

### 3.1 EXISTING MUNICIPAL WASTEWATER TREATMENT SYSTEMS

The West Hanover Township Water and Sewer Authority (WHTWSA) own and operate the only municipal wastewater treatment plant (WWTP) within West Hanover Township. Its service lines and treatment plant location are shown on Map 2 in Appendix J. The Authority's facility is located approximately four miles east of Linglestown, Pennsylvania, between US Route 22 and Interstate 81. A copy of the West Hanover Township Water and Sewer Authority 2004 Chapter 94 Wasteload Management Report prepared by Gannett Fleming, Inc. is included as Appendix C of this report.

Wastewater flows from two developments in the southwest portion of West Hanover Township, Westford Crossing and Country Manor Farms, is conveyed to the Swatara Township Authority (STA) WWTP for treatment via Lower Paxton Township Authority's Beaver Creek Interceptor through a 1978 Intermunicipal Agreement between the West Hanover Township Board of Supervisors and Lower Paxton Township Authority (LPTA). Wastewater flows generated from the developments are considered part of LPTA's flow to the STA WWTP and operation and maintenance of the sewers serving the two developments is conducted by LPTA. West Hanover Township has also purchased 414,000 gpd reserve capacity at the STA WWTP via a 1985 Intermunicipal Agreement which has gone unused to this point.

#### 3.1.1 Permitting

The WHTWSA WWTP discharges treated effluent to an unnamed tributary of Manada Creek in Dauphin County under National Pollutant Discharge Elimination System (NPDES) permit number PA0085511. This permit is valid from 12/1/2004 through 12/1/2009. The WWTP is designed for an annual average daily flow of 0.78 million gallons per day (mgd) and an annual average daily influent organic loading rate of 1,626 pounds of BOD<sub>5</sub> per day (lbs BOD<sub>5</sub>/day). Table 3-1 presents the current NPDES discharge limits and the 2004 average discharge characteristics from the WHTWSA WWTP. The WWTP discharge consistently complied with the NPDES Permit discharge requirements, with the exception of a violation of the maximum weekly total suspended solids concentration occurring in April 2004.

**Table 3-1 NPDES Effluent Limits and Discharge Characteristics for WHTWSA WWTP**

Parameter	Discharge Limits <sup>(1)</sup>	Discharge Characteristics <sup>(2)</sup>
Flow, mgd	0.78	0.342
CBOD, mg/L	25 (monthly)	2
	40 (max week)	3
Solids, Total Suspended, mg/L	30 (monthly)	5
	45 (max week)	12
Phosphorus, mg/L	2.0	0.4
Fecal Coliform, #/100 ml	200 (summer) <sup>(3)</sup>	40
	2,000 (winter)	
pH (standard units)	6.0 (minimum)	7.0 (minimum)
	9.0 (maximum)	8.1 (maximum)

**Notes:**

<sup>(1)</sup> NPDES Permit Discharge Limits, average monthly values.

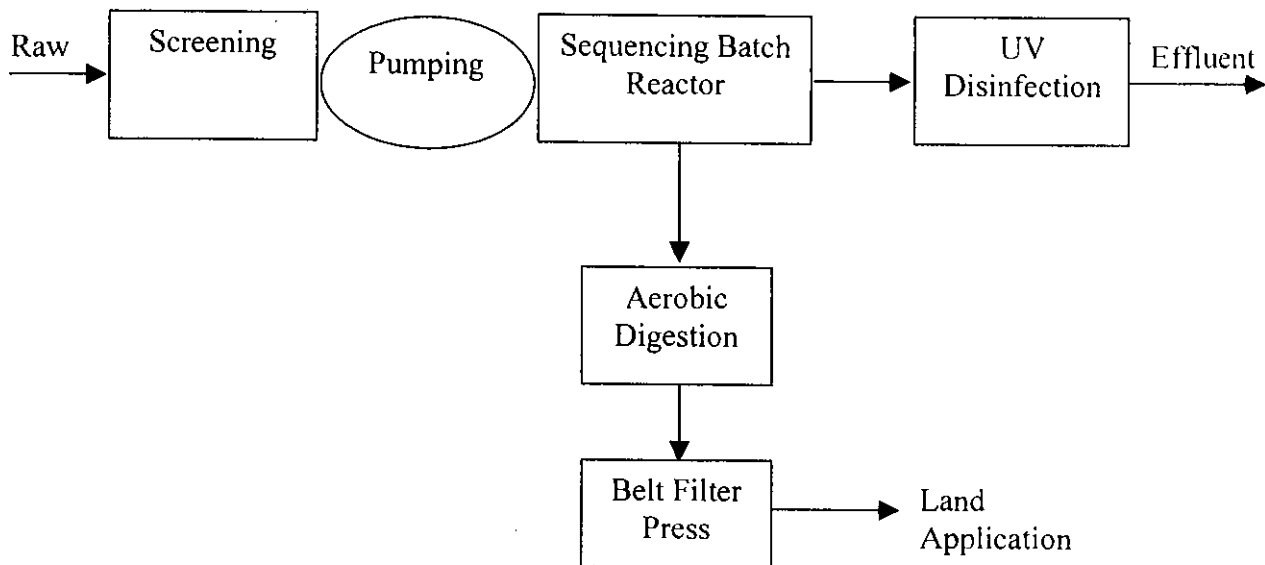
<sup>(2)</sup> 12-month average discharge characteristics from the period from January through December 2004.

<sup>(3)</sup> Summer limits from May 1 to September 30. Winter limits from October 1 through April 30.

### 3.1.2 Basic Treatment Process

Treatment processes employed at the WHTWSA WWTP include influent screenings removal, sequential batch reactor (SBR) activated sludge process, and ultraviolet (UV) disinfection. The facility also utilizes chemical addition for the precipitation of total phosphorus from the wastewater. Solids generated during the treatment process are further stabilized in aerobic digesters prior to disposal. The digested sludge is dewatered on a belt filter press, lime post treated and stored on-site on a covered storage pad. A schematic diagram of the process is included as Exhibit 3-1.

