township intends to use both as guides during the review of development proposals, infrastructure improvements, and other public improvements and programs.

This Plan revision certainly addresses many of the objectives and policies of the County's Comprehensive Plan. However, very often the reason why improved sewer services are needed in a developed area is because the soils are not appropriate for onsite disposal with insufficient area for land application close to the areas in need. Therefore, it is often necessary to collect the sewage and convey it another area where suitable land is available for disposal.

1. Township Zoning Map (Map 8)

The Township Zoning Map identifies the residential, commercial, industrial, agricultural, recreational and open space areas.

2. Township Zoning and Subdivision Regulations:

a) West Pikeland Township Zoning Ordinance of 2005. Adopted April 25, 2005:

The Zoning Ordinance is one of the primary means of implementing the Comprehensive Plan. By establishing the various districts, allowable uses, and area and bulk regulations, (i.e. density of development) the Township specifies the form and location of future growth to best suit the needs of the community, protect natural and historic resources, and accommodate growth where existing facilities and infrastructure are most supportive.

The Zoning Ordinance Update, adopted April 25, 2005, for West Pikeland Township provides three base zoning districts within the Township, and two overlay districts. An Open Space Design Option is also provided.

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- b) West Pikeland Township Subdivision Ordinance, No. 15, Adopted February 18, 1974, Last Updated November 1, 1997:

Development and use of available land throughout the Township is controlled by Subdivision and Land Development Ordinance (SALDO). These standards are to ensure that development within West Pikeland is conducted with consideration given towards the existing natural resources, residents, safety, and consistency with the character of the Township.

The SALDO, No. 15 as amended, was adopted February 1974 by the West Pikeland Township Board of Supervisors. This ordinance, pursuant to the Pennsylvania Municipalities Planning Code, Act 247 of 1968, governs Subdivision and Land Developments within the limits of West Pikeland Township, and provides for the planned development of the Township by:

- Assisting in the orderly and efficient integration of land developments within the Township.
- Ensuring that development and land uses pose no threat to the safety and health of the citizens and their environment.
- Ensuring the provision of adequate public facilities including roadways, walkways, street lighting, water supply, storm and sanitary sewerage facilities, recreation sites, open spaces, and other improvements for the public's health, safety, and welfare.
- Providing for the coordination of existing public facilities with proposed facilities. Particular emphasis is placed on the development of a safe, convenient, and functional roadway system to meet the demands of the current and future traffic needs.
- Ensuring that the environmental and agricultural resources, as well as the existing topography, are protected and/or enhanced with future development.
- Securing equitable handling of all land development plans by providing uniform standards and procedures.
- In general, promoting greater health, safety, and welfare for the citizens of the Township.

3. Limitations related to floodplain, storm water management and special protection areas:

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a) Protection of Natural Resources:

West Pikeland Township has established the preservation of the existing natural and historic features within its boundaries as one of the main objectives in the Comprehensive Plan. The Township has incorporated overlay districts in the Zoning Ordinance Update specific to environmentally sensitive areas and those deemed as having historic value, in order to facilitate this goal.

The Residential Development (RD) District, as discussed in the Zoning Ordinance, has been identified as having the highest potential for population growth. The Township recognizes the need to have public infrastructure such as roadways, water facilities, and sewer facilities available to meet the demand for this growth. The Zoning Ordinance protects much of the remaining open space and encourages development into the Residential Development District by permitting smaller lot sizes and supporting infrastructure development in this district, while requiring larger lot sizes and discouraging infrastructure in other districts of the Township.

The Subdivision and Land Development Ordinance was written to foster an orderly integration of land development; allowing only those uses that provide no threat to the health, safety, and welfare of its residents at the same time ensuring that the environment and agricultural resources are protected. The Township's Comprehensive Plan highlights the natural resources by identifying sensitive natural areas and resources. The Township's Zoning and Subdivision Ordinances limit development in these sensitive areas and offer incentives for development in other areas.

b) Protection of Water Resources:

The natural water resources within the Township have been identified to include floodplains, wetlands, and watercourses. The Zoning Ordinance does not allow any disturbance within a floodplain or wetlands unless appropriate permits have been obtained from the state or federal agencies having jurisdiction. Wetland margins and riparian buffers exist to reduce the disturbance to these areas and possible risk of water quality degradation.

The Comprehensive Plan recommends that any proposed development outside of the existing public water supply area be evaluated with respect to groundwater capabilities and any possible negative effects on existing wells.

All of the streams and creeks within the Township have been designed as High Quality. Higher quality standards apply to any point source discharge proposed, so as not to affect the protected waters. The Pickering Creek and its tributaries flow through the planning area and feed the Pickering Creek Reservoir, located in Schuylkill Township. This reservoir supplies approximately 1.5 billion gallons

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per year of potable water to approximately 500,000 residences. It is owned and maintained by Aqua Pennsylvania.

In 2008, the Environment Hearing Board, in the case of Jeff Lipton et al. v. DEP 2008, EHB 223, ruled that anti-degradation requirements (required by Pa Code title 25 Chapter 93) in special protection watersheds must be incorporated into sewage planning. Prior to this case only point source discharges to surface waters were considered. PA Code Title 25 §93.4c(b)(2) states; “*Nonpoint source control* - The Department will assure that cost-effective and reasonable best management practices for nonpoint source control are achieved.”

4. Additional Limitations:

a) Protection of Prime Agricultural Soils:

The protection or preservation of prime agricultural soils is stated as an objective of the Agricultural Land Use Goal, in the Comprehensive Plan. The U.S. Department of Agriculture has identified Prime Farmland Soils. Those found in West Pikeland are given in Table No. 5.

Table 5 - Prime Agricultural Soils	
Brandywine	Glenelg
Chester	Glenville
Chewacla	Neshaminy
Penn	

While the areas containing these soils are not specifically delineated in the Zoning Ordinance, the conservation of these soils is inherent with the use, area, and bulk regulations specified for the Resource Conservation District. The program to transfer development rights from prime farmland and other naturally sensitive areas to the more appropriate Residential Development District also aids in the conservation of prime agricultural soils.

b) Protection of Historic Areas:

The Historic Preservation Overlay District consists of properties in Yellow Springs and Anselma Mill. The majority of the lots in these areas are currently developed. The standards proposed for this district assure that any further development is compatible with the existing structures while allowing viable uses to continue.

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The Anselma Mill is a grist mill that was constructed in 1747 and has since been preserved in working condition. Yellow Springs is a historic village that dates back to the 18th century. In the 1700's, Yellow Springs was a fashionable spa village that built a social scene around its healing waters. A military hospital was commissioned at the village by George Washington to care for sick and injured soldiers from Valley Forge and the Battle of the Brandywine. After the Revolutionary War, the village was converted back into a spa and Civil War era orphanage, then served as the Pennsylvania Academy of the Fine Arts Country School, and then was used as the headquarters of the film studio Good News Productions. Since 1974, Historic Yellow Springs, Inc. has preserved the village as a historical area.

B. Delineation and description of Future Growth and Land Development:

1. Areas of existing development:

The impact of development of the last twenty to forty years has left its mark on West Pikeland Township. The RD Residential Development District has witnessed the most development and has contained the most significant number of on-lot sewage disposal system failures. Table 6 presents the subdivisions, the number of units with on-lot sewage disposal systems, and the number of units with public sewer within RD Residential Development District. The locations of these subdivisions are presented in Map 1.

Table 6 - Subdivisions within the RD - Residential Development District			
Subdivision Name	Location	Number of Lots Sewage Disposal Type	
		Individual	Community
Spring View	Sycamore Lane, South of PA Turnpike	26	0
Fox Ridge	Talley Ho Lane & Harkaway Road	41	0
Pickering Estates	David Road & Hunt Club Lane	64 ¹¹	0
Bridlewood	Saddlebrooke Circle	62	0
Fairfield	PA Route 113 & Fairfield Lane	71	0
Meadow Creek	PA Route 401 & Meadow Creek Lane	17	0
Chantilly	Chantilly Lane and Horseshoe Trail	34	0
Haverhill	Haverhill Road	18	0
Twin Hills	Eagle Farms Road	0	250
Pickering Meadows	Creek Crossing Lane	0	80

2. Establishment of Lot Sizes - Zoning Designations:

a) RD - Residential Development District:

This district is located in primarily west of Route 401 is designated based on anticipated residential growth. The RD District is the most accessible area to major roadway and contains large commercial and employment areas. The Comprehensive Plan and Zoning Ordinance determined that it is the most likely area for future expansion of public or community water and sewer facilities, based upon development density. The maximum allowable single-family density within this district is 1.5 units per acre, based on the minimum tract size of ten acres for a cluster subdivision. A cluster subdivision requires forty percent open

¹¹ Pickering Estates is currently served with individual onlot sewage disposal systems. This plan recommends and provides that Pickering Estates will served by a community sewage facility.

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space, at a minimum. Conventional subdivision design standards for the RD District allow a maximum development density of one unit per acre.

b) RC - Residential and Conservation District:

This district, located throughout the majority of the Township, is designated to maintain the rural character of primarily agricultural and environmentally sensitive land. The Conventional Residential development Option for existing Parcels less than ten net acres allows two acre net lots for single-family residences. Lot Averaging may also be utilized with a minimum average lot area over the subdivision of two net acres. Prime agricultural properties shall be a minimum of ten acres with a total maximum number of residential units equal to the gross tract area in acres x 0.10. Non-residential and non-agricultural uses must be a minimum of five net acres. The residential open space option may be utilized if fifty percent of the net tract area is included in the minimum restricted open space. The density is calculated at 0.55 units per net tract area, in the open space option.

c) Village Preservation Districts:

These districts preserve the historical development pattern of the Township and provide a non-residential and higher residential use within the Township. Three Village Preservation Districts have been designated within the Township.

- i. V-1 - Village Preservation District- Opperman's Corner has been designated as a commercial center for the Township, allowing for the development of small commercial and institutional uses. The majority of the twenty-one lots contained within this District are currently developed. A gas station convenience store, a restaurant, and several small offices are located within the V-1 Village Preservation District.
- ii. V-2 - Village Preservation District- the Anselma Mill, Chester Springs, and Pikeland Village areas have been designated to encourage the continued minor commercial and industrial uses associated with this area. Portions of this District are included within the Historic Overlay District. Attached residential homes with commercial use exist in this district.
- iii. V-3 - Village Preservation District- Yellow Springs has been designated as the cultural center of the Township, preserving the historic features of the area. This area is also contained in the Historic Overlay District. All of the lots in this district are developed. However, expansion of the existing facilities may be possible.

d) Overlay Districts:

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These districts shall be treated as additional regulations to the otherwise applicable base zoning district. The Act 167 Historic Districts of Yellow Springs and Anselma Mill were created to protect the historical character of these areas and to regulate the erection, reconstruction, alteration, restoration, demolition, or razing of building within these areas. The Resource Overlay District protects and conserves natural resources within the Township. Areas such as floodplains, steep slopes, wetlands, watercourses, riparian buffers, and woodland are protected under this overlay district.

e) Open Space Design Option:

This option is intended to conserve open land and provide greater design flexibility and efficiency while implementing the policies of the West Pikeland Comprehensive Plan.

Development under the Open Space Design Option shall be served by individual, community or public sewage disposal systems consistent with this Act 537 Plan and in accordance with applicable provisions of the West Pikeland Township Subdivision and Land Development Ordinances. Developments must also demonstrate compliance with all applicable regulations of the Chester County Health Department and/or the Pennsylvania Department of Environmental Protection.

3. Population Projections and Future Growth Areas:

a) Population Projections:

Over the past ten years, West Pikeland Township has experienced growth in its residential population of approximately 13%. According to the 2010 U.S. Census Bureau, there were 4,024 persons in West Pikeland Township. The 2010 Census, as shown in Table 7, indicates an average household size of 2.92 persons. This is higher than both the County and State averages.

