ACT 537 OFFICIAL SEWAGE FACILITIES PLAN SPECIAL STUDY: SEWAGE NEEDS OF EXISTING RESIDENCES

WESTTOWN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

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EXECUTIVE SUMMARY

Previous Westtown Township Act 537 planning had identified all unsewered areas of the Township to be in eventual need of public sewer due primarily to relatively high levels of sewage system repair permitting activity and the results of a mail survey of on-lot sewage system conditions completed by West Chester University. As approved by DEP in 2006, the prior Westtown Township Act 537 Plan had proposed an all gravity sewer extension to residences in the eastern portion of the Township. This planning has not been implemented due to unfeasibly high costs and questionable sewage needs relative to the costs.

The current planning effort has been prepared in accordance with a Consent Order and Agreement, executed with the Pennsylvania Department of Environmental Protection (DEP), which requires that Westtown Township complete updated planning to resolve the unfeasibility of prior efforts. This planning effort is being submitted in the form of a "Special Study", consistent with DEP designations for planning which is a direct result of prior DEP approvals.

This Special Study focuses on the eastern portion of the Township previously proposed for public sewer service. Map I-1 in Chapter I illustrates this Study Area.

Existing on-lot sewage system conditions were evaluated in the Study Area to identify existing sewage needs (those which may be indicative of a current problem) and long term sewage needs (those which may present challenges to on-lot system use in the future). The following criteria and data sources, identified in coordination with DEP, were evaluated to identify these sewage needs:

1. Chester County Health Department sewage system repair and pumping records
2. Age of sewage systems
3. Soils mapping
4. Lot sizes

The table on the following page summarizes sewage needs findings and classifications, and detailed discussion for each criterion is presented in Chapter II.

Approximately 8% of the 1,019 improved parcels in the Study Area were found to exhibit conditions which may be indicative of an existing sewage need and approximately 57% have conditions which are indicative of long term sewage needs. Given the relatively limited incidence of existing sewage needs and the fact that many of these remain indeterminate with regard to on-lot sewage system repair feasibility, Westtown Township has determined that sewage planning is needed primarily to address the long term needs of existing residences.

Alternatives to meet these sewage needs are identified and discussed in Chapter IV, including public sewerage service, continued use of on-lot sewage systems, and implementation of an on-lot sewage management program.

SEWAGE NEEDS SUMMARY

Sewage Needs Identified	Criteria	No. of Parcels	% of Study Area[(1)]	Comments
Existing	Repair permit application, unresolved	17	1.7%	Current on-lot repair difficulties possible
	Repair permit application, no feasible repair	8	0.8%	Current on-lot repair difficulties known
	Pumping more than once per year	62	6.1%	May be indicative of ongoing need for repair
	Total Existing Sewage Needs	83	8.1%	Total less than sum of each criteria; some parcels meet more than 1 criterion
Long Term	Absorption area permit issued	124	12.2%	Diminished ability to install another replacement area
	Absorption Area permit issued with BTG	3	0.3%	Unlikely to accommodate another replacement area
	Pre-1972 Lots/Systems	476	46.7%	Limited significance in the absence of other needs indicators
	Small Net Lot Sizes	360	35.3%	Soil suitability incorporated via net-out of unsuitable soils
	Total Long Term Sewage Needs	579	56.8%	Total less than sum of each criteria; some parcels meet more than 1 criterion
None		357	35.0%	Includes all remaining improved parcels

(1) Percent of 1,019 improved parcels in the Study Area. There are 29 vacant parcels excluded from calculation

The alternatives selected by Westtown Township to best meet the needs of the Study Area are discussed in Chapter VII. They are:

1. Public Sewage Collection, Conveyance, Treatment, and Disposal Alternatives

   The Township has determined that no extension of public sewage facilities to existing residences served by on-lot sewage systems is appropriate at this time. Updated sewage needs data do not justify a public sewer extension, and significant costs would render any such project economically unfeasible. Properties presently approved for public sewer service will continue to be so served, with new development connections addressed as needed through the planning module process.

2. Continued Use of On-Lot Sewage Systems

   Existing lots served by on-lot sewage systems will continue to be so served, with repair or replacement by property owners as needed to abate malfunction. All available system technologies may be considered when addressing any malfunction, including small flow treatment facilities and holding tanks.