**Exhibit 3-1 Process Flow Schematic**

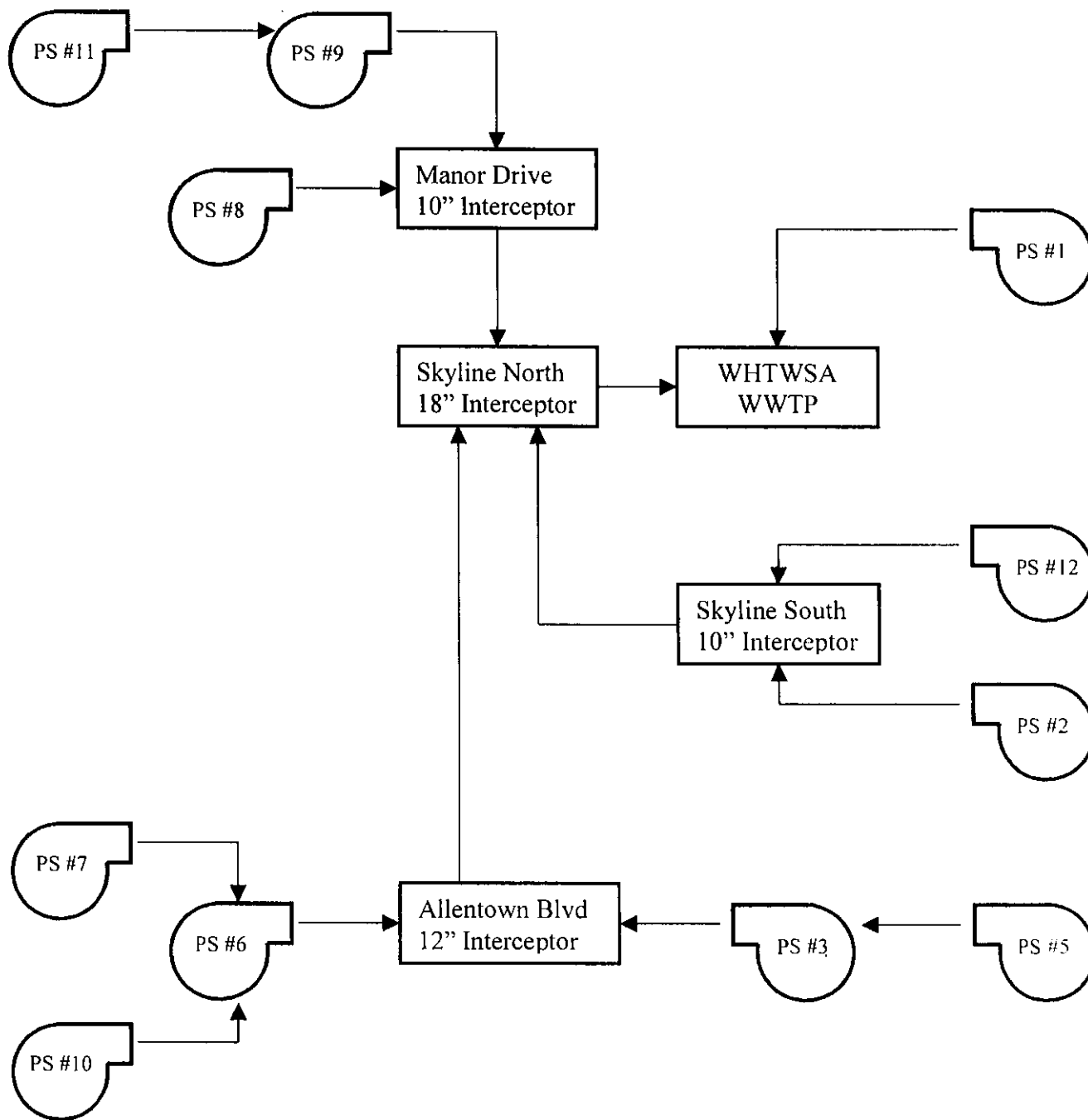


### 3.1.3 Collection and Conveyance Facilities

The WHTWSA sanitary sewer system consists of approximately 37.1 miles of lateral, trunk, and interceptor sewers ranging in size from 8 to 18 inches and eleven (11) pumping stations. The sanitary wastewater collection lines collect both residential and commercial waste discharges and, assisted by the pumping stations, convey the wastewater to the WWTP. The pumping facilities serving the Township include superstructures utilizing suction lift pumps and wet wells and submersible pump stations. A schematic of the WHTWSA collection and conveyance system is presented as Exhibit 3-2.

There are eleven (11) pumping stations in the system owned and operated by WHTWSA. The stations are maintained and inspected by the plant operators on a regular basis, typically once per week. Cleaning, repairs and routine maintenance items are performed as needed. All facilities are in good working order and well maintained. Table 3-2 presents the calculated 2004 average daily flows and facility capacities for the WHTWSA pumping stations as provided by the West Hanover Township Water and Sewer Authority 2004 Chapter 94 Wasteload Management Report prepared by Gannett Fleming, Inc.

Exhibit 3-2 WHTWSA Collection and Conveyance System Schematic



**Table 3-2 Average Daily Flows and Rated Capacities of WHTWSA Pumping Stations**

Pumping Station	Location	Rated Capacity (mgd)	2004 Conditions	
			Average Daily Flow (mgd) <sup>(1)</sup>	Remaining Facility Capacity (mgd)
1	Manada View	0.076	0.007	0.069
2	Rider Lane	0.144	0.019	0.125
3	South Clover Lane	1.137	0.117	1.020
5	Oak Grove & Sterling	0.245	0.005	0.240
6	Hanover Heights	0.634	0.029	0.605
7	Cedar Lane	0.374	0.012	0.362
8	Jonestown Road	0.360	0.013	0.347
9	Manor Drive	0.986	0.060	0.926
10	Bradford Estates	0.345	0.008	0.337
11	Piketown Road	0.720	0.010	0.710
12	Townes of Hershey	0.144	0.001	0.143

**Notes:**

<sup>(1)</sup> Average Daily Flows are calculated based on the monthly pump run-times and the rated capacity of the pumps as supplied by the pump manufacturers.

**3.1.4 Existing Operating Conditions****A. Condition of Collection System**

Based on information provided by WHTWSA staff, the collection and conveyance system appear to be in generally good condition. Preventative maintenance activities are routinely performed by the WWTP staff to optimize the operation of the system and to minimize the occurrence of blockages. The pumping stations are visited regularly to monitor the operation of these facilities and to maintain the equipment in good condition.