Table 7 - Average Household Size (US Census Bureau)			
Year	West Pikeland Township	Chester County	Pennsylvania
1980	3.03	2.90	2.75
1990	2.95	2.73	2.57
2000	2.93	2.65	2.48
2010	2.92	2.65	2.45

Past population trends, as shown in Table 8, indicate a significant reduction in the rate of growth in the most recent decade. The 2010 Township Comprehensive Plan discusses a slow-down in growth beginning in 2006. Stating that this is, "...likely a result of the nation's current economic climate."

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Table 8 - Population History, West Pikeland Township (US Census Bureau)		
Year	Population	10-Year Growth (%)
1960	782	-----
1970	1,420	80.9
1980	1,536	8.2
1990	2,323	51.2
2000	3,551	52.9
2010	4,024	13.2

Table 9 - Population Projections, West Pikeland Township			
Year	US Census Reported Population	Projected Population (CCPC, 2002)	Projected Population (DVRPC ¹²)
2000	3,551	3,551	3,551
2010	4,024	4,480	4,501
2020		5,670	5,023
2030		6,520	

Both the Chester County Planning Commission (CCPC) and the Delaware Valley Regional Planning Commission (DVRPC) provide population projections and are shown in Table 9. However, both of these published projections were prepared prior to the 2010 US Census which indicates a population of 4,024 in 2010. A review of average household size (Table 7) shows a consistent trend in smaller households combine this with less suitable land to develop for new homes and current economic climate, it is unlikely that there will be drastic increase in population in the near future, compared to increases between 1980 and 2000.

¹² Reference: Figure 2.5 of the Township Comprehensive Plan

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b) Future Growth Areas:

It is expected that growth will continue to occur throughout the Township based on the future population projections discussed above, current development patterns, and available land throughout the Township. The Zoning Ordinance of 2005 encourages more dense development to occur in the Residential Development District in the south/southwestern portions of the Township. In this District, as shown on Map 9 - existing vacant land use- undeveloped and unrestricted land totals approximately 320 acres.

Assuming a maximum 1.5 residential dwelling units per acre (density) for tracts greater than ten acres using the open space option and one residential dwelling unit per two acres for tracts less than ten acres (RD), the corresponding build out density is approximately 409 residential units. This build out projection, for the Residential Development District, includes adjustments to tract acreage for constraints such as right-of-way, wetlands, steep slopes, floodplain, riparian buffers, and other subdivision requirements.

Approximately 70% of the Township lands are contained within the Residential and Conservation District. Undeveloped land in this district, not restricted from future subdivision or constrained lands, totals approximately 1,568 acres. The residential density allowable in the RC Zoning District is considerably less than that of the other Districts. Two net acres of constrained lands or 0.55 units per net acre using the open space plan option are required for development. Any public or community sewage planning in this district should be considered on a case-by-case basis as developments of tracts are proposed. It is anticipated that most development in this area will continue with on-lot disposal systems due to the large lot sizes. The West Pikeland Land Trust helped pass an Open Space Tax referendum in the fall of 2007 to raise money to purchase land for open space. The restrictive zoning regulations and the conservation ambitions of the West Pikeland Land Trust make it impractical to project what the build out density will be.

The allowable density in the V-1, V-2, and V-3 Zoning Districts is based on a minimum lot area of one acre for non-residential use and 15,000 square feet for residential use. The Zoning Ordinance requires that a back up sewage disposal area be provided if public sewer service is not available. No more than 60% of the net area of the tract subject to development may be used to calculate compliance with Area and Bulk Regulations applicable to townhouses or multi-family dwellings. The Village Zoning Districts primarily contain commercial developments and have too many variables to predict the build out density accurately.

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c) New and Proposed Developments:

Construction is currently underway for Fox Meadows and Nottingham, which consist of eight and eleven units, respectively. Both of these developments lie within the Residential and Conservation District. The David Cutler Group has preliminary plans to develop a portion of the White Tract with the 57 single family homes within the Residential Development District. There are no other developments before the Township at the time of this plan's adoption for other large subdivisions. Several single lots, however, are currently being developed throughout the Township.

d) Restricted Growth Areas:

The restricted growth areas within West Pikeland Township are those which are presently designated by the Township as Historic Resources or which have been restricted from future development by means of land trust ownership, agreements, dedication to the Township, deed restrictions, or other legal means. To date, the Historic Overlay District has been designated for the Yellow Springs and Anselma Mill Districts. Areas limited by topography, such as those located in steep slope regions or flood plains, also are considered restricted growth areas.

4. Zoning regulations relating to development, use and protection of land and water resources:

The Zoning Ordinance Update provides the following guidance with regard to sewerage facilities in the various zoning districts:

a) RD District:

- i. Municipally or privately owned and operated community wastewater treatment and reuse or irrigation systems, in accordance with applicable provisions of the Zoning Ordinance, is permitted by conditional use.
- ii. Pre-existing Parcels less than One Net Acre, Not Resulting from Prior PRD or Cluster Subdivision, shall have the new sewage system certified as adequate for the size of the dwelling by the Chester County Health Department.
- iii. Conventional Residential Development Option for Pre-Existing Parcels less than Ten Net Acres requires that all lots be capable of supporting individual on-lot systems, except where public or community sewage disposal acceptable to the Township is provided.

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b) RC District:

- i. Municipally or privately owned and operated community wastewater treatment and reuse or irrigation systems, in accordance with applicable provisions of the Zoning Ordinance, is permitted by conditional use.
- ii. Pre-existing Parcels less than One Net Acre, Not Resulting from Prior PRD or Cluster Subdivision, shall have the sewage system certified as adequate for the size of the dwelling by the Chester County Health Department.
- iii. Conventional Residential Development Option for Pre-Existing Parcels less than Ten Net Acres requires that all lots be capable of supporting individual on-lot systems, except where public or community sewage disposal acceptable to the Township is provided.

c) Village Preservation District:

- i. Public sewage disposal services shall be required for any use in the V-3 District and public or community sewage disposal and water supply services, if available, shall be required for any use permitted in any Village Preservation District.
- ii. If public or community sewage disposal is not available and cannot reasonably be made available, any lot containing an individual on-site sewage disposal system shall include a minimum contiguous area suitable for on-site sewage disposal. The system shall be sufficiently sized to accommodate disposal of all sewage generated on-site, in conformance with all applicable regulations, including provisions for a back-up disposal system. In no case shall such minimum contiguous area be less than 10,000 square feet.

d) Overlay Districts:

- i. Utilities and public facilities including streets, water lines, storm sewers, and sewage treatment plants may be permitted upon issuance of a special exception by the Zoning Hearing Board.
- ii. All new or replacement water and sanitary sewer facilities and systems shall be located, designed, and constructed to minimize or eliminate flood damage and the infiltration of flood waters.
- iii. Sanitary sewer facilities and systems shall be designed to prevent the discharge of untreated sewerage into floodwaters.
- iv. No part of any on-site sewage system shall be located within any identified floodplain area, except in strict compliance with all state and local regulations

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for such systems. If any such system is permitted, it shall be so located to avoid impairment to it, or contamination from it, during a flood.

5. Sewage planning needed for Future Growth and Land Development:

Sewage planning will be needed for all new subdivisions (as defined under PA Code 25§71), except as provided by PA Code 25§71.55 (relating to exceptions) or PA Code 25§71.51(b) (relating to use of retaining tanks).

IV. Identification of Alternatives for New or Improved Wastewater Disposal Facilities:

A. Traditional “Centralized” and Alternative Sewage Treatment Facilities:

1. The potential for a Regional Wastewater Treatment Facility:

West Pikeland Township is within a protected watershed, presently designated as High Quality. While designation as a High Quality watershed does not necessarily prohibit discharges to surface waters, non-discharge alternatives to surface waters must be evaluated. If no “environmentally sound and cost-effective” is available then a combination of cost-effective treatment, land disposal, pollution prevention and wastewater reuse technologies must be evaluated. While there are other alternatives under Pa Code 25§93, the Township’s preference for sewage disposal is towards subsurface land application and retaining water within the local watershed. Based on the Township’s preferences and with the lack of capacity at any of the existing regional sewage treatment facilities, construction of or connection to a Traditional “Centralized” sewage treatment facility is not a feasible alternative for West Pikeland Township.

2. The potential for extension of existing sewage facilities to the area in need of improved sewage facilities:

Sewage treatment capacity in the adjacent municipal facilities is not available. If capacity were available, the cost to convey the sewage would be cost prohibited. At the present time, there is limited capacity in the Little Washington Wastewater Company’s Twin Hills Plant and area for land disposal is limited.

3. The potential for the continued use of existing sewage facilities:

The Little Washington Wastewater Company’s Twin Hills Plant appears to be well maintained with little need of major repair but will need certain upgrades to accommodate new connections. There is little room on the site for a physical expansion; however a major change in the treatment process could possible

result in a reduced footprint allowing then for plant expansion. The Township Comprehensive Plan notes that residents near the Twin Hills plant are negatively impacted with odors from the wastewater treatment plant and recommends that these concerns be addressed with any future additions or plant upgrades.

4. Repair or replacement of existing collection and conveyance system components:

In discussions between the PA DEP Southeast Regional office and the Township regarding the existing Twin Hills collection system, DEP indicated some concerns regarding an increase in reported flow to the treatment plant resulting from a possible increase of ground and surface water into the collection system (inflow and infiltration or I&I). Repair and possible replacement of system components is often more cost effective than a plant expansion.

5. The need for construction of new community sewage systems:

There is an immediate need for additional treated effluent disposal areas in the Township. There is limited area available at the existing Twin Hills site. Other potential disposal areas that were reviewed were the White Tract, Windolph Knoll, and Pickering Meadows.

6. Use of innovative/alternative methods of collection/conveyance to serve areas of need:

Collection and Conveyance of Sewage:

The traditional method of sewage collection has been by conventional gravity sewers. "In the late 1960's, the cost of conventional gravity collection systems in rural communities was found to dwarf the cost of treatment and disposal...In developing alternative collection systems for these small communities, engineers turned to concepts which had theretofore been either forgotten or ignored by the profession."¹³

a) Gravity Sewer Systems:

Gravity sewer collection systems have traditionally been the preferred method of sewage collection and conveyance. Gravity sewer collection systems are typically used wherever practical, especially in new construction. Pumping stations are required when gravity system cross from one drainage basin to another. Careful planning is essential when sizing a gravity sewer collection system in order to serve the future needs of the drainage basin.

¹³ EPA/625-1-91-024, October 1991

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Gravity collection systems can become expensive due to rock excavation or length of sewer lines required to serve less populated areas. Gravity collection systems are also prone to Inflow and Infiltration (I&I). Inflow is described as storm or rainwater that enters the collection system from leaks around manhole lids and cleanouts or by direct connections for roof and floor drains. Infiltration is groundwater that enters the collection system through leaks in the piping, manholes, and other sanitary sewer structures.

During heavy rain events I&I can overload the collection piping and pumping stations and cause a “SSO” or sanitary sewer overflow event. EPA estimates that there are at least 40,000 SSO's each year. The untreated sewage from these overflows can contaminate our waters, causing serious water quality problems. It can also back-up into basements, causing property damage and threatening public health.

For these reasons, pressure sewers should be considered as a possible alternative for all new projects. Pressure sewers do not require pumping stations, are not as susceptible to I & I, and are less expensive to construct because the force main can follow the contours of the existing land as opposed to be required to have a continuous downward slope.

b) Pressure Sewer Systems:

The two major types of pressure sewer systems are Grinder Pump systems and Effluent Pump systems. The major differences between them are in the onsite equipment and layout. Neither type of pressure sewer system requires any modification to conventional household plumbing.