3. Sewage Management Program

   All existing on-lot systems will be subject to an on-lot sewage management program as described in Chapter IV.

These alternatives are also deemed applicable to the balance of the Township (properties served by on-lot sewage systems in Westtown which are not specifically within the defined Study Area) until such time as additional planning is completed to investigate on-lot sewage system conditions in these areas in more detail.

Township commitments necessary to implement the selected alternatives are limited to the on-lot sewage management program. These commitments are described in a draft ordinance which can be found in Appendix G and include oversight of the following program components:

1. Public education to inform residents of the need for and benefits of regular sewage system maintenance.

2. Regular sewage system inspections will be required by a qualified contractor hired by the property owner. The inspection component will have two facets: detailed initial sewage system inspections will be conducted within the first three years to identify sewage system type, functional status, and maintenance needs, and simpler routine inspections will be required every three years thereafter to maintain oversight of maintenance and operational measures.

3. Property owners will be responsible for having on-lot systems pumped at least once every three years.

It is anticipated that existing Township staff, in coordination with a qualified consultant as may be utilized by the Township, will be capable of program administration; no new institutional arrangements are needed for the selected alternatives. Estimated costs for implementation and ongoing administration of the sewage management program are presented below. Actual costs will vary in proportion to problems identified in system inspections and needed Township follow-up. Additional discussion of costs and institutional factors can be found in Chapters V and VI respectively.

Implementation (1st Year)

Preparation and dissemination of public education materials	$1,000
Completion and adoption of ordinance	$1,000
Prepare database for pumping oversight and inspection findings	$4,700
Administration of database, pumping, and inspection requirements	$80,000
Total	$86,700

Annual Costs (Years 2 and 3)

Administration of database, pumping, and initial inspection requirements	$70,000

Annual Costs (Year 4 onward)

Administration of database, pumping, and routine inspection requirements	$40,000

No capital financing will be required to implement the selected alternatives. Implementation and administration of the on-lot sewage management program will be financed by the Township's general fund, with collection of an annual fee from applicable property owners as a back-up measure if deemed necessary by the Township.

Major milestones for implementation of this Act 537 Special Study are provided in the schedule below.

Implementation Schedule

Complete Draft Plan	August 2012
Public Agency Reviews	August – September 2012
30 Day Public Comment Period (Comments must be in writing)	August – September 2012
Board Adopts Plan and submits to DEP	September 2012
DEP Approves Act 537 Plan (10 day completeness + 120 day technical reviews)	February 2013
Board Adopts On-Lot Management Ordinance* (Six months after DEP approval)	August 2013
Complete updated planning for all existing residences (Five to ten years after DEP approval)	2018 - 2023

*Copy to be submitted to DEP upon adoption.

CHAPTER I

BACKGROUND

The current Act 537 planning effort was initiated due concerns with previous Township planning. The previous planning, the resultant Township implementation efforts, and the current Township efforts are discussed below.

A. Previous Act 537 Planning

Westtown Township adopted a Township-wide Act 537 Base Plan in 2002 and an Act 537 Plan Addendum in 2005 which were collectively approved by the Pennsylvania Department of Environmental Protection (DEP) in 2006. Discussion of each planning document follows.

1. Act 537 Sewage Facilities Base Plan, 2002

   The 2002 Base Plan focused on evaluating the sewage needs of existing properties served by on-lot sewage systems throughout the Township. This document relied primarily upon issuance of on-lot sewage system repair permits to determine public sewage needs of existing properties; 354 such permits were issued in Westtown Township by the Chester County Health Department between 1982 and September 1999. Parcels subject to this permitting activity were generally dispersed throughout the unsewered areas of the Township. These data were supplemented by the Regional Sewage Study prepared by the West Chester Regional Planning Commission, dated fall 2000. This study noted a high incidence of on-lot failure and repair in the region, and stated "Westtown Township has had significantly more on-lot systems replaced or repaired when compared to the other townships in the study area."

   Based upon the data noted above, the Township evaluated alternatives to extend public sewerage facilities to all unsewered portions of the Township. The selected alternative was use of a grinder pump and/or gravity collection and conveyance system to connect residences to public sewerage facilities. Westtown-Chester Creek Wastewater Treatment Plant service was proposed for those properties in the eastern portion of the Township, and West Goshen Wastewater Treatment Plant was proposed for applicable properties in the western portion of the Township.