WHTWSA has not identified I/I as a major concern. As the system ages and the excess capacity is used, they may feel the need to implement a regular program. Activities of such a program could include televising or smoke testing to identify sources of I/I with subsequent repairs. They could also undertake a house-to-house inspection program to identify illegal connections to the system, such as downspouts and sump pumps.

**B. Projected Overload**

Based on the 2004 Chapter 94 Wasteload Management Report (included in Appendix C), WHTWSA is not projecting a hydraulic overload for the five-year planning period from 2005 through 2009, however, an organic overload condition, based on the current annual average organic loading capacity, is anticipated to occur in 2009. Approximately 0.39 MGD of capacity is available for system expansion or modification (based on the 2004 3-month maximum flow).

**C. Industrial Waste**

The WHTWSA WWTP receives primarily domestic wastewater in addition to negligible quantities of industrial wastes. The Authority has determined that there is no need to implement an Industrial Waste Discharge Program at this time, and continues to review applicable information to determine if any further future actions are warranted. The Authority has not encountered any specific problems in the wastewater collection system or at the WWTP that are known to be caused by industrial waste discharges.

#### **D. Permit Violations**

PA DEP's eFacts website was searched to determine any permit violations incurred by the Authority. No violations were found.

#### **3.1.5 Scheduled or In-Process Upgrading of Treatment and Collection Facilities**

There are no major upgrades or expansions of the WHTWSA treatment facility scheduled or in progress at this time. Projects may occur as a result of recommendations or suggestions made in this Act 537 Plan.

Construction of a public sewer extension serving the Wells Drive, Bolton Drive, and Slate Ridge Road area of the Township was completed in May 2005. The project will provide sanitary sewer service to 31 homes in the area previously served by on-lot systems.

#### **3.1.6 Operation and Maintenance Requirements**

WHTWSA is responsible for the operation and maintenance of the municipal sewage collection and treatment system. The Authority employs three (3) full-time personnel who are responsible for the operation and maintenance of the treatment plant, collection system and pumping stations, including laboratory testing and sewer extension inspections. These personnel perform required maintenance of the collection system and are assisted by additional WHTWSA personnel or outside contractors in case of emergencies.

#### **3.1.7 Disposal Areas**

The effluent from the WHTWSA wastewater treatment facility is discharged to an unnamed tributary of the Manada Creek. Sludge from the facility is dewatered on a belt filter press. The dewatered biosolids are applied to farmland under a contract with Star Rock Farms, Inc. of Conestoga, Pennsylvania.

### **3.2 EXISTING PACKAGE WASTEWATER TREATMENT FACILITIES**

According to Mr. Brian McFeeters of Light-Heigel & Associates, Inc., West Hanover Township Sewage Enforcement Officer (SEO), several abandoned package wastewater treatment facilities and small flow treatment facilities are located throughout West Hanover Township. A package facility is located at the Fishing Creek Elementary School. The school is no longer in operation and the wastewater treatment facility has been abandoned. Two small flow treatment facilities located along Sandy Hollow Road have been abandoned due to construction of public sewers in this area. Two package plants serving the Interstate 81/Route 39 interchange have been abandoned following construction of public sewers to serve the area.

### **3.3 EXISTING INDIVIDUAL ON-LOT SYSTEMS**

Sanitary sewer service is provided to only approximately a third of the Township's area, and consequently, the remainder utilizes on-lot disposal systems (OLDS) for treatment and disposal of domestic wastewater. A community on-lot disposal system (COLDS) located in the Walnut Run Subdivision of the Township serves seven (7) residences along Rabbit Lane. The system utilizes two (2) elevated sand mounds for treatment of septic tank effluent from the residences. The remaining properties outside the sanitary sewer service area use several forms of OLDS. The type of system implemented varies, but is classified as one of the following:

- **In-Ground** – Systems consisting of absorption areas, trenches and other disposal systems that rely solely on the surrounding soil for treatment.
- **Elevated Sand Mound** – Systems utilizing a bed of sand, elevated above the existing surface, to enhance the treatment provided by the underlying soil.
- **Holding Tanks** – Holding tanks and privies that require periodic pumping for removal of waste and residual solids.

Types of systems observed during the sanitary survey (as described in Section 3.3.2) include:

- Standard in-ground systems (septic tank with below-grade seepage bed).
- Elevated sand mounds (septic tank with above-grade seepage bed).
- Privies.
- Holding tanks.
- Cesspools.
- Greywater discharge directed to ditches, streams, and surfaces.

Current regulations regarding on-lot disposal systems began in 1966, and most systems that were created before 1972 did not use best available technologies or methods that would be acceptable today.

### 3.3.1 Residential Complaints and Requests for Service

According to Mr. Brian McFeeters of Light-Heigel & Associates, Inc., West Hanover Township Sewage Enforcement Officer (SEO), complaints of sewage disposal problems have been received from Township residents in the areas of Piketown, Ritzie Village, and the intersection of Piketown Road and Moyer Road. Most of the complaints have been due to malfunction of aged on-lot systems and small lot sizes. Some residents of Short Street and Ritzie Village have requested public sewage service due to malfunction of their on-lot systems. Malfunctions and repairs of Township on-lot systems as identified in Township SEO records from 1988 to 2004 are shown in Table 3-3 and are displayed in mapping prepared for this Plan and provided in Appendix J.