In Grinder Pump systems, household wastes are collected and conveyed by gravity to a small buried pump vault containing the grinder pump. Waste solids in the sewage are macerated into slurry and then pumped through a small diameter pipe to either a larger network of pressure sewers or a traditional gravity sewer collection system. The onsite piping arrangement includes at least one check valve and one gate valve to allow isolation of each pump from the main sewer. Grinder pumps are generally not installed in the basements of homes because access to maintain the pump is more difficult than when the system is installed outside the home.

There are two types of grinder pumps: centrifugal and semi-positive displacement type. Both of these pump types have certain advantages and in many cases the pressure sewer system can be intermixed with either type pump.

Grinder pump systems are particularly suitable for extending sewer service into existing residential communities. Traditional gravity sewers can be very costly and disruptive to the local environment. Effluent pump systems are

advantageous when used in combination with Decentralized and Small Community Sewage Disposal systems and Community Land Application systems. Pressure sewer systems can be served by a combination of grinder pumps and effluent systems, provided that the treatment system is not dependent on septic tank quality influent.

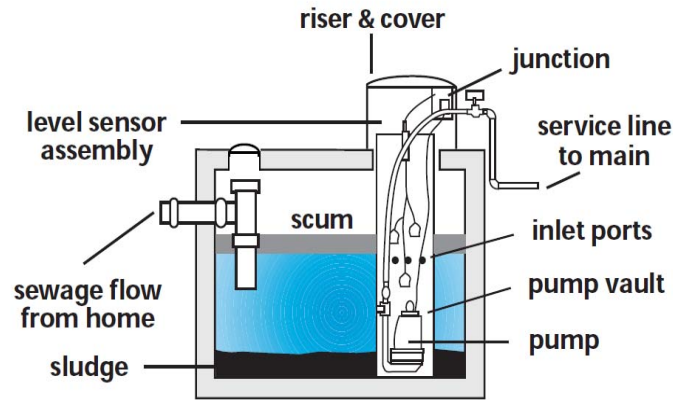
In Effluent pump systems (see Figure 1), wastes flow by gravity to a conventional septic tank or other type of treatment tank. The primary purpose of the septic or treatment tank is to remove the solids and provide a clarified effluent that can be easily pumped. When a higher level of effluent quality is desired, an advanced treatment unit can be use in place of or after the septic tank. The effluent then flows to a holding tank, which houses the pump, level control sensors to control the pump. Normally, small centrifugal pumps are employed. These pumps are submersible and range in size from $\frac{1}{4}$ to $\frac{1}{2}$ horsepower. When the pump is protected with filter screen, turbine type pumps can be used. Turbine pumps similar to the pumps used in deep drinking water wells can produce very high hydraulic head and allow pumping great distances.

When installing a pressure sewer system in an existing community the use of the existing septic tank should be considered for conversion to an effluent pump system. However, often it is just as cost effective to install at new tank. If so a larger tank should be considered to provide additional storage capacity. If the existing septic tank is to be reused, it will be need to inspected and tested, both for structural and hydraulic integrity. Regardless the existing tank should be leak tested both full and empty. Care needs be taken when testing an empty tank with wet soil conditions to assure the empty tank does not float during testing.

There a number of manufacturers that provide a pump vault that can be installed in single compartment tank eliminating the need for a second tank for the pump. A time dosed controls with elapsed time meter and pump cycle counters are also recommended to assist in monitoring the performance of the effluent pump system.

The effluent pump system should be inspected annually; checking the solids levels in the tank. The tank should be pumped when the solids level is in excess of one third the liquid depth. The pump elapsed time meter and pump cycle counters should be recorded. See Figure 2 for projected pump out frequencies.

Figure 1 – Effluent Pump System



(Pipeline Fall 1996, Vol. 7, No. 4)

B. The Use of Individual Sewage Disposal Systems:

Individual on-lot sewage disposal systems are the current preferred alternative within the Township. Due to the relatively low housing density in most of West Pikeland Township, these individual systems have been quite successful in meeting sewage disposal needs throughout the years.

1. Soil and slope suitability:

The soil texture and structure play a key part in its ability to absorb, disperse and renovate sewage effluent. While some slope well aid with water dispersion excessive slope may lead to breakout of partially treated sewage which could be a health hazard.

2. Preliminary hydrogeologic evaluation:

When there are many homes in close proximity the effects of too many disposal systems can cause issues with groundwater quality particularly with elevated Nitrate-Nitrogen levels in drinking water wells. In areas of known high background Nitrate-Nitrogen or a high density development a preliminary hydrogeologic evaluation is required to assure the public drinking water supply is protected.

3. The establishment of a sewage management program:

In the past, it was a common thought that all homes and businesses would be ultimately served with centralized or “public” sewers and that on-lot sewage disposal systems were temporary. However, the current trend is for the permanent use of individual on-lot sewage disposal systems for existing

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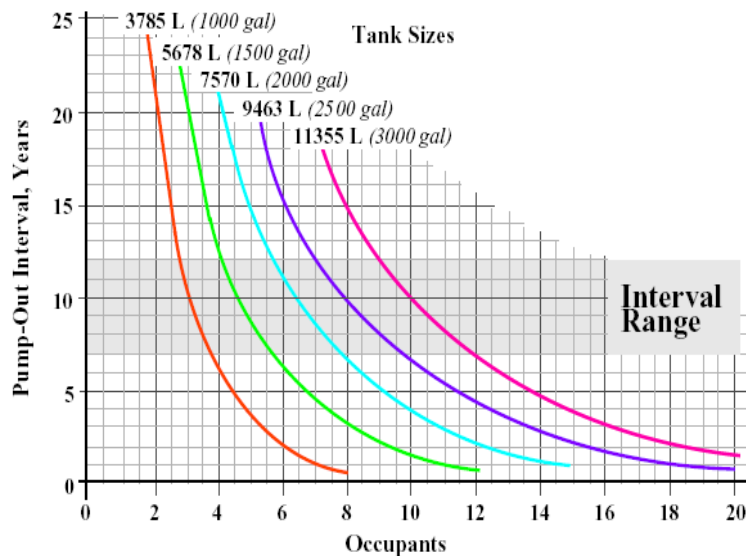
residences and future homes in areas where appropriate subsurface and hydrological conditions exist. Disposing of sewage by subsurface land application utilizes the natural soil to provide renovation prior to recycling the water back into the environment. This can reduce the amount of pre-treatment required. On-lot sewage disposal provides an acceptable degree of treatment and is often the most cost-effective means of sewage treatment disposal.

It is essential that all sewage facilities be properly operated and maintained to assure adequate sewage treatment and disposal over the functional life of the system. On-lot sewage systems should be regularly inspected and pumped.

Since April 2005, the Chester County Health Department has been recording the location and frequency of on-lot sewage disposal systems pump outs. When routinely inspected every three years, on the average septic tanks only need to be pumped out once every ten years (see Figure 2). However, it is not uncommon for septic tanks to be pumped out when inspected. Pumping of septic more frequently than once every three years can be excessive, more than once per year is generally an indication of a problem.

Map 7 shows the location and pumping frequency since the Health Department started documenting these activities. There are a few isolated properties of concern throughout the Township; however the area near the intersection of Yellow Springs Road and Street Road, Street Road towards the Township boundary with Charlestown Township indicates a concentration of high number of pump outs. There are relatively a few number certification failures reported in this area. These areas may require further study if other warning signs increase.

Figure 2 – Pump Out Interval Frequency of Septic and other Treatment Tanks



At 95% confidence level (Orengo Systems, Inc.)

4. The repair, replacement or upgrading of existing malfunctioning systems in areas suitable for on-lot disposal should consider the following:

- a) Using alternative treatment technologies that reduce dependence on soil for renovation which often permit a reduction in conventional disposal areas. Often an upgrade from a conventional septic tank to an advanced treatment unit can reduce the organic load allowing the malfunctioning disposal area to recover.
- b) Using an expanded absorption area.
- c) Consider use of water conservation devices including low water use laundry machines.

C. Small Flow Sewage Treatment Facilities:

Small flow facilities are intended to serve single-family residences, duplexes, and small commercial establishments that generate 2,000 gallons per day or less of domestic wastewater. Figure 3 shows an example of a small flow facility (AdvanTex) that is recommended by this plan.

1. Treatment and discharge requirements:

Small flow facilities discharge treated water into a local stream, storm sewer, or dry ditch. Small flow facilities require a stream discharge or NPDES permit and a Water Quality Management Permit for the construction and operation of the facility. Small flow facilities are generally very expensive to permit, install, operate, and maintain. Discharges to protected watersheds, such as the entire watershed of West Pikeland are not eligible for General NPDES Permits and require an Individual NPDES Permit. In protected watersheds, small flows facilities are generally not permitted for new construction, and are only used as replacements for malfunctioning on-lot sewage disposal systems when no other alternative is available.

2. Soil Suitability:

Small Flow Sewage Treatment Facilities (small flow facilities) are used where onsite soils are completely unsuitable for any form of land disposal and a community sewer facility is not reasonably accessible.

3. Preliminary hydrogeologic evaluation:

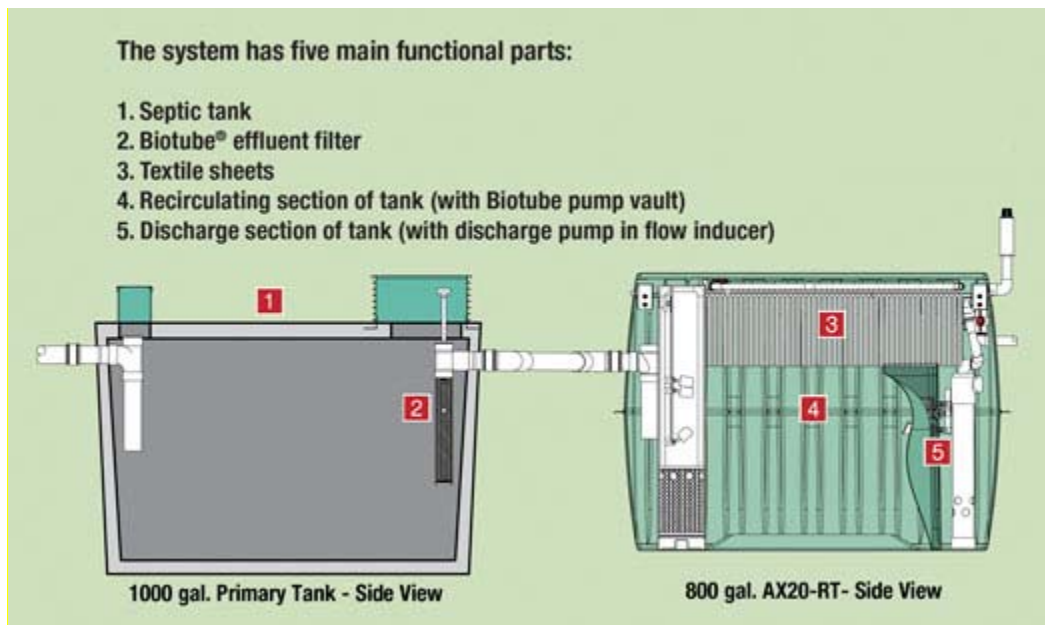
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Where a small flow facility discharges overland or dry ditch a preliminary hydrogeologic evaluation is typically required. This is to assure that effluent flows to a surface water course without causing a public health hazard or nuisance.

4. Management of Small Flow Facilities:

While small flow facilities do not require a licensed wastewater treatment plant operator, the local municipality is typically required to assure that the facility is properly operated and maintained. This occurs through either a Sewage Management Program, Municipal Ordinance, or individual maintenance agreement with the property owner.