   The timing and type of any specific sewer extension were deferred to follow-up Act 537 Special Studies, which would incorporate the findings of additional investigations to refine sewage needs determinations for each neighborhood or area. The additional investigations proposed were twofold: a Township-wide inventory of on-lot sewage system conditions would be completed via a mail survey, and an on-lot sewage management program would be implemented with a certification component which would further detail lot-by-lot sewage system status.

The Base Plan was adopted by the Township and submitted to DEP in 2002. DEP indicated concerns with the lack of specificity, i.e. no actionable conclusions with regard to construction of public sewer extensions to serve existing residences. The Township prepared an Act 537 Plan Addendum in response to these concerns.

2. Act 537 Plan Addendum, 2005

The Act 537 Plan Addendum dated 2005 incorporated the results of a Township-wide on-lot sewage system survey conducted by West Chester University's Center for Social and Economic Research to better establish the public sewage needs of existing residences served by on-lot sewage systems. This mail survey asked a series of questions regarding size of property, age of the home, the type of on-lot system on the property, and the occurrence of symptoms indicating on-lot system problems. The information requested in this mail survey was based upon the sample form provided in DEP's Sewage Disposal Needs Identification guidance, dated march 1996. A follow up interview of 100 respondents geographically dispersed throughout the Township was also conducted to verify information provided in the original survey.

The survey results indicated symptoms of on-lot system problems throughout the Township, with a concentration in older communities where smaller lot sizes are common. In consideration of the survey results, the Township concluded that all unsewered areas of the Township were in eventual need of public sewer. Specific sewer extensions were only proposed for the eastern portion of the Township, indicated as the Westtown-Chester Creek Study Area in the 2002 Base Plan, based upon a generally higher incidence of survey findings suggesting on-lot system problems in this area.

A gravity sewer extension utilizing 13 pump stations was the option selected to serve approximately 900 existing residences in the eastern portion of the Township via an expanded Westtown-Chester Creek Wastewater Treatment Plant, with additional planning proposed to identify sewerage service for the balance of residences with on-lot systems. An on-lot sewage management program was selected to address the sewage needs of all residences which would not be sewered in the near future.

DEP granted approval in 2006 for both the 2002 Base Plan and the 2005 Plan Addendum; this approval memorialized the gravity sewer extensions in the eastern portion of the Township, need for additional planning elsewhere, and implementation of an on-lot sewage management program for all residences not proposed for public sewer connection in the near future. A copy of this DEP approval letter can be found in Appendix A.

B. Previous Implementation Efforts

Subsequent to the 2006 DEP approval, Westtown Township initiated design efforts for the gravity sewer extensions. Additional detailed information required as part of final engineering design efforts, coupled with construction cost escalation, resulted in a 2007

total project cost per household of approximately $63,000 for service to all residences in the Westtown-Chester Creek Study Area via gravity sewer.

In 2007 the Township attempted to mitigate this financial burden to residents by pursuing a modified sewer extension project which would reduce costs by lessening the depth of gravity sewers and connecting some homes by individual grinder pump units. The total project cost per household for this modified project approach would have been approximately $53,000.

The high costs for a gravity (or mostly gravity) sewer extension were deemed infeasible by the Township; residents could not afford the mandatory connection costs. Many residents also questioned the fundamental need for public sewage, anecdotally reporting a lower incidence of on-lot sewage system problems than suggested by the West Chester University survey data. During the mid-2000's public water service was also extended to large portions of the area which had been proposed for public sewer in the 2006 approved planning, thus improving conditions for any needed on-lot sewage system repair.

C. Current Planning

The Township considered various Act 537 planning options subsequent to 2007 to address the infeasible costs and questioned need for public sewer extensions, but the 2006 approved Act 537 planning remained in effect and unimplemented in this period. The Township entered into a Consent Order and Agreement (CO&A) with DEP in 2011 which required new planning to address this condition.

Consistent with the mandates of the CO&A, Westtown Township has prepared the current Act 537 planning. The current planning effort has been prepared as an Act 537 Special Study, consistent with DEP designations for planning which is a direct result of prior DEP approvals. This Special Study focuses on the eastern portion of the Township which was proposed for public sewer connection in the 2005 Act 537 Plan Addendum. Map I-1 illustrates this Study Area.