**Table 3-3 Township SEO Reported On-lot Malfunctions and Repairs**

Address	Tax Parcel Number	Date	Description of Malfunction or Repair	Action Taken
7141 Sterling Dr.	68-037-086	1988	Holding tank w/overflow to creek	Disconnected overflow pipe
7831 E. Valley View Rd.		1989	Field filled with roots in pipe	Cut down trees
353 Sarhelm Rd.		1989	Discharge of sewage	Connected to sewer
7560 Allentown Blvd.		1989	Discharge to surface	Repaired system
416 Sarhelm Rd.		1989	Discharge to surface	Holding tank installed
1289 Piketown Rd.	68-010-008	1989	Discharge to surface	Installed new sand mound
7825 Dewey Dr.		1989	Discharge to surface	Re-leveled distribution box
7601 Old Field Rd.	68-010-075	1989	Wet area in yard	Frequent pumping
7803 Sunset Dr.		1989	Greywater discharge	Reconnect to septic system
7033 Fishing Creek Valley Rd.	68-001-020	1989	Malfunctioning system	Tested new system location
7429 Allentown Blvd.	68-028-077	1989	Malfunction to surface	Holding tank installed
7608 Morningstar Ave.		1989	Greywater discharge	Reconnect to septic system
7005 Terrann Drive		1989	Greywater discharge	Reconnect to septic system
7008 Sandy Hollow Rd.		1989	Discharge to surface	Holding tank installed
323 Windcrest Rd.		1989	Discharge to surface	Installed new sand mound
146 Florence Drive		1989	Enlarged existing system	
7824 Kiwanis Rd.	68-021-009	1989	Wet area in yard	Re-leveled distribution box
7800 Linglestown Rd.		1989	Crushed tank	New tank installed
7712 Avondale Terrace		1989	Discharge to surface	Frequent maintenance
7844 Jonestown Rd.		1990	Broken pipe to building	Replaced pipe
627 Walnut Ave.	68-018-025	1990	Greywater discharge	Reconnect to septic system
612 Fishing Creek Valley Rd.	68-003-063	1990	Crushed tank	New tank installed

Address	Tax Parcel Number	Date	Description of Malfunction or Repair	Action Taken
7727 Farndale Ave.		1990	Broken line to tank	Replaced line
858 Shawnee Dr.	68-017-033	1990	Malfunction to surface	Installed new sand mound
7725 Minute Rd.		1990	Collapsed Tank	New tank installed
7721 Valley View Ave.		1990	Wet area in yard	Installed new system
635 Chestnut Ave.	68-018-049	1990	Replaced Septic Tank	
7348 Trent St.	68-017-028	1990	Discharge to creek	Removed pipe to creek
7570 Red Pine Rd.		1990	Malfunctioning system	Holding tank/sand mound installed
7804 Jonestown Rd.		1990	Backup into home	Overflow holding tank installed
7856 Kiwanis Rd.	68-021-016	1991	Backup into home/roots	Root cleanout and tree removed
7541 Fishing Creek Valley Rd.	68-003-037	1991	Tank Problems	New tanks installed
7520 Manor Dr.	68-024-004	1991	Malfunctioning system	Installed new sand mound
7940 Devonshire Heights Rd.	68-039-008	1991	Malfunctioning system	New inground bed installed
146 Alva Dr.		1991	Malfunction to surface	New inground bed installed
7533 E. Appalachian Trail	68-010-047	1991	Seasonal discharge	Pump as needed
7964 Manada View Dr.	68-027-038	1991	Wet area in yard	Installed new sand mound
7833 Kiwanis Rd.		1991	Discharge to surface	Installed new sand mound
7700 Jonestown Rd.	68-024-027	1991	Collapsed Tank	New tank installed
248 Mertle Drive		1991	Broken Pipe	Pipe Replaced
8020 Yellowstone Dr.		1991	Wet area in yard	Re-leveled distribution box
1289 Piketown Rd.	68-010-008	1991	Discharge to surface	Installed new sand mound
7816 Fishing Creek Valley Rd.		1992	Malfunction to surface	Re-leveled distribution box
7420 Slate Ridge Rd.	68-023-027	1992	Malfunction to surface	Installed new sand mound
664 Piketown Rd.	68-016-010	1992	Malfunction to surface	Holding tank installed
7741 Appleby Rd.	68-011-020	1992	Discharge to surface	Installed new sand mound
7749 Fishing Creek Valley Rd.	68-005-008	1992	Crushed pipe to building	Replaced pipe
1453 Mumma Rd.	68-007-016	1992	Clogged terra cotta pipe	Replaced with PVC pipe
248 White Birch Rd.	68-022-068	1993	Overflow pipe to ditch	Disconnected overflow pipe
6948 Hemlock Rd.	68-002-012	1993	Cracked pipe to building	Replaced pipe
508 Hershey Rd.	68-039-002-001-0001	1993	Blocked pipe to building	Replaced pipe
7549 Old Field Rd.	68-010-072	1993	Discharge to surface	Holding tank installed
631 Piketown Rd.	68-018-015	1993	Cesspool	Installed new sand mound
7825 Kiwanis Rd.	68-021-023	1994	Malfunction to surface	Installed new sand mound
6940 Beechwood Rd.	68-002-055	1994	Malfunction to surface	Installed new sand mound
7204 Charles Dr.	68-028-121	1994	Malfunction to surface	Installed new sand mound
7013 Terrann Dr.		1994	Malfunction to surface	Terralift
7914 Eveningstar Dr.		1994	Malfunction to surface	Connected to sewer
7412 Green Hill Rd.	68-037-048	1994	Malfunction to surface	Installed new sand mound
7640 Appleby Rd.	68-009-019	1995	Malfunction to surface	Installed new sand mound
7664 Appleby Rd.	68-011-002	1995	Aging tanks	New tanks installed
8077 Fox Mill Rd.	68-020-020	1995	Discharge to creek	Connected to sewer
7409 Wells Dr.	68-023-033	1995	Discharge to surface	Installed new sand mound
7608 Appleby Rd.	68-009-007	1995	Discharge to surface	Disconnected pipe
7725 Avondale Terrace		1995	Discharge to surface	Connected to sewer
75 N. Hershey Rd.		1995	Poor soil conditions	Holding tank installed
7499 Jonestown Rd.		1996	Discharge to surface	Connected to sewer
7612 Fishing Creek Valley Rd.	68-003-063	1996	Greywater discharge	Connect to septic system
111 Cedar Ln.		1996	Discharge to surface	Frequent pumping