Figure 3 – AdvanTex® AN20-RT w/ Effluent Pump



D. Community Land Disposal Alternatives – Decentralized Systems:

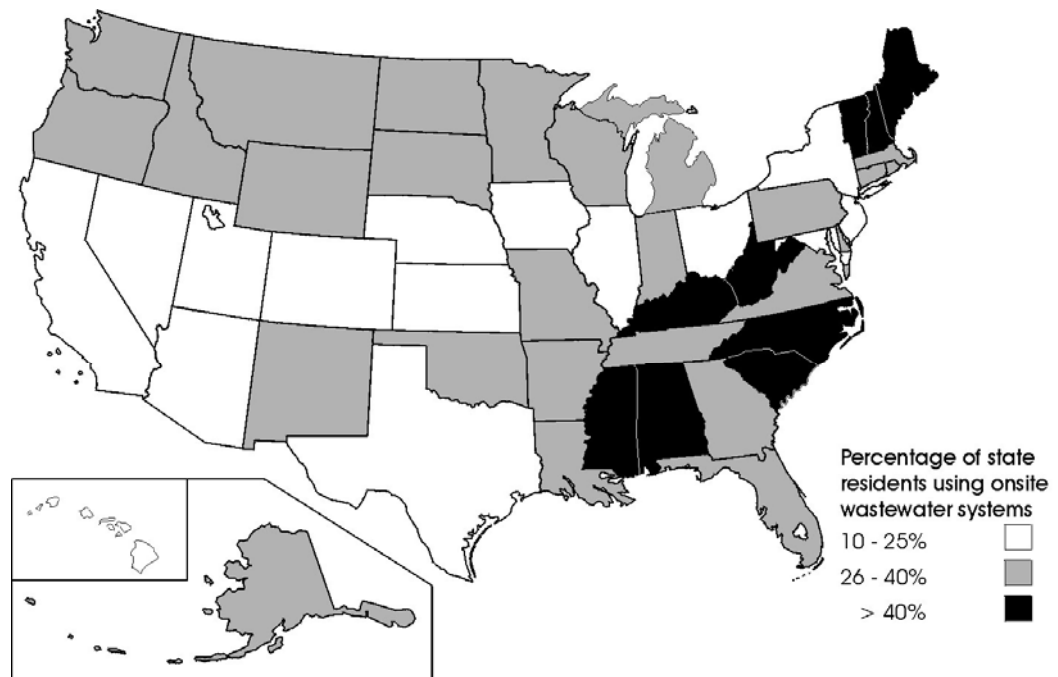
In the April 1997 “*Response to Congress on use of Decentralized Wastewater Treatment Systems*”¹⁴, the United States Environmental Protection Agency reported that, “Decentralized systems serve approximately 25 percent of the U.S. population, and approximately 37 percent of new land development.” Decentralized systems included individual onsite systems and small cluster wastewater systems used to treat and dispose of relatively small volumes of wastewater, generally from dwellings and businesses that are located relatively close together.

¹⁴ EPA doc No. 832-R-97-001b, April 1997

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The April 1997 US EPA report lists many benefits of using decentralized systems. When property managed, decentralized systems can provide treatment just as well as centralized systems and decentralized systems promote better watershed management by avoiding the potentially large transfers of water from one watershed to another. This response also listed several barriers to implementing decentralized systems:

- Lack of Knowledge- the public often has the misperception that centralized systems are better for property values. Regulators and wastewater engineers are often not comfortable with decentralized systems, due to a lack of knowledge.
- Legislative and Regulatory Constraints- lengthy approval processes dissuade developers from building decentralized systems. Unreasonable regulatory constraints are commonly the result of a lack of knowledge.
- Lack of Management Programs – often municipalities do not have the organizational structure to manage decentralized systems effectively. This is mainly due to the low number of customers.
- Liability – homeowners are commonly unwilling to accept responsibility for systems they are unfamiliar and prefer systems they feel are traditional and conventional.
- Engineering Fees – engineering fees are usually based as a percentage of the project cost, therefore engineers have less incentive for designing low cost systems. Low cost and innovative designs generally cost more to design than traditional and conventional systems.



Source: U.S. Census Bureau, 1990

The acronym “COLDS” (community on lot disposal systems) is often used to describe what are now referred to as Decentralized Systems. These community systems serve more than one lot or dwelling. Community systems can be privately owned or municipally owned. Privately owned systems can serve a single development or several developments. Privately owned systems are owned and operated by condominium/homeowners associates or by private businesses servicing their own facilities. An example of a private business may be an apartment house, mobile home park, or shopping center. Municipally owned systems are usually owned and operated by investor owned public utility companies, regulated by the Pennsylvania Public Utility Commission. Public systems can also be owned by a municipality.

In Chester County, there are three prominent methods for a community land application system: Large Volume Subsurface, Spray Irrigation, and Drip Distribution.

Large Volume On-lot Systems:

Large Volume On-lot systems are effluent dispersal systems that are constructed and operated very similarly to pressure dosed systems, with the exception that these systems do not depend on the soil entirely for renovation of the applied effluent. With these systems, the designer considers soil permeability (hydraulic conductivity), depth to perched or seasonal high water table, hydrology, and hydrogeology to design an effective system to disperse the effluent into the ground water. An advanced secondary treatment system typically precedes the dispersal system. Treatment requirements vary depending on the specific site conditions.

There are several advantages of these systems over traditional community systems. One advantage is, because the sewage is fully treated or partially treated, the system is not as dependent on the soil for renovation. Another advantage is that higher application rates are generally permitted which reduces of the amount of land required for the dispersal system, saving land costs. The disadvantage is that the treatment process is much more complex and more costly to build, operate, and maintain.

Large Volume On-lot systems are generally permitted for flow greater the 10,000 gallons per day and require Clean Streams Law permits also known as Water Quality Management Permits or Part II permits.

Spray Irrigation:

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Spray Irrigation involves applying treated or partially treated sewage effluent to the land surface. Hydraulic application rates vary for the site-specific soil types, topography and climatic conditions. Application during and shortly after rain events is typically stopped to reduce the possibility of runoff. Additional treatment of the effluent can also be accomplished by plant uptake and through the soil matrix. Application rates vary based on plant nutrient absorption rates at that time of year. Spray Irrigation has been a popular land application technique, for systems that depend on the soils and plants for renovation, and is generally accepted as a very reliable system by local regulating agencies.

Among the factors that affect the feasibility of Spray Irrigation are topography, soil conditions, weather conditions, agricultural practices, and economics. Spraying involves the application of effluent above the ground, through either nozzles or sprinkler heads. Other elements of the system include effluent storage lagoons, pumps, supply mains, laterals, and risers. Design of the system can be quite variable; it can be portable or permanent, moving or stationary. The use of fixed kicker type spray nozzles is the prominent design in the Chester County area. These systems provide an efficient and uniform flow distribution.

High wind, a problem common to spray irrigation systems, adversely affects efficiency of distribution and can spread aerosol mists (fine sprays of effluent carried by the wind). Systems are easily designed to control this problem by providing large setbacks to other properties, installing high earthen berms with dense landscaping to shield the misting, or including an anemometer (an instrument for measuring wind velocities) in the pump control circuit to delay spraying until the wind has diminished.

Freezing weather can be a problem with Spray Irrigation. If the effluent is applied when the air temperature is below freezing, the effluent will freeze as it leaves the sprayer. The frozen effluent will then accumulate on the ground surface. This of itself is not a problem however, if additional applications are made, the frozen effluent continues to accumulate, and when the air temperature rises, the melting rate of the effluent may exceed the rate at which the soil can absorb the effluent and runoff may occur.

While the control of the spray system can be automated, common practice in Chester County is to operate the spray system manually. Designing a control system that can consider all of the variables for when spraying could occur would be very complicated.

Spray Irrigation systems in Chester County most often use lagoon treatment systems and depend on crop uptake for Total Nitrogen removal. During the cooler seasons and particularly during the winter months, application rates are reduced to keep pace with the reduced nitrogen uptake. Because the nitrogen is bound up in the crop plant matter, the crop must be harvested and removed at least annually.

Drip Distribution:

Drip Distribution, also known as Drip Irrigation or Drip Dispersal, is a subsurface land application system that was first installed in Pennsylvania at Bridlewood Treatment Plant in Thornbury Township, Chester County. The system was installed in the fall of 1998 after being demonstrated at Delaware Valley College. While the Bridlewood Plant disposes highly treated effluent, drip distribution systems have been extremely successful for many years for disposing Septic Tank Effluent.

Drip distribution has two major advantages over other land applications systems: first, it applies water directly into the most biologically active zone of the soil, just below the surface; and second, when properly designed and installed, it has "better distribution of effluent over a larger area."¹⁵ Drip distribution is a very effective process for water reuse. For wastewater application systems, drip distribution's principal advantage over Spray Irrigation is that the wastewater daily application rates are uniform and are not as affected by climatic changes. Spray Irrigation has practical limitations during rainy, windy, and freezing weather; requiring large volumes of effluent to be stored during days when spraying are not recommended or permitted. Storage requirements for drip distribution are minimal.

Drip distribution delivers the effluent in small frequent doses, leaving the soil near the surface in an unsaturated state. This is accomplished by the use of tubing with specially designed emitters that allow the effluent to leave the tubing in small droplets. Because the soil is unsaturated, leaving a large portion of the void spaces still filled with air, the soil remains in an aerobic condition, providing for improved renovation of the effluent.

During freezing weather, if the soil moisture at the ground surface freezes, the air and void spaces remain, permitting continued movement of the effluent as it is applied below the surface. As long as the effluent is applied in small doses, the soil will remain unsaturated and water continues to move downward and away from the colder surface. When the ambient air temperature is less than the soil temperature the heat flux is upward and assists in the downward movement of the water. Drip systems perform quite well in a cold climate, as long as proper attention to design details is made.

Treatment requirements for drip systems vary from primary treatment (septic tank effluent) to advanced secondary treatment with denitrification. Because there is no potential for human contact with drip, disinfection is not needed. Drip systems are

¹⁵ Drip Irrigation Workbook Course #312, Prepared by the Pennsylvania State Association of Township Supervisors in conjunction with Delaware Valley College for the Department of Environmental Protection (Pa DEP), p 1-2

easily automated and are very suitable to being monitored and controlled by a programmable logical controller (PLC), increasing its reliability.

1. Soil and site suitability:

The land requirements for onsite disposal systems vary greatly. Individual onsite systems have required setbacks from property lines, wells, and other uses to the absorption field. Community systems require greater setbacks, with these setbacks based on site evaluations, studies, and other information provided about the site. Absorption areas can serve as passive open space and, with certain limitations, continue to be farmed or used for recreational activities.

Three areas have been evaluated for a community disposal system; locally known as Pickering Meadows, Windolph Knoll and the White Tract. Preliminary soil probes and test pits witnessed by Pa DEP soil scientists along with described soil profiles were performed on the Windolph Knoll and White Tract sites. In addition, permeability testing was completed on the White Tract. Copies of the soils reports are in the appendices. Both the Windolph Knoll and White Tract sites are suitable for disposal of wastewater. The Pickering Meadows site will require further testing and evaluation to verify testing that was previously performed.

2. Preliminary hydrogeologic evaluation:

Systems that will process 5,000 gallons per day or more may require additional field studies beyond the standard deep hole and percolation tests. These hydrogeological studies might determine that the proposed soil absorption field affects a much larger area than the actual area of the absorption field. Installing a soil absorption system may require that portions of land within the dispersion plume area be restricted against the drilling of wells for drinking water.

Preliminary hydrogeological studies were performed for both the Windolph Knoll and White Tract sites. Copies of these reports are in the appendices.