It should be noted that there was significant public participation in this effort. This participation included contributions from a residents group known as the Concerned Citizens for Westtown Sewers. Among these contributions were regular meeting attendance, participation in sewage needs and alternatives analyses discussions, and public outreach as demonstrated by completion of a socioeconomic survey which can be found in Appendix M. Significant additional public comment was collected by the Township via a public notice and submission of a petition by residents. Public comments and the petition can be found in Appendices L and N respectively.

This Special Study accordingly not only reflects the outcome of coordination between the Township and its residents but includes additional data obtained from the Chester County Health Department. Those new data from the Chester County Health Department did not support the conclusions of the previous sewage needs survey conducted by West Chester University's Center for Social and Economic Research or the inference from the 2000

Regional Sewage Study prepared by the West Chester Regional Planning Commission that a high incidence of on-lot sewage system repairs correlates to a need for public sewage.

The new and updated data regarding on-lot sewage system conditions were analyzed, economic constraints carefully considered, and selected alternatives identified which best meet the needs of Westtown residents in a technically, environmentally, and administratively sound fashion. The following chapters detail these analyses and conclusions.

MAP I-1

STUDY AREA

CHAPTER II

SEWAGE NEEDS ANALYSIS

Prior Westtown Township planning had evaluated on-lot sewage system conditions in the Study Area predicated primarily upon the results of a mail survey. In an effort to consider additional factors, and in coordination with DEP, additional physical features and on-lot sewage system data have been identified as sewage needs criteria for the purposes of the current planning effort. The term "sewage needs" is used herein as an identifier for areas where conditions may warrant some area-wide action by the Township.

The following sewage needs criteria have been evaluated:

- Chester County Health Department records – the Chester County Health Department (CCHD) issues permits for all on-lot sewage systems and investigates reports of sewage system malfunctions. Detailed lot specific data regarding incidence of any malfunction and on-lot repair feasibility can be identified via CCHD records.

- Age of sewage systems – DEP policies identify areas constructed prior to initiation of current standards for on-lot sewage system as potential sewage needs areas.

- Soils mapping – data which categorizes soils with regard to on-lot sewage system suitability can help identify the likelihood of current or future problems.

- Lot sizes – the size of lots can help identify where sufficient area may exist to install replacement on-lot sewage system absorption areas if needed.

Discussion of these criteria as applicable to the Study Area follows.

A. Chester County Health Department Records

The Chester County Health Department (CCHD) is charged with all individual on-lot permitting in Westtown Township. When a sewage system malfunctions and needs to be repaired, the CCHD Sewage Enforcement Officer (SEO) for Westtown oversees all site evaluations and reviews proposed designs to repair or replace the failing system. Records for all repair permitting since approximately 1999 are maintained by CCHD, evaluation of which can serve as valuable tool in assessing on-lot sewage system conditions.

The available CCHD records indicate a total of 187 lots in the Study Area which have been subject to either repair permit issuance or repair permit application (without subsequent permit issuance). In many cases, the CCHD records also indicate the reason a repair was needed – either system malfunction or an unsatisfactory certification. An unsatisfactory certification may be the result of a regulatory malfunction, but is often a consequence of a property sale without system failure. In these cases, a private firm is hired to make a determination on the condition of the existing sewage system solely for the purpose of informing parties involved in the property sale. There are no statutory standards for these

private firms, and identified problems often address a range of issues that do not constitute a regulatory malfunction.

Of the 187 total repair permitting activities documented in the Study Area by available CCHD records, 77 (41%) were due to a system malfunction, 75 (40%) were due to unsatisfactory certifications, and 35 (19%) had no repair reason specified. Although this planning effort focuses on evaluation of specific site conditions as indicated by CCHD permitting records, it should be noted that total permitting activity may not accurately reflect historic rates of actual system malfunction - a minority of property owners indicated this condition when pursuing a permit. A large percentage of repair permitting activity may be instead related to property transfers.

In addition to sewage system repair permitting records, the CCHD maintains a septage management database which tracks on-lot sewage system pumping activity throughout Chester County. All sewage pumpers/haulers are required to be licensed by CCHD, and each must enter a record of all sewage pumping activities into the County database as a requirement of this licensing. While this database is primarily intended as a sewage management program tool, records may also be used to identify properties of concern for Act 537 planning purposes where unusually frequent pumping activities are documented.