Address	Tax Parcel Number	Date	Description of Malfunction or Repair	Action Taken
7841 Avondale Terrace		1996	Crushed pipe	Replaced pipe
7016 Fishing Creek Valley Rd.		1996	Crushed tank	New tank installed
7557 E. Appalachian Trail	68-010-053	1997	Greywater discharge	Reconnect to septic system
7020 Sterling Rd.	68-037-050	1997	Pipe to creek	Removed pipe to creek
1277 Cottage Dr.	68-010-051	1997	Malfunction to surface	Installed new sand mound
7036 Linglestown Rd.	68-018-058	1997	Malfunction to surface	Installed new sand mound
225 N. Clover Ln.		1998	Malfunction to surface	Pump as needed
1338 Piketown Rd.	68-008-041	1998	Malfunction to surface	Installed new sand mound
7141 Sterling Rd.	68-037-086	1998	Malfunction to surface	Installed new sand mound
8068 Fox Mill Rd.	68-020-017	1998	Malfunction to surface	Connected to sewer
7008 Birchwood Rd.	68-002-006	1998	Discharge to surface	New inground bed installed
86 S. Hershey Rd.	68-035-034	1999	Clogged system	New inground trenches installed
7624 Jonestown Rd.		1999	Malfunction to surface	Connected to sewer
505 S. Oak Grove Rd.	68-037-009	1999	Malfunction to surface	Installed new sand mound
681 Knight Rd.		1999	Collapsed pipe to building	Replaced line
1620 Mountain Rd.	68-002-058	2000	Roots in pipe	Replaced pipe
7768 Green Hill Rd.	68-030-190	2000	Clogged sand mound	Replaced all clogged components
1240 Piketown Rd.	68-035-010	2000	Discharge to surface	Installed new sand mound
7540 Linglestown Rd.	68-019-016	2000	Holding tank	Placed on pumping schedule
7059 Linglestown Rd.	68-022-002	2000	Crushed pipe to building	Replaced pipe
7210 Linglestown Rd.	68-018-064	2000	Malfunction to surface	Installed new sand mound
7344 Moyer Rd.	68-017-023	2001	Malfunctioning tank	New tank installed
1332 Piketown Rd.		2001	Malfunction to surface	New system installed at grade
1295 Piketown Rd.	68-010-027	2001	System too small for addition	Installed new sand mound
7920 Appleby Rd.	68-005-025	2001	Crushed pipe to building	Replaced Pipe
7048 Pine Rd.	68-002-041	2001	Septic location moved	
940 Piketown Rd.	68-014-086	2001	No septic system	Holding tank installed
628 Walnut Ave.		2001	Substandard system for addition	Installed new sand mound
237 Piketown Rd.	68-022-063	2001	Greywater discharge	New tanks installed
1156 Piketown Rd.	68-014-004	2002	Discharge to surface	Illegal system (still pending)
119 N. Hershey Rd.	68-024-102	2002	Malfunction to surface	Installed new sand mound
7653 Moyer Rd.	68-019-009	2002	Septic system too small	Installed new sand mound
7953 Moyer Rd.	68-015-045	2002	Relocated dosing tank	
7171 Allentown Blvd.		2003	Blocked lines	Replaced lines
323 Short St.	68-030-159	2004	Unsuitable soil	None
887 Shawnee Dr.	68-017-008	2004	Clogged distribution box and line	Installed new distribution box
871 Shawnee Dr.	68-017-011	2004	Backup into home	Soil testing pending
466 Douglas Rd.	68-036-011	2004	Malfunction to surface	New system installed at grade
830 Piketown Rd.	68-016-032	2004	Malfunction to surface	Installed new sand mound
7916 Green Hill Rd.	68-030-030	2004	Malfunction to surface	Installed new sand mound
7233 Sleepy Hollow Rd.	68-007-060	2004	Malfunction to surface	New system installed at grade
7400 Wells Drive	68-023-036	2004	Malfunction to surface	Connected to public sewer
7405 Wells Drive		2004	Holding tank	Connected to public sewer
7413 Wells Drive	68-023-032	2004	Malfunction to surface	Connected to public sewer
7429 Wells Drive	68-023-028	2004	Malfunction to surface	Connected to public sewer
7420 Slate Ridge Rd.	68-023-027	2004	Discharge to surface	Connected to public sewer
7400 Slate Ridge Rd.	68-023-023	2004	Discharge to surface	Connected to public sewer
7348 Manor Dr.	68-023-020	2004	Malfunction to surface	Connected to public sewer
7421 Slate Ridge Rd.	68-023-015	2004	Malfunction to surface	Connected to public sewer



### 3.3.2 Sanitary Survey

As part of the planning work for this Act 537 Plan Update, sanitary surveys were conducted throughout West Hanover Township. The Act 537 Sewage Disposal Needs Identification Guidance (SDNIG) document published by the PA DEP in March of 1996 was utilized as the basis for performing the Sanitary Surveys. Herbert, Rowland & Grubic, Inc. (HRG) conducted the sanitary surveys.

#### A. *Public Health Needs*

The PA DEP has designated “public health needs” as a general needs category relating to sewage disposal that must be considered. The definitions and requirements stated in this section are taken from the PA DEP’s SDNIG document. Public health needs are considered to be those health hazards and water pollution problems that involve discharging untreated or inadequately treated sewage to the surface of the ground or waters of the Commonwealth, including groundwater. Most commonly, these needs are found to be malfunctioning on-lot disposal systems (OLDS) and malfunctioning community on-lot disposal systems (COLDS). On-lot disposal system malfunctions are classified into three categories: confirmed, suspected, and potential. When determining the public health needs of an area using OLDS/COLDS, all systems inventoried, mapped, and analyzed must be placed into one of four categories:

1. Confirmed Malfunctions are malfunctions documented by dye testing, laboratory test results, observation by a Sewage Enforcement Officer (SEO) or a professional with experience in OLDS. “Best Technical Guidance” repair permits, and seasonally wet absorption areas. Also included are piped discharges from a single structure with direct evidence of sewage (i.e. direct observation of soap suds, food residue, solids, odors, etc.), reported system backups, malfunctions with photographic documentation, or other similar evidence.
2. Suspected Malfunctions are systems exhibiting some malfunction characteristics such as abnormally green grass in the vicinity of an absorption area, piped discharges from a dwelling without direct evidence of sewage (i.e. no observation of soap suds, food residue, solids, odors, etc.), absorption areas located in known unsuitable soils (observed wetlands, rock outcropping, etc.), cesspools in high-density development areas, and pit privies.
3. Potential Malfunctions are systems that appear to be operating satisfactorily but were constructed prior to system permitting requirements, systems located in areas extremely unlikely to receive permitting by current standards, systems constructed in areas having soils mapped as unsuitable or with severe limitations for OLDS and systems located on exceptionally steep slopes greater than 25 percent. Included as potential malfunctions are permits issued for OLDS repairs that meet Chapter 73 standards. While this needs category does not represent “stand alone” existing needs, the information may be utilized in a needs analysis to locate areas affected by poorly defined adverse circumstances. For example, clusters of legitimate repairs will often indicate areas requiring closer scrutiny.
4. No Malfunction are those systems that appear to be operating satisfactorily, were constructed since the implementation of system permitting requirements, and appear to have been constructed in accordance with the permitting requirements in effect at the time of construction. For the purpose of needs identification, OLDS permitting under Act 537 became effective on May 15, 1972.