3. Management of Community Land Disposal Systems:

Community Land Disposal Systems typically require a licensed wastewater treatment plant operator depending on the size of the system and treatment technology. The plant operator can be an employee of the municipality or an independent contractor. For non-municipal disposal systems, the local municipality is typically required to assure that the facility is properly operated and maintained either through a Sewage Management Program, Municipal Ordinance or individual oversight or management agreement with the system owner.

4. Rehabilitation or replacement of existing malfunctioning community land disposal systems:

Disposal areas are often divided into multiple sections or zones. It is recommended that a reserve disposal area equal to the largest zone be tested and included in the original design and permit application. This reserve area could then be used should it be needed in the future.

E. Retaining Tanks, Holding Tanks, Privies, Chemical or Portable Toilets, Recycling, Incinerating, or Composting Toilets:

1. Commercial, residential and industrial use:

Retaining Tanks, commonly called holding tanks, are temporary holding facilities used to retain wastewater “sewage” before it is transported by truck to an authorized treatment facility.

Holding tanks are also very useful during the initial stages of a project, while the permanent system is being constructed. Sewage can be stored in holding tanks and then be pumped and hauled to a sewage plant for treatment.

Holding Tanks have also been used to aid a marginal system. By installing a holding tank between the septic tank and the absorption bed, the holding tank can serve as an emergency storage tank. Rather than having the system back up into the septic tank and then into the house, the wastewater overflows into the holding tank, which can be later pumped out or returned to the septic system, giving the absorption area time to rest.

Certain commercial and industrial uses, for example non-domestic wastes (grits and other settlements) from a car washing facility including other toxic and hazardous liquid wastes maybe stored onsite in a “holding tank,” but are permitted through an Industrial Waste Permit issued by PA DEP.

2. Designated conveyance facilities:

Conveyance of liquid wastes is typically contracted out to independent licensed haulers. The Chester County Health Department regulates and permits all liquid waste haulers in Chester County. The Health Department also routinely inspects all pumper trucks used for conveyance to treatment facilities.

3. Designated treatment facilities:

There are no specific designated treatment facilities; liquid waste is hauled to a number of Pa DEP permitted treatment plants both in Chester County and several adjacent counties. County Health Department also maintains the *Chester County Septage Management Data System* which tracks pumping activity of all licensed liquid waste haulers.

4. Implementation of a retaining tank ordinance:

The use and maintenance of new and existing holding tanks in West Pikeland Township is governed by Ordinance 2006-202. Under this ordinance, the Township is responsible to assure that all retaining tanks are being maintained.

5. Financial assurances:

The West Pikeland Holding Tank Ordinance requires bonding and other financial assurances.

6. Other retaining tank alternatives:

a) Privies:

Privies (outhouses) are still permitted but are limited to sites where there is no potable water under pressure on site. Privies are permitted by the Chester County Health Department in Chester County.

b) Chemical or Portable Toilets:

Chemical or Portable Toilets are usually used on a temporary basis at construction sites, fairs, concerts, or camping events. Portable toilets are exempt of permitting by the Chester County Health Department (CCHD). CCHD has separate rules and regulations on the proper use of Portable Toilets and the licensing of the Liquid Waste Haulers to service portable toilets.

c) Recycling, Incinerating, or Composting Toilets:

Recycling, Incinerating, or Composting Toilets can be used in new or existing residences or establishments. These devices shall bear the National Sanitation Foundation (NSF) seal indicating testing and approval under NSF Standard No. 41. For new residences or establishments, an approved method of sewage disposal and a permit is required for the "Gray Water" (i.e. wash water for sinks, showers, bath tubs, and for excess water from the device). Such devices may be installed for existing residences and other establishments provided that no alteration of the existing on-lot system be proposed.

F. Sewage Management Programs:

Municipalities are required to address the long-term operation and maintenance of all sewage facilities with their borders.

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1. Municipal ownership or oversight of individual on-lot sewage disposal systems, small flow treatment facilities and other non-municipal treatment facilities:

a) Municipal ownership:

Municipally owned facilities would include those systems owned by the Municipality itself, the Municipality's Authority or other Joint or Regional Authority. While municipal ownership may be the preferred method to assure adequate operation and maintenance, it is often not practical or cost effective unless the sewage facilities serve most of the municipality.

b) Oversight of individual on-lot sewage disposal systems, small flow treatment facilities and other non-municipal treatment facilities:

There are two general types of sewage facilities: individual sewage systems and community sewage systems. For the purposes of the Township Sewage Management Program, an Individual sewage system serves a single lot and a Community sewage system serves two or more improved properties.

In general, property owners are responsible to properly operate and maintain the sewage facilities on their individual property. Where an individual property is served by a community sewage system, property owners are responsible to comply with the rules and regulations of the Community sewage system. Community sewage systems are often referred to as "public" sewers and may not be necessarily owned by the Municipality or an Authority, but owned by an Investor Owned Public Utility company or a Homeowners or Condominium Association.

2. Requirement for inspection of sewage disposal systems:

Sewage disposal systems that have Water Quality Management Permits are routinely inspected by PA DEP. Certain "Alternate" and most "Experimental" system permits contain requirements for scheduled inspections. Otherwise, any requirement for inspection of sewage disposal systems would be part of an established Sewage Management Program.

3. Requirements for maintenance of sewage disposal systems:

A draft ordinance establishing procedures for the proper operation and maintenance of all individual sewage facilities is provided in the appendices.

4. Repair, replacement or upgrading of malfunctioning on-lot sewage systems:

a) The Chester County Health Department is currently the Local Agency for the Township who conducts investigations regarding potential malfunctioning on-lot

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sewage systems and also issues any necessary permits for repairs, replacements and upgrades.

- b) The Township residences are encouraged to use the Township Website which contains useful information on the proper operation and maintenance of sewage disposal systems.

5. Establishment of joint municipal sewage management programs:

The Township remains open to considering a joint municipal sewage management program. None are proposed at the present time.

6. Requirements for bonding, escrow accounts, management agencies or associations to assure operation and maintenance for non-municipal facilities:

Operation and maintenance of the existing non-municipal facilities does not appear to warrant any financial assurances; however future projects will be reviewed on a case by case basis.

G. Non-Structural Comprehensive Planning Alternatives:

- 1. While the Township has recently updated its Comprehensive Plan, future updates should consider the following:
 - a) Land use designations - A review of existing land use designations and make recommendations as needed.
 - b) Densities - Consider decreasing lot densities, as lot sizes less than 1.4 acres should be evaluated for possible nitrate-nitrogen elevation in the ground water.
 - c) Municipal ordinances - A periodic review of existing municipal ordinances and regulations is recommended.
 - d) Improved enforcement - Continue to support the Chester County Health Department and PA Department of Environment Protection in their enforcement efforts.
 - e) Protection of drinking water sources - Continue to support the Chester County Health Department with enforcement of the drinking water well program.
- 2. Review and update the Comprehensive Plan, as needed.
- 3. Alternatives for changing municipal subdivision regulations to assure long-term use of on-site sewage disposal systems that consider lot sizes and protection of replacement areas.

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- a) The Chester County Health Department requires for most on-site systems, including elevated sand mounds, that a suitable replacement area also be found during permitting. A major problem often occurs is that this replacement area is not protected and is not available should a replacement be needed.
4. Evaluation of existing local agency programs and the need for technical or administrative training.
- a) Support requiring regular maintenance of on-lot septic systems. Consider implementation of a Sewage Management Program for individual on-lot sewage disposal systems. Also, consider Operation and Maintenance oversight agreements with owners of community sewage facilities.
 - b) Support requiring groundwater studies for new development projects not proposed for connection to public water service to ensure that adequate water supply is available and sustainable.

H. No-Action Alternatives:

The impact of the No-Action Alternative provides a benchmark to enable the Township to compare the magnitude of effects of the action alternatives.

1. Pickering Estates No-Action Alternative:

This alternative assumes that each property owner will need to either not repair any malfunctioning on-lot system or left to seek individual repair alternatives.

a) Water Quality/Public Health:

Malfunctioning on-lot systems have a direct impact on the water quality of the local watershed and in time will have a negative effect on the local environment, which will then have an impact on public health.

b) Growth potential (residential, commercial, industrial):

The No-Action Alternative will likely have little or no effect on the potential growth of the local neighborhood, because the project area is fully developed. However, the growth of the Township could be effected because of the problems within a small community.

c) Community economic conditions:

The effect to the local economy of most concern, without a properly functioning sewage system, homes have a greatly reduced value. For most people their home is their most important physical asset.

d) Recreational opportunities:

There are likely very little concerns with regards to recreational activities.

e) Drinking water sources:

There are three areas of concern with regards to drinking water.

- i. The immediate effect on the homeowner's own drinking water well, as this area is served by individual wells.
- ii. The possible effect on neighboring drinking water wells.
- iii. The long term effect of possible nitrate-nitrogen in the drinking water.

f) Other environmental concerns:

In general, malfunctioning on-lot sewage systems have a negative effect on most other environment systems.

2. Sewage Management Program No-Action Alternative:

With the limited exception of education, this alternative considers the impact of no municipal sewage management program.

a) Water Quality/Public Health:

The assumption is most of the existing on-lot systems are operating properly and if so should not have a negative effect on the local environment or Public Health.

b) Growth potential (residential, commercial, industrial):

This No-Action Alternative could have an effect on the potential growth of the community.

c) Community economic conditions:

It is more cost effective to properly operate and maintain an on-lot sewage system then connect to or construct a public sewer system. The cost to properly operate and maintain an on-lot sewage system is most often less than the operation and maintenance costs associated public sewers. The effect to the local economy of most concern, without a properly functioning sewage system, homes have greatly reduced value. For most people their home is their most important physical asset.

d) Recreational opportunities:

There are likely very little concerns with regards to recreational activities.

e) Drinking water sources:

There are three areas of concern with regards to drinking water.

- i. The immediate effect on the homeowner's own drinking water well, as this area is served by individual wells.
- ii. The possible effect on neighboring drinking water wells.
- iii. The long term effect of possible nitrate-nitrogen in the drinking water.

f) Other environmental concerns:

In general, malfunctioning on-lot sewage systems have a negative effect on most other environment systems.

SUMMARY OF SELECTED ALTERNATIVES

1. Individual On-lot Sewage Disposal Systems:

Existing and proposed new building lots over two acres will continue to depend on the use of individual on-lot systems as their primary method of sewage disposal, where suitable conditions permit.

Existing building on lots less than two acres will continue to depend on the use of individual on-lot systems. When conventional repairs and replacement systems are not suitable, alternative on-lot sewer disposal systems shall be considered including the use of a “holding” tank system.

With proper operation and maintenance by the property owner, in most cases on-lot sewage disposal systems will be very cost effective, environmentally sound and will protect public health.

2. Community On-lot Sewage Disposal Systems:

Existing Facilities – The systems serving the Historic Yellow Springs and the Montgomery School are presently the only non-PUC privately owned Community On-lot Sewage Disposal Systems. With proper operation and maintenance, these systems should properly serve these properties for the near future.

Future Facilities – New Community On-lot Sewage Disposal Systems are the preferred alternative for New Land Development projects with flows less than 10,000 gallons per day.

3. Large Volume On-lot Sewage Systems:

Large Volume On-lot Sewage Systems include both individual and community on-lot sewage systems that discharge to a subsurface disposal system with flows in excess of 10,000 gallons per day. This is preferred alternative for New Land Development projects with flows excess than 10,000 gallons per day.

For existing areas in need where there are insufficient soils for disposal it is possible to collect and convey the sewage to another area where there are sufficient soils and land available for the treatment facilities.

4. Small Flow Treatment Facilities:

Small flow treatment facilities are individual or community sewerage systems that treat sewage flows less than 2,000 gallons per day. Small flow treatment facilities that discharge to surface waters in High Quality classified watersheds

are generally limited as replacement systems for existing, malfunctioning on-lot systems.