Several other situations exist that must be inventoried, mapped, and analyzed when identifying public health needs for an Act 537 Official Plan or Plan Update Revision. These include wildcat sewers, borehole disposal, holding tanks, public complaints, and sanitation-related illnesses.

5. Wildcat Sewers are collection systems (community sewers) serving more than one equivalent dwelling unit (EDU) and discharging untreated or partially treated sewage to the surface of the ground, storm sewers, or other waters of the Commonwealth.
6. Borehole Disposal is an individual or community system that discharges to a borehole, abandoned water well, dry well, ventilation shaft, or other subterranean structure.
7. Holding Tanks are watertight receptacles designed to retain sewage for disposal at another location. All holding tanks installed as repairs are counted as "needs." Specifically excluded are holding tanks installed to serve new land development or low flow commercial facilities. While not actually discharging sewage into the environment, properly maintained holding tanks, when used in OLDS repair situations, are included in the confirmed malfunction category.
8. Public Complaints are legitimate complaints received by the PA DEP or the municipality concerning improper sewage disposal. The number, nature, and location of public complaints concerning improper sewage disposal are important, yet often overlooked indicators of sewage disposal problem areas.
9. Sanitation Related Illness is any reported illness, either resulting from or suspected to be resulting from improper sewage disposal. Records and incidents in which polluted water supplies have been suspected or confirmed as the cause of disease is documentation establishing a community's wastewater treatment needs. Confirmed or suspected vectorborne disease that may be attributed to surface ponding of sewage should also be considered.

#### **B. Sanitary Sewage Survey**

In order to determine the extent of the conditions as stated above in West Hanover Township that could endanger public health, a Tier 1 sanitary sewage survey was conducted throughout the Township. Mail surveys were sent to property owners in the Township served by OLDS as indicated by Township tax parcel mapping. For the purpose of conducting the sanitary sewage survey, the Township was divided into six quadrants as shown in Map 2 in Appendix J. There are approximately 1,270 homes in West Hanover Township served by OLDS. A total of 730 surveys were sent to random property owners (some with multiple parcels). The survey inquired about the age, type and condition of the septic and water systems on the property.

Follow-up field verifications ("door-to-door surveys") were performed for a percentage of the properties based on guidelines set forth in the SDNIG document during October and November of 2004. According to the SDNIG document, a recommended minimum number of properties with OLDS within each Sewage Management Area (SMA) should be surveyed in order to conduct a "representative", or "valid" door-to-door sanitary sewage survey of the SMA. The minimum percentage of the properties that should be surveyed varies with the total number of properties in the SMA in accordance with the requirements published in the SDNIG (Table 3-4). A Tier 1 (15%) survey was conducted for the entire West Hanover Township in order to identify sub-areas of the Township for closer scrutiny. The field inspectors made general observations of the properties and performed closer investigations of sites that demonstrated evidence of sewage malfunctions including direct observation of sewage, soapsuds, food residues, solids, or odors. Other environmental conditions including abnormally green grass, piped discharges and swampy or wet areas in the vicinity of the on-lot systems were also noted. See Table 3-5 for door-to-door results.

**Table 3-4 Minimum OLDS Requirements for Door-To-Door Sanitary Survey**

OLDS in the SMA	Minimum Percentage of OLDS to Survey
Up to 50	50%
51 to 100	35%
101 to 500	25%
501 to 1,000	20%
Greater than 1,000	15%

During the Tier 1 survey, a total of 195 properties were surveyed. Based on the Tier 1 Survey, the number and percentage of the properties in West Hanover Township that were determined to have confirmed, suspected, potential, and no malfunctions are summarized in Table 3-5. Complete results are presented in Appendix B.

**Table 3-5 Summary of Tier 1 Survey Malfunction Category\***

Survey Quadrant	OLDS Surveyed	Malfunction (% of OLDS Surveyed)							
		Confirmed		Suspected		Potential		None	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
A1	32	3	9%	7	22%	16	50%	6	19%
A2	38	5	13%	8	21%	20	53%	5	13%
B1	46	5	11%	8	17%	25	54%	8	17%
B2	29	4	14%	5	17%	14	48%	6	21%
C1	22	0	0%	5	23%	12	55%	5	23%
C2	28	2	7%	4	14%	19	68%	3	11%
<b>TOTAL</b>	<b>195</b>	<b>19</b>	<b>10%</b>	<b>37</b>	<b>19%</b>	<b>106</b>	<b>54%</b>	<b>33</b>	<b>17%</b>

\* Based on door-to-door sanitary sewage survey and soils limitations

Following the completion of the Tier 1 sanitary survey, the West Hanover Township Board of Supervisors requested that a Tier 2 survey be conducted in areas of the Township that contained an elevated number of properties with suspected and confirmed OLDS malfunctions. These study areas are shown on Map 2 and are detailed below. Mail surveys were sent to residents in the study areas followed by door-to-door field verifications based on the minimum requirements as identified in Table 3-4 during March 2005. Table 3-6 displays the results of the Tier 2 sanitary survey for the study areas. Complete results are presented in Appendix B.

#### ***Ritzie Village Area***

The Ritzie Village area includes Ritzie Village, properties along Fishing Creek Valley Road and properties along Sleepy Hollow Road and A.V. Acri Road. Ritzie Village was identified as a future needs area in the 1996 West Hanover Township Act 537 Plan. All properties surveyed in the area were residential. There are approximately 89 parcels with OLDS in the Ritzie Village Area. In order to meet the requirements shown in Table 3-4, 35% of the parcels (33 total) were surveyed during Tier 1 and Tier 2 studies.

#### ***Holiday Park Area***

The Holiday Park area includes properties along Piketown Road, Tucker Street, Shawnee Drive, Trent Street and Moyer Road. There are 46 parcels with OLDS in the Holiday Park Area. A total of 23 (50%) residential properties were included in the sanitary survey.

**Houck Manor Area**

The Houck Manor Area includes properties along Pheasant Road, Piketown Road, Linglestown Road, Chestnut Avenue, Hillside Drive and Walnut Avenue. The majority of the area is within the Township's Designated Growth Area identified in Chapter 4. There are 78 parcels with OLDS in the Houck Manor Area. A total of 28 (35%) residential properties were included in the sanitary survey.

**Short Street Area**

The Short Street Area includes five (5) properties along Short Street served by OLDS. Short Street is located in the public sewer area of the Township; however, five (5) of the homes on Short Street are not connected. Potable water is provided to homes on Short Street by the Pennsylvania American Water Company; water samples were not collected from Short Street residences. Three (60%) residential properties along Short Street were included in the sanitary survey.

**Table 3-6 Summary of Tier 2 Survey Malfunction Category\***

Study Area	OLDS Surveyed	Malfunction (% of OLDS Surveyed)							
		Confirmed		Suspected		Potential		None	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
Ritzie Village	33	2	6%	7	21%	21	64%	3	9%
Holiday Park	23	6	26%	3	13%	14	61%	0	0%
Houck Manor	28	4	14%	5	18%	17	61%	2	7%
Short Street	3	1	33%	1	33%	0	0%	1	33%
<b>TOTAL</b>	<b>87</b>	<b>13</b>	<b>15%</b>	<b>16</b>	<b>18%</b>	<b>52</b>	<b>60%</b>	<b>6</b>	<b>7%</b>

\* Based on door-to-door sanitary sewage survey and soils limitations; includes results of Township-wide Tier 1 Study.

**C. Soil Suitability for On-Lot Sewage Disposal**

The characteristics of the soils located in the Township were compiled using information presented in the USDA's Soil Survey of Dauphin County, and were used to determine the areas of the Township suitable for the use of on-lot sewage disposal systems (OLDS). Factors taken into consideration for OLDS suitability include the following:

- Depth to limiting zone (bedrock or water table).
- Percent slope.
- Hydric soils (soils with hydric components or inclusions of hydric components).

The criteria used to determine areas suitable for the use of either elevated sand mound OLDS or in-ground OLDS, are presented in Table 2-1. Using these criteria, in combination with the soil characteristics presented in the USDA's Soil Survey and Section 2.3, a determination was made regarding the suitability of areas of the Township for the use of elevated sand mound OLDS, or in-ground OLDS. (See Table 2-2 and Map 5 in Appendix J.)

**3.3.3 Well Water Survey**

Public water service is not available to a large portion of the Township, and not all properties that have access are connected. During the door-to-door sanitary sewage survey, well water samples were collected from the surveyed properties where private wells are used.

According to the guidelines for well water surveys published in the SDNIG document, well water surveys may be completed in two tiers (or steps). In tier one, a minimum of 15 percent of the wells in the study area must be sampled. For the second tier, representative sampling must be completed with percentages the same as for the Door-to-Door Survey (see Table 3-4). Each well water sample was analyzed for total coliform bacteria, fecal coliform bacteria and nitrate-nitrogen concentration.

The Sewage Disposal Needs Identification Guidance requires representative sampling, or second tier sampling in any SMA, if:

1. The total coliform bacteria contamination rate is 10 percent or greater in the first tier well water samples; and
2. The fecal coliform bacteria contamination rate is 20 percent or greater in the first tier well water samples that had total coliform bacteria contamination.

A number of homeowners participating in the sampling program indicated that they have installed some type of water treatment system on their well. Where possible, well water samples were collected from these properties prior to the treatment system. However, this was not possible for all of the samples.

A total of 192 water samples were collected during Tier 1 analysis of West Hanover Township. These samples were analyzed by Microbac Laboratories, Inc. The results of the Tier 1 water sampling are displayed in Table 3-7. A letter containing the laboratory results for each sample and general information on water quality was prepared and sent to the homeowners who participated in the well water sampling. The letter recommended that property owners with concerns regarding their water sample results should re-sample their wells; a list of PA DEP certified laboratories was provided.

**Table 3-7 Tier 1 Well Water Survey Results - Bacteria and Nitrate Contamination**

Survey Quadrant	Wells Surveyed	Total Coliform Present (% of Surveyed)		Fecal Coliform Present (% of Total Coliform)		Nitrate > 5 mg/L, but < 10 mg/L (% of Surveyed)		Nitrate > 10 mg/L MCL (% of Surveyed)	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
A1	31	20	65%	3	15%	2	6%	0	0%
A2	37	20	54%	3	15%	2	5%	0	0%
B1	46	28	61%	1	4%	6	13%	1	2%
B2	29	13	45%	1	8%	2	7%	0	0%
C1	22	13	59%	1	8%	3	14%	0	0%
C2	27	12	44%	2	17%	5	19%	0	0%
<b>TOTAL</b>	<b>192</b>	<b>106</b>	<b>55%</b>	<b>11</b>	<b>10%</b>	<b>20</b>	<b>10%</b>	<b>1</b>	<b>1%</b>

\* Water samples were not taken in the sewered areas of the Township.

\*\* Environmental Protection Agency: Safe Drinking Water Act set the limit for nitrate (as nitrogen) to 10 mg per liter.

As illustrated in Table 3-7, the results of the Tier 1 well water testing did not indicate a need to complete Tier 2 sampling throughout the entire West Hanover Township. At the request of the West Hanover Township Board of Supervisors, Tier 2 water sampling was conducted in the Ritzie Village, Holiday Park and Houck Manor Study Areas. The results of Tier 2 water sampling are displayed in Table 3-8. A letter containing the laboratory results for each sample and general information on water quality was prepared and sent to homeowners who participated in the well water sampling.

**Table 3-8 Tier 2 Well Water Survey Results - Bacteria and Nitrate Contamination**

Study Area	Wells Surveyed	Total Coliform Present (% of Surveyed)		Fecal Coliform Present (% of Total Coliform)		Nitrate > 5 mg/L, but < 10 mg/L (% of Surveyed)		Nitrate > 10 mg/L MCL (% of Surveyed)	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
Ritzie Village	32	17	53%	5	29%	2	6%	0	0%
Holiday Park	23	9	39%	1	11%	0	0%	1	4%
Houck Manor	28	16	57%	2	13%	6	21%	0	0%
<b>TOTAL</b>	<b>83</b>	<b>42</b>	<b>51%</b>	<b>8</b>	<b>19%</b>	<b>8</b>	<b>10%</b>	<b>1</b>	<b>1%</b>

\* Water samples were not taken in the sewerred areas of the Township. Includes results of Township-wide Tier 1 Study.