V. Evaluation of Alternatives:

A. Consistency of alternatives with objectives and policies:

1. Plans Developed and Approved under Sections 4 and 5 of the Clean Streams Law or Section 208 of the Clean Water Act:

Comprehensive Water Quality Management Plans were developed under Sections 4 and 5 of the Clean Streams Law and 208 of the Clean Water Act for all areas of the Commonwealth. These plans have not been subject to an ongoing maintenance process; in fact, these plans are out of print and are not longer available. In absence of the actual and likely outdated plan, since all of the alternatives proposed in this plan update promote enhanced water quality, it is believed this plan is consistent with those sections of the Clean Streams Law and Clean Water Act.

2. Municipal Wasteload Management under Chapter 94:

There are no “municipal” sewerage facilities in the Township, non-municipal sewage facilities are not covered by Chapter 94.

3. Previous Plans Developed under Title II of the Clean Water Act or Titles II & VI of the Water Quality Act of 1987:

Title II of the Clean Water Act contain information on waste treatment management plans and practices which provided for: the application of the best practicable waste treatment technology before discharge into receiving waters, including reclaiming and recycling of water; the confined disposal of pollutants so they will not migrate to cause water or other environmental pollution; and the consideration of advanced waste treatment techniques.

All of the alternatives in the Plan are consistent with the above.

4. Comprehensive Plans Developed Pursuant to the Municipalities Planning Code:

All of the alternatives in the Plan are consistent with the above.

5. Anti-degradation Requirements Contained in Chapters 93, 95 and 102:

All of the alternatives in the Plan are consistent with the above.

6. State Water Plan Developed Under the Water Protection Planning Act and the Pennsylvania Administrative Code:

All of the alternatives in the Plan are consistent with the above.

7. Pennsylvania's Prime Agricultural Land Policy:

The protection or preservation of prime agricultural soils is stated as an objective of the Agricultural Land Use Goal, as stated in the Township Comprehensive Plan. The U.S. Department of Agriculture has identified Prime Farmland Soils and those found in West Pikeland and were previously presented in Table 5.

While the areas containing these soils are not specifically delineated in the Zoning Update, the conservation of these soils is inherent with the use, area, and bulk regulations specified for the Resource Conservation District. The program to transfer development rights from prime farmland and other naturally sensitive areas to the more appropriate Residential Development District also aids in the conservation of prime agricultural soils.

8. County Stormwater Management Plan:

Chester County does not have a storm water management plan, no conflict exists.

9. Wetland Protection Under Chapter 105:

All proposed facilities should be able to be located to avoid impacts on wetlands. Wetlands in general are not suitable for sewage disposal areas; therefore there should be no impact with respect to the disposal areas. Ancillary facilities such as pumping stations should be able to be located to avoid impacts on wetlands along with other associated construction activities (road crossing, utility lines, etc.) may require a Chapter 105 permit prior to construction.

10. Protection of rare, endangered or threatened plant and animal species:

A copy of the Pennsylvania National Diversity Inventory (PNDI) search document for the White Tract and Windolph Knoll sites are provided in the appendices, along with response letters from the appropriate agencies. The Pickering Meadows site has an existing permit and it is assumed that this site is clear.

11. Historical and archaeological resource protection:

A copy of the Cultural Resource Notice for both the White Tract and Windolph Knoll sites are included in the appendices. Responses from the Pennsylvania Historic and Museum Commission indicating no potential impacts on known

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historic or archaeological resources are also included. The Pickering Meadows site has an existing permit and it is assumed that this site is consistent.

B. Resolution of inconsistencies:

No inconsistencies exist to resolve.

C. Applicable water quality standards:

All alternatives evaluated are consistent with applicable water quality standards.

D. Cost estimates:

Cost estimates for each alternative are presented in the appendices.

E. Funding Methods:

1. Individual On-Lot Sewage System Loans:

The Pennsylvania Infrastructure Investment Authority (PENNVEST) has a special funding program for eligible homeowners who do not have access to a public sewage system and need to repair or replace their individual on-lot sewage disposal system. Assistance is in the form of loan at an interest rate of one percent. The monthly payment also includes a $\frac{3}{4}$ percent servicing and insurance fee. Loans will be secured by a mortgage on the borrower's home. The maximum loan is \$25,000 with a maximum term of 20 years. A loan must be immediately repaid in full if the property is either sold or transferred. The property has to be the primary residence of the owner. Family income may not exceed \$75,800. Other requirements may also apply.

2. Individual Public Sewer Connection Loans:

The Pennsylvania Infrastructure Investment Authority (PENNVEST) does not have a specific funding program for individual property owners who need to connect to public sewers; however it is still recommended that PENNVEST be contacted for special arrangements. Otherwise, local banks are a possible source for financing.

3. Municipal Loans and Bonds:

- a) Municipal Bonds - A debt security issued by a state, municipality or county to finance its capital expenditures. The borrowing rate (interest) for municipal bonds is typically less than most other loans because the interest paid to the purchasers of Municipal Bonds are exempt from federal taxes and from most state and local taxes. The down side is there are any upfront costs that are somewhat fixed regardless of the total amount of the loan. Municipal Bonds are

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typically used for large multimillion dollars project and ever the municipality often does not plan to refinance or payoff the bond prior to the maturity date of the original bond.

- b) Bond Pools – A bond pool is similar to municipal bond offering in which a sponsor, often a Municipal Authority or other Trust sells an issue of bonds with proceeds used by a number of municipalities or other tax-exempt organizations. The pool permits smaller municipalities with low borrowing requirements to reduce the underwriting and interest costs inherent in a small issue. There are several such financial Authorities and Trusts.
- i. Pennsylvania Infrastructure Investment Authority (PENNVEST) – PENNVEST has been empowered by Pennsylvania state law, Pennsylvania Infrastructure Investment Authority Act 16 of 1988, to administer and finance the Clean Water State Revolving Fund (CWSRF) and the Drinking Water State Revolving Fund (DWSRF) pursuant to the federal Water Quality Act of 1987, as well as to administer the American Recovery and Reinvestment Act of 2009 (ARRA) funds (while all the ARRA funds are presently exhausted).

PENNVEST also finances, through the issuance of special obligation revenue bonds, water management, solid waste disposal, sewage treatment and pollution control projects undertaken by or on behalf of private entities. Primarily low interest loans (some grant funding available) to pay for costs associated with design, engineering, and construction of public wastewater systems. Ineligible uses include: House laterals, interior plumbing, curb to curb paving, land and association costs, redesign, refinancing, and costs associated with litigation. The interest rate will depend upon resulting user rates in the community (1% to 4%) with a term depending upon the useful life of the sewer system. Typically PENNVEST only considers “Shovel Ready” projects, those projects with designs completed, all permits obtained, all easements and land acquired, construction bids received and with a construction contract ready to be executed. A flow chart for the PENNVEST application progress is provided in the appendices.

- ii. Pennsylvania Local Government Investment Trust (PLGIT) - Intergovernmental Cooperation Act originally adopted as Act 180 of 1972, authorizes two or more “local governments” to “jointly cooperate in the exercise or in the performance of their respective governmental functions, powers or responsibilities.” PLGIT was formed initially by two Boroughs as a vehicle for Pennsylvania municipal entities to pool their funds for investment purposes in 1981. Participation in the Trust requires action, the enactment of an Ordinance or a Resolution, by the governing body of each prospective participant. PLGIT currently has three bond pools available to their members.

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- iii. Delaware Valley Regional Finance Authority – DVRFA was formed in 1985 by Bucks, Chester, Delaware and Montgomery Counties in order to provide financing to local governments within the four county region. The Authority is governed by a five-member board appointed by the commission of each of the counties. DVRFA currently have several fixed rate programs for terms from 3 to 20 years, including variable rate. DVRFA is also able to structure a loan to meet the specific needs of the Township. An example a structured loan is provided in the appendices.

F. Project Phasing:

No phasing is proposed.

VI. Institutional Evaluation:

A. Existing Wastewater Treatment Institutional Entities:

1. Historic Yellow Springs Inc:

Historic Yellow Springs Inc. owns and manages the Yellow Springs Community Treatment System.

No changes in this institutional arrangement is warranted or proposed.

2. Montgomery School:

Montgomery School owns and manages the Montgomery School On-lot Sewage Disposal System.

No changes in this institutional arrangement is warranted or proposed.

3. Little Washington Wastewater Company:

The Little Washing Wastewater Company, an Aqua PA subsidiary, owns and operates the Twin Hills Sewer system which serves the Twin Hills and Pickering Meadows developments along with homes on Byers Road between the two developments. This sewer system includes the sewage collection, conveyance, treatment and disposal systems. The sewage facilities (Grinder Pumps) on individual properties are owned by the individual property owners, who are also responsible for the proper operation and maintenance for their onsite sewage facilities. The current rate for sewer service is a minimum monthly customer

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charge of \$47.00 plus consumption charge of \$ 1.76 per 1,000 gallons of water used. Based on an average water consumption of 180 gallons per day the annual charge for sewer service is \$680.00.

No changes in this institutional arrangement is warranted or proposed.

4. Other Existing Wastewater Treatment Institutional Entities:

There are no Municipal Authorities that provide wastewater services in West Pikeland Township. All other on-lot sewage disposal systems within the area are owned and maintained by individual landowners.

B. Identification of Administrative Alternatives:

There are two types of administrative arrangements for sewage facilities: municipal and non-municipal.

Municipal sewage facilities typically include those sewage facilities:

- Owned & operated by the Municipality themselves,
- Owned & operated by Municipal Authority, or
- Owned by Municipal Authority then leased to the Municipality who then operates & maintains the facility.

Non-Municipal sewage facilities typically include those sewage facilities:

- Owned & operated by a Public Utility,
- Owned & operated by a Condominium / Homeowners Association, or
- Owned & operated by an individual property owner.

1. Municipal Authorities:

The Pennsylvania Municipality Authorities Act of 1945 gives a county, city, town, borough, township, or school district the ability to incorporate a separate corporate body and give that corporate body (the authority) prescribing rights, powers, and duties. These rights, powers, and duties might include the authorization to acquire, construct, improve, maintain, and operate a project, and to borrow money and issue bonds. Authorities can also be given the right of eminent domain and the ability to enter into contracts with and accept grants from the Federal Government.

There are two general types of municipal authorities, which deal with sewage facilities: operating and financing authorities. Operating authorities generally own, maintain, and otherwise operate the sewage facilities. Financing (lease back)

authorities generally own and lease the sewage facilities back to the municipality, who in turn maintain and operate the facility.

Both municipal ownership and lease back options require the municipality to operate and maintain the sewage facilities. While it is possible for a municipality to contract out some of these services, the municipality is ultimately fiscally responsible. The fixed soft or overhead costs associated with operating small sewage facilities may not be so easily distributed over such a small user base. In addition, it is easily seen that the operational costs per unit for smaller facilities would be greater than for large facilities.

2. Public Utilities:

The Pennsylvania Public Utility Commission (PUC) regulates and supervises the rates and service of the state's public utilities, including electricity, water/wastewater, natural gas, and telephone. The PUC's goal is to ensure that consumers receive safe, adequate service at reasonable prices. Public utilities are investor owned companies that charge rates for its services and can be a corporation, partnership, or a sole proprietor. The PUC generally does not have jurisdiction over municipally owned facilities unless the municipality serves and directly charges customers outside the municipal corporate boundary. The PUC also does not generally regulate mobile home parks or bona fide cooperative associations, such as condominiums or homeowners associations.

The PUC recognizes an emerging competition between PUC-regulated (and tax-paying) companies and unregulated and tax-exempt municipally owned and municipal authority owned facilities for service areas. PUC-regulated companies are becoming increasingly accepted as viable entities to provide sewage services, where only municipally and municipal authority owned facilities used to exist. This acceptance can be seen in the number of large municipal facilities that have been sold to PUC-regulated companies.

3. Condominium and Homeowners Associations:

Condominium and Homeowners Associations are typically considered properly chartered and bona fide not-for-profit associations whose shareholders or members are property owners within a political subdivision. Such associations can provide a variety of services for its members from landscaping & snow removal to operation and maintenance of utility services.

Only very large associations (greater than 1,000 units) have been successful in owning and operating their sewage facilities. In general, smaller associations do not plan operational budgets very well and procrastinate on repairs until the money is available.

4. Individual property ownership:

Individual property ownership is usually the simplest and easiest administrative or institutional arrangement. Ownership by an uninformed or misinformed property owner, however, will lead to environmental problems for the community and ultimately financial problems for the property owner. These problems can be reduced by appropriate municipal oversight of the system and proper education.

C. Needed administrative and legal activities:

1. Incorporation of authorities or agencies:

Presently, the Township does not own or operate any sewage facilities. The Township should consider retaining an outside firm to administer the construction and operation of any proposed new sewage facilities. For the additional administrative duties, if necessary additional part-time staff can be hired.

2. Development of Municipal Ordinances, Regulations, and Standards:

The Township will need to adopt a Sanitary Sewer Ordinance to establish the Pickering Estates sewer district and to authorize the design and construction of the sewer project. Rules and regulations for the installation and home owner responsibilities of the individual onsite sewage facilities will also need to be established.

Ultimately, the Township will need to also adopt a Sewage Management Ordinance to assure all other sewerage facilities are properly operated and maintained.

3. Rights-of-Ways, Easements and Land Transfers:

For the White Tract disposal alternative an easement for the disposal area will be required. The Township currently owns the land for the Windolph Knoll alternative. Little Washington Wastewater Company has an easement for the Pickering Meadows disposal area, a copy of the easement agreement is in the Appendices. The pressure sewer system can be installed within existing public rights-of- ways therefore easements are not necessary. During the final design of the pressure sewer system, it may be determined that locating the portions of the sewer outside the existing public rights-of- ways may be cost effective, if so, an easement would be needed. However, the Township will need to obtain permission and a permit from the PennDOT to occupy state highway rights-of way.

4. Adoption of other Municipal Sewage Facilities Plans:

Adoption of other municipal sewage facilities plans is not required or proposed.

5. Imposing of Connection and Rental Fees:

Section 2502 of the Second Class Township Code provides the Township with the ability to impose fees for the cost of constructing and maintaining the sewer system. Various fees are provided for under the Municipality Authorities Act of 1945:

- **Connection Fee** – based on the actual cost for the installation of the service lateral. Service laterals are the individual pipes from the sewer main in the street or right of way to the property or curb line of the property.

- **Customer Facilities Fee** – the actual cost of the sewage facilities on the customer’s property. These costs include furnishing and installing: the sewer pipes, the treatment and effluent pump system, the pressure sewer and the connection to the Service lateral. This fee is generally only charged if the property owner fails to connect and the Township is forced to connect a home or building to the public sewer.

- **Tapping Fee** – A Tapping Fee is a charge that reflects the capital cost of the sewage system to the property owners who connect to the sewage system. Often to reduce the cost of the Tapping Fee, a portion of the capital cost is paid by a grant or the selling of municipal bonds or another loan. Tapping Fees have four components:
 - Capacity – generally, this part pertains to costs related to the treatment plant and conveyance capacity.
 - Collection – this part generally pertains to the costs for the collection system within the streets and right of ways.
 - Special Purpose – sometimes a customer or group of customers have special needs or requirements not shared by others in the sewer district. These costs are equability distributed in the tapping fees of the customers in need.
 - Reimbursement – this part of the tapping fee is used to reimburse a developer or other private party who constructs facilities with excess capacity.

Section 2511 of the Second Class Township Code provides for property owners to pay, in addition to the cost for the initial connection to the sewer system, a rental fee. This rental fee shall be deposited into a special fund to be used only for the cost of construction, reconstruction, repair, operation and maintenance of the sanitary sewer system.

- **Rental Fee** – generally this fee includes several components
 - Cost of operation and maintenance of Municipal Facilities

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- Capital Reserve – a sinking fund for future equipment replacement
- Cost of operation and maintenance of Customer Facilities
- Debt Service – principal and interest for any bond or other loan used pay all or a portion of the capital cost of the sewage system

6. Time frame for items 1-5 above:

The sewer ordinance will need to be adopted within a short time 30 to 60 days after approval of this Plan Revision. The other items will need to be completed prior to the first connection to the project.

VII. Implementation Schedule and Justification for Selected Technical & Institutional Alternatives:

A. Selected Alternatives:

1. Existing Individual On-lot Sewage Disposal Systems:

The Township will consider adoption of a Sewage Management Program for the existing individual on-lot sewage disposal systems. Additional analysis is needed to study the cost, environment and public health benefits before adopting such a program.

2. Pickering Estates Study Area:

The homes in this study area will be served with individual Advanced Treatment systems with effluent pumps and a public pressure sewer system. Treated effluent will convey to a drip dispersal system at the White Tract site. The treated water will then be recycled back to the local watershed by a subsurface drip dispersal system.

a) Existing wastewater disposal needs:

This alternative addresses the current wastewater disposal needs of the Pickering Estates area.

b) Future wastewater disposal needs:

No other needs are foreseen after completion of the sewer project.

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c) Operation and maintenance considerations:

The selected alternative places very little operation and maintenance responsibilities on the individual property owner only to:

- Not dispose of any substance that would cause harm to the system, or the environment in general.
- Provide electrical power to the system.
- Provide access to the system for maintenance and service.
- Contact proper authorities of an event of alarm or unusual occurrence with the system.

d) Cost-effectiveness:

Capital costs – It is not unreasonable for a new land development project in Chester County to spend \$30,000 to \$50,000 per home for the total sewer improvements. In addition, on challenging sites, repairs to existing on-lot disposal system in the \$30,000 to \$50,000 range are also common.

Operating costs – As a comparison, the annual sewer user fees for three similar type communities are presented. All three communities are in Chester County and all three are serviced by the Little Washington Wastewater Company¹⁶.

The Greens at Penn Oaks, Thornbury Township, Chester County		
Customer Charge per EDU \$90.00 per month	Annual cost	\$1,080.00
Consumption charge based on 180 gallons per day		
180 gpd X 365 days X \$1.50/1,000 gallons	Annual cost	<u>\$98.55</u>
	Total cost	\$1,178.55

¹⁶ Source Aqua Pa website for Tariffs (Greens at Penn Oaks effective: June 30, 2007), (Plumsock effective: June 24, 2005) (Twin Hills effective: November 30, 2007)

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Plumsock, Willistown Township, Chester County		
Customer Charge per EDU \$60.00 per month	Annual cost	\$ 720.00
Consumption charge based on 180 gallons per day		
180 gpd X 365 days X \$7.91/1,000 gallons	Annual cost	<u>\$ 519.69</u>
	Total cost	\$ 1,239.69

Twin Hills, West Pikeland Township, Chester County		
Customer Charge per EDU \$47.00 per month	Annual cost	\$ 564.00
Consumption charge based on 180 gallons per day		
180 gpd X 365 days X \$1.76/1,000 gallons	Annual cost	<u>\$ 115.63</u>
	Total cost	\$ 679.63

e) Available management and administrative systems:

There a number providers and contractors in the Chester County area that can provide sewage management, maintenance, operation and other administrative services.

f) Available finance methods:

The Township will likely need some interim financing for the design and construction phase of the project. The term of any construction loan is likely too short and the amount required too low for traditional municipal bonds; the Township may wish to consider a bond pool such as the Delaware Valley Regional Finance Authority for any construction financing.

g) Environmental soundness and compliance with natural resource planning and preservation programs:

The alternative provides an innovative state of the art treatment system. It will provide treated water that will be recycled back into the local watershed by a drip distribution system.

B. Capital Financing Plan:

At the present time, the long term capital financing plan has not been selected. This will be determined during plan implementation.

C. Implementation Schedule:

(Estimated duration times from date of DEP Approval of the Official Plan)

• PA DEP approval	–	0
• Adoption of Sewage Management Ordinance	–	30 days
• Adoption of Pickering Estates Sewer Ordinance	–	30 days
• Notify Residents	–	60 days
• Prepare engineering plans for bidding and permits	–	90 days
• Expect DEP permits	–	120 days
• Advertise for Bids	–	150 days
• Open Bids, finalize and secure financing	–	180 days
• Notice of Award	–	210 days
• Notice to Proceed & Start Construction	–	240 days
• Complete Construction (season depended)	–	420 days
• Send notices to connect within 60 days	–	450 days
• Project complete and operational	–	510 days

VIII. Technical Alternatives Considered for Pickering Estates:

Three technically feasible alternatives have been considered for Pickering Estates.

- **White Tract Alternative** – Individual AdvanTex Treatment Systems with Effluent Pumps, Pressure Sewers with conveyance of treated effluent to White Tract for disposal.
- **Twin Hills Alternative** – Individual Grinder Pumps, Pressure Sewers, Treatment at the Twin Hills Treatment Plant with conveyance of treated effluent to the White Tract for disposal.
- **Windolph Knoll Alternative** – Individual AdvanTex Treatment Systems with Effluent Pumps, Pressure Sewers with conveyance of treated effluent to Windolph Knoll for disposal.

A. Disposal Options:

West Pikeland Township lies entirely within the Pickering Creek Watershed. This is High Quality Watershed which has certain special protections under the PA Code, Title 25, Chapters 93, 95 and 102, relating to water quality standards and

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wastewater treatment requirements. This combined with County and local preference to avoid any form of direct stream discharge of treated wastewater to surface waters limits disposal alternatives to land application or subsurface soil disposal systems. Additionally, the Township has a preference away from surface application method such as Spray Irrigation towards subsurface soil disposal systems.

The existing subsurface soil disposal component of the existing Twin Hills system does not have sufficient capacity or enough additional land available to meet the disposal needs of Pickering Estates. The disposal site at Pickering Meadows was originally permitted as a Spray Irrigation system. It would need some site renovation and re-testing, as portions of the site have been disturbed over the past years.

There are two viable disposal sites - Windolph Knoll and the White Tract. Both these sites have been evaluated and are equally suitable for disposal of treated effluent (with a total nitrogen concentration of 20 mg/l or less). The Windolph Knoll site is owned by the Township but is a further distance from the White Tract. The White Tract site is privately owned. The Township and its owner(s) have reached a tentative easement agreement for the disposal of treated effluent on the site. It is contained in the appendicies. The easement will be executed upon the approval of this plan by DEP.

The estimated cost for the Disposal System installed at either location is roughly the same and is as follows:

• Drip Dispersal System	\$ 200,000
• Effluent Storage Tankage (3 days)	\$150,000
• Control Building and Site Work	\$ 75,000
• Engineering	<u>\$ 75,000</u>
Total	\$ 500,000

B. Treatment Options:

For both disposal alternatives Nitrate-Nitrogen is the limiting parameter. Nitrate mass balance evaluations for both sites using an applied Nitrate-Nitrogen concentration of 20 mg/l for an effluent flow of 21,000 gallons per day, indicates that anticipated average Nitrate-Nitrogen level in the groundwater, including the existing background level of Nitrate-Nitrogen will be less than the PA DEP Drinking Water Limit of 10 mg/l.

Two treatment alternatives have been evaluated that will meet the disposal requirements. One is a central treatment alternative – the existing Twin Hills plant and the other alternative proposes the use of a PA DEP approved alternate on-lot

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sewage treatment system – Orenco AdvanTex® AX-Series (AdvanTex) treatment system.