\*\* Environmental Protection Agency: Safe Drinking Water Act set the limit for nitrate (as nitrogen) to 10 mg per liter.

### 3.3.4 Summary and Conclusions

Tables 3-5 and 3-6 display the results of the sanitary surveys completed for West Hanover Township as part of this Act 537 Plan. The results indicate that while the soils in the area are generally unsuited for conventional subsurface systems, the majority of these systems appear to be functioning well. The Township-wide Tier 1 survey indicated a 10% confirmed malfunction rate based on field observations.

Tables 3-7 and 3-8 display the results of the water samples collected. The Tier 1 water sampling revealed a Township-wide positive total Coliform result of 55%. Fecal coliforms were present in 10% of samples that contained total coliforms. Nitrate nitrogen concentrations greater than 5 mg/L were present in 10% of the water samples with only one sample containing a concentration greater than 10 mg/L.

The observation of few confirmed malfunctions and few samples with fecal coliforms throughout the Township is most likely a result of the implementation of the Township's On-lot Management Ordinance. SEO data contained in Table 3-3 confirms that the Ordinance has resulted in the reduction of on-lot malfunctions in the Township since its adoption. A summary of each of the Study Areas follows:

**A. Ritzie Village Area**

During the sanitary sewage survey, two (2) properties, or 6 percent of the properties that were surveyed in the Ritzie Village Area, had an OLDS with a confirmed malfunction; 7 properties (21%) had an OLDS with a suspected malfunction; 21 properties (64%) had an OLDS with a potential malfunction, with 9 of those due to general soils limitations only; and 3 properties (9%) had an OLDS with no malfunction. Seventeen (17) wells, or 53 percent of the wells sampled in the Ritzie Village Area, had coliform bacteria and five (5), or 29 percent of those with total coliform, had fecal coliform bacteria. Two (2) of the wells sampled in the Ritzie Village Area, or 6 percent of the total wells sampled, contained a nitrate nitrogen concentration between 5 mg/L and 10 mg/L. None of the wells sampled in the Ritzie Village Area contained nitrate nitrogen concentrations in excess of 10 mg/L.

**B. Holiday Park Area**

During the sanitary sewage survey, six (6) properties, or 26 percent of the properties that were surveyed in the Holiday Park Area, had an OLDS with a confirmed malfunction; 3 properties (13%) had an OLDS with a suspected malfunction; 14 properties (61%) had an OLDS with a potential malfunction, with one (1) of those due to general soils limitations only. None of the properties surveyed in the Holiday Park Area had an OLDS with no malfunction. Nine (9) wells, or 39 percent of the wells sampled in the Holiday Park Area, had coliform bacteria and one (1), or 11 percent of those with total coliform, had fecal coliform bacteria. None of the wells sampled in the Holiday Park Area contained a nitrate nitrogen concentration between 5 mg/L and 10 mg/L; one (1) well, or 4 percent of the wells sampled in the Holiday Park Area contained a nitrate nitrogen concentration in excess of 10 mg/L.

**C. Houck Manor Area**

During the sanitary sewage survey, four (4) properties, or 14 percent of the properties that were surveyed in the Houck Manor Area, had an OLDS with a confirmed malfunction; 5 properties (18%) had an OLDS with a suspected malfunction; 17 properties (61%) had an OLDS with a potential malfunction, with one (1) of those due to general soils limitations only; and 2 properties (7%) had an OLDS with no malfunction. Sixteen (16) wells, or 57 percent of the wells sampled in the Houck Manor Area, had coliform bacteria and two (2), or 13 percent of those with total coliform, had fecal coliform bacteria. Six (6) of the wells sampled in the Houck Manor Area, or 21 percent of the total wells sampled, contained a nitrate nitrogen concentration between 5 mg/L and 10 mg/L. None of the wells sampled in the Houck Manor Area contained nitrate nitrogen concentrations in excess of 10 mg/L.

**D. Short Street Area**

Three of the residences on Short Street not served by public sewage were included in the sanitary sewage survey. One (1) property, or 33 percent of the properties surveyed on Short Street, had an OLDS with a confirmed malfunction; one (1) property (33%) had an OLDS with a suspected malfunction; one (1) property (33%) had an OLDS with no malfunction. No OLDS with potential malfunctions were observed in the Short Street Area.

**3.4 WASTEWATER SLUDGE AND SEPTAGE GENERATION**

Upon treatment of domestic and industrial wastewater, the entrained solids are removed and often require special consideration for ultimate disposal. Solids from wastewater are created in two forms, sewage sludge and septage. Sludge is generated at wastewater treatment facilities and is generally disposed by landfilling or land application. The remaining homes not served by public sewers generate septage. Septage is the decomposed remains of the separated solids from domestic wastewater. As this sludge ages within a septic tank or similar treatment system, partial treatment is provided. Septage is a concentrated form of sludge.

### **3.4.1 Sources of Sludge or Septage in the Planning Area**

The WHTWSA WWTP generates wastewater sludge within the planning area. Septage is generated by the on-lot systems described in Section 3.3.

### **3.4.2 Quantities of Sludge and Septage Generated**

The WHTWSA WWTP generated 138 dry tons of sludge in 2004. The Township's OLDS Management Ordinance requires pumping of on-lot systems once in a four-year period. Assuming 25 percent of all septic tanks are pumped out annually (1,000 gallons each), approximately 318,000 gallons of septage are generated in West Hanover Township.

### **3.4.3 Present Methods of Disposal**

Sludge generated by the WHTWSA WWTP is presently applied to farmland under a contract with Star Rock Farms, Inc. of Conestoga, Pennsylvania. Solids handling facilities consist of a belt filter press. The WWTP reported disposing of 147 dry tons of biosolids in 2004 through land application. Approximately 89.5 dry tons were applied in March 2004 and approximately 57.4 dry tons were applied in August 2004 at Star Rock Farms. Currently, septage removed from Township on-lot systems is not accepted at the WHTWSA WWTP.