1. Twin Hills Sewage Treatment Plant:

The existing Twin Hills has a discharge limit for Total Nitrogen of 10 mg/l, however the plant will require an upgrade to accept additional flows. In a Letter of Understanding dated February 11, 2011, the Little Washington Wastewater Company estimates the cost for needed upgrades to be \$325,000 and should “re-rate” the treatment plant to a design capacity of 93,500 gallons per day.

After the sewage is treated the effluent would to be pumped and conveyed to the disposal area. Conveying the treated effluent to Windolph Knoll would not be very practical given the distance. There are two routes to the White Tract disposal area, Byers Road to Conestoga Road then to Walnut Lane, or along Valley Lane overland to the disposal area. The later routing is the most direct but would require two easements one from the Valley Lane Association and the other from the Mills at Anselma.

The estimated cost to convey the treated effluent is as follows:

• Approx. 3,300 feet of pressure sewer @ \$55/ft	\$ 181,500
• Effluent pumping station	\$ 50,000
• Easements	\$ 60,000
• Engineering and Legal	<u>\$ 70,000</u>
Total	\$ 361,500

2. AdvanTex® Treatment Systems:

The AdvanTex treatment system is an individual onsite wastewater treatment that produces a high quality effluent. The AdvanTex AX-Series treatment system was the first system to be approved by PA DEP Technology Verification Program a third party testing protocol overseen by NSF International. The accepted nitrogen loading figure for assessing groundwater impacts may be lowered to 20 mg/l total nitrogen for this technology. Therefore, no additional treatment is required. The system model AX20-RT would be used for the single family homes with four bedrooms or less. For five or more bedrooms and the commercial applications systems with multiple AX20N pods will be used.

The estimated cost to furnish and install a complete residential AX20-RT system per dwelling is as follows:

• AdvanTex AX20-RT system	\$ 9,075
• 1,000 gallon Septic Tank	\$ 1,000

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• Effluent Pump Package	\$ 1,100
• Installation & misc. materials	<u>\$ 4,500</u>
Total	\$ 15,675

C. Collection and Conveyance:

Traditional gravity sewers would be cost prohibitive for the Pickering Estates area: requiring a central pumping station. Pressure sewers are typically much more cost effective and more environmentally friendly to install. Pressure sewer will require a pump for each property. The AdvanTex AX-Series treatment systems can be furnished with an effluent pump. For the Twin Hills treatment alternative, each property will be served with an individual grinder pump, the estimated cost for a grinder pump furnished and installed is approximately \$ 7,000.

Depending on the ultimate alternative selected there are three possible points of conveyance, Windolph Knoll disposal area, the existing force main at Byers Road and Conestoga Road or White Tract disposal area on Walnut Lane. The collection system for all three alternatives would convey the intersection of Conestoga and Kimberton Roads (Routes 113 & 401, a.k.a. Opperman's Corner)

Kimberton Road (South of Davis)	4 lots	620 ft
Davis Road (Kimberton to Fox)	5 lots,	620 ft
Stirup Lane (to Davis)	6 lots,	410 ft
Fox Lane (Davis to Hunt Club)	19 lots,	1,980 ft
Kimberton Road (within Storm Easement)	4 lots,	825 ft
Hunt Club (Davis to Kimberton)	26 lots,	3,100 ft
Kimberton (Hunt Club to Conestoga & Kimberton)	<u> </u>	<u>1,400 ft</u>
Total	64 lots,	8,955 ft

Conestoga & Kimberton to Windolph Knoll (disposal site)	5,680 ft
Conestoga & Kimberton to Byers Road	4,490 ft
Conestoga & Kimberton to White Tract (disposal site)	3,800 ft

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The estimated cost for Pressure Sewer including soft costs for engineering is approximately \$ 71.50 per linear foot. The estimated cost for each collection system alternative is as follows:

- Windolph Knoll – (8,955 ft + 5,680 ft) @ \$ 71.50 \$ 1,046,403
- Byers Road – (8,955 ft + 4,490 ft) @ \$ 71.50 \$ 961,318
- White Tract – (8,955 ft + 3,800 ft) @ \$ 71.50 \$ 911,983

The cost per connection based on 70 connections and rounded to the nearest \$10 is as follows:

- Windolph Knoll - \$ 14,950 per connection
- Byers Road – \$ 13,730 per connection
- White Tract – \$ 13,030 per connection

D. Operation and Maintenance Costs:

The various components for collection, conveyance, treatment and disposal have different associated operation and maintenance (O&M) costs. The estimated O&M costs for these components are as follows:

- Grinder Pump – annual service contract \$ 182
- AX20 System – annual service contract \$ 350
- Twin Hills - annual O&M fee \$ 680
- Drip System and Management – annual fee \$ 175

1. Twin Hills Alternative:

The total annual O&M costs for the Twin Hills alternative would include: the Annual Service Contract for the Grinder Pump, the current Twin Hills O&M fee and the Drip System with Management for a total annual O&M cost of \$ 1,037.

2. Windolph Knoll and White Tract Alternatives:

Both the Windolph Knoll and White Tract alternatives have the same annual O&M costs and include: the Annual Service Contract for the AX20 System and the Drip System with Management for a total annual O&M cost of \$ 525.

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Official Sewage Facilities Plan**

E. Capital Cost Comparisons:

System Component	Twin Hills	Windolph Knoll	White Tract
Onsite	\$ 7,000	\$ 15,675	\$ 15,675
Collection	\$ 13,730	\$ 14,950	\$ 13,030
Treatment	\$ 9,820		
Disposal	\$ 7,140	\$ 7,140	\$ 7,140
Total	\$ 37,690	\$ 37,765	\$ 35,845

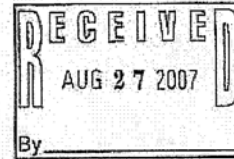
F. Present Worth Analysis:

To determine the most cost effective alternative when both the capital costs and annual O&M costs vary a Present Worth Analysis is often used to compare the alternatives. In this analysis, the capital costs for each alternative are discounted based on series of annual future payments. The annual future payment for each alternative is then added to the current annual O&M cost. This sum is then use to compare the alternatives.

Alternative	Capital Cost	Present Value	Annual O&M	Total
Twin Hills	\$ 37,690	\$ 2,179	\$ 1,037	\$ 3,217
Windolph Knoll	\$ 37,765	\$ 2,184	\$ 525	\$ 2,709
White Tract	\$ 35,845	\$ 2,073	\$ 525	\$ 2,598

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Figure 4 – Letter from Upper Uwchlan Township



Upper Uwchlan Township

August 24, 2007

Mr. Theodore J. Gacomis
West Pikeland Township Engineer
125 Dowlin Forge Road
Exton, PA 19341

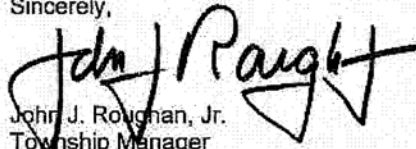
RE: West Pikeland Township Act 537 Update

Dear Mr. Gacomis:

Thank you for your June 25, 2007 letter, expressing West Pikeland Township's interest in purchasing approximately 100,000 gallons per day of sewage treatment capacity from Upper Uwchlan Township. I regret to inform you that Upper Uwchlan does not have treatment capacity available for purchase at the Route 100 Wastewater Treatment Plant currently in Phase I, nor will it with the Phase II expansion scheduled for 2009.

Should you have any questions, please contact Eugene Briggs, ARRO Consulting, the Upper Uwchlan Township Municipal Authority Engineer, at 610-495-2114 or eugene.briggs@thearrogroup.com.

Sincerely,


John J. Roughan, Jr.
Township Manager

JJR:ecb

c: Upper Uwchlan Township Board of Supervisors
Upper Uwchlan Township Municipal Authority
Matt Brown, PE, ARRO Consulting
Christopher Frantz, Municipal Authority Solicitor
Eugene Briggs, AICP, ARRO Consulting

140 Pottstown Pike, Chester Springs, PA 19425
Phone: (610) 458-9400 • Fax: (610) 458-0307

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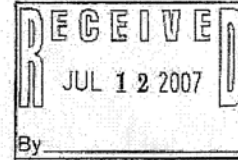
Figure 5 – Letter from Valley Forge Sewer Authority



Environmental Protection by
Caring Professionals

Valley Forge Sewer Authority

333 Pawling Road
Phoenixville, Pennsylvania 19460
610-935-1553
Fax 610-983-9684



July 11, 2007

MUNICIPALITIES

Charlestown
Easttown
East Pikeland
East Whiteland
Malvern
Schuylkill
Tredyffrin
Willistown

Mr. Theodore J. Gacomis, P.E., CPESC
Edward B. Walsh and Associates, Inc.
Lionville Professional Center
125 Dowlin Forge Road
Exton, PA 19341

RE: West Pikeland Township Act 537 Update
Sewerage Facility

Dear Mr. Gacomis:


This letter addresses your 25 June 2007 request for information on existing available capacity and/or future capacity at our facility. Our treatment plant, located at 333 Pawling Road in Schuylkill Township PA has a capacity for 9.2 mgd of which practically all is accounted for through existing customers or development planned to occur in the next five years.

The Valley Forge Sewer Authority (VFSA) is now submitting an Act 537 Plan to the Pennsylvania Department of Environmental Protection (PADEP) within the next couple of days. The Plan, which is available at VFSA, calls for an expansion of the existing wastewater treatment plant to about 11.5 mgd of capacity to cover the long term needs of Schuylkill, East Pikeland, Charlestown, Tredyffrin, East Whiteland, Easttown, Willistown Townships, and Malvern Borough.

There were no capacity provisions made for customers outside of VFSA's service areas.

I trust this information is what you need. If you have any questions, please feel free to call me at (610) 935-1553.

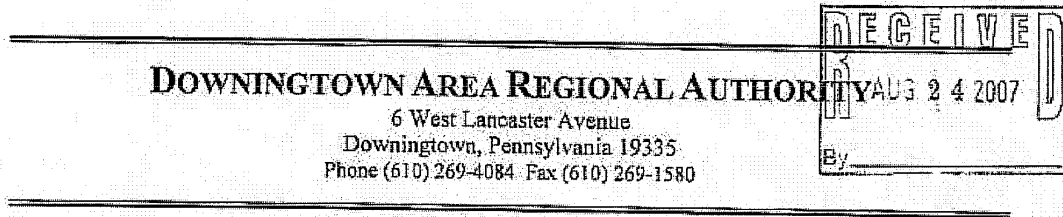
Best regards,


Martin F. Goldberg, P.E.
Operations Manager, VFSA

cc. Len Pinchok, Business Manager, VFSA
Steve Yuhas, Chief Inspector, VFSA
Larry Lutter, Buchart-Horn Inc., Engineer of Record

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Official Sewage Facilities Plan**

Figure 6 – Letter from Downingtown Area Regional Authority



August 22, 2007

Theodore J. Gacomis, P.E., CPESC
Edward B. Walsh & Associates, Inc.
125 Dowlin Forge Road
Exton, PA 19341

RE: West Pikeland Township
Act 537 Plan Update

Dear Mr. Gacomis:

The Authority has reviewed your June 25th letter to us requesting information regarding available capacity at the Authority's wastewater treatment facility, the Downingtown Regional Water Pollution Control Center ("DRWPCC"). After reviewing this matter with the municipalities, the Authority regrettably informs you that we currently have no treatment capacity available for sale to West Pikeland Township, nor any immediate plans to increase capacity at the DRWPCC that would allow us to grant the township's request.

If you have any comments or questions regarding this matter, please contact me.

Very truly yours,

Herbert J. Mays, P.E.
Executive Director

cc: Board Members
Municipalities
wpikeltr.doc