CCHD records for both sewage system repair permitting activities and on-lot sewage system pumping were analyzed to identify associated potential sewage needs. Map II-1 illustrates resulting categorizations, which are discussed below. Detailed tables representing all CCHD data collected can be found in Appendix C.

1. Absorption Area Repair Permits Issued

   This category comprises all permits issued to repair sewage system absorption areas which did not necessitate any compromises to applicable DEP regulations. A total of 124 of these repairs are documented by the available CCHD records, comprising both conventional and alternate absorption area technologies.

   Conventional on-lot sewage system technologies are described by Title 25, Chapter 73 of the Pennsylvania Code. Chapter 73 also provides for “alternate” on-lot system technologies, which represent technologies that have been reviewed and approved by DEP but have not been fully detailed in Chapter 73 at this time pending completion of an update to DEP regulations. As noted in Chapter 73, Section 73.3(c), “The alternate sewage system permit will provide a method for utilizing proven technologies within this Commonwealth without constant changes to this chapter”. The DEP document entitled Alternate Systems Guidance serves to define detailed standards for alternate systems until such time as Chapter 73 is updated and these technologies are fully incorporated therein.

   Since alternate systems represent proven technology as provided for by Chapter 73, all absorption area repair permits which CCHD data indicates to be in compliance with conventional or alternate technology standards have been included in the same category.

The majority of these repairs consist of standard in-ground beds or trenches, subsurface sand filter beds or trenches, elevated sand mounds, drip irrigation disposal, and use of infiltrator chambers.

In the absence of other sewage needs indicators, a prevalence of absorption area repairs satisfactorily completed in accordance with applicable DEP standards suggests generally favorable existing conditions for on-lot disposal. Potential long term sewage needs may be of concern, however, since there may be a diminished ability to find a suitable site for another repair absorption area on a lot if needed in the future.

2. Absorption Area Repair Permits Issued Using Best Technical Guidance

As allowed by DEP regulations, a sewage system repair permit may be issued despite noncompliance with certain siting requirements. Specifically, minimum isolation distances between the sewage system components and features such as property lines, buildings, driveways, or water supplies may be violated to the minimum extent necessary to abate a malfunction. When a repair permit is issued which includes consideration of this "best technical guidance", specific indication of same is required in the permitting documentation.

This category includes all lots where CCHD records indicate use of best technical guidance, or BTG, in order to permit installation of a new absorption area to repair an existing sewage system. Only 3 repairs are documented in this category, as described in Table II-1 below.

TABLE II-1
BTG ABSORPTION AREA REPAIR PERMITS

Permit No.	Parcel No.	Address	Final Approval Date	Repair Reason	Absorption Area Design	Minimum Isolation Distance Reductions
Z047580	67-2Q-15	901 Robin Dr.	10/29/2010	Malfunction	Drip Irrigation	Absorption area to property line
Z65430	67-3-125.13	1510 Woodland Rd	8/20/2009	Unspecified	Standard Trench	Absorption area to property line, water supply line, and steep (>25%) slopes
Z047665	67-5D-1	1024 Robin Dr.	1/16/2009	Unsatisfactory Certification	At-Grade Bed	Absorption area to road right-of-way.

As discussed in the DEP document entitled Technical Decision Making and the use of Conventional Technology, Alternate Technology, Experimental Technology, and Best Technical Guidance (BTG) in Onlot Sewage System Repair Situations (Document No. 362-2208-003), minimum isolation distances may be classified as "critical" and "non-critical" when applying BTG to correct sewage system malfunctions. Critical isolation

distances are defined as (1) minimum isolation distance to a water supply, (2) minimum vertical isolation distance to a limiting zone, and (3) downsizing absorption system areas below that already provided for in Section 73.16(c), the Alternate System Guidance, or Experimental System Guidance. All other criteria, when considered individually, are considered non-critical criteria. Non-critical criteria include minimum isolation distances to such things as structures, driveways, and property lines.

This distinction acknowledges that not all regulatory criteria will exert equal impact on public health and environmental protection. Only one of the noted BTG permits involve a critical criteria variance, permit no. Z65430.

New absorption area installations utilizing BTG for permitting do not suggest an existing sewage needs condition, since all applicable systems are relatively new and were otherwise installed in accordance with all DEP and CCHD regulations. However, the siting constraints inherent in these situations suggest that a long term sewage need may exist. Installation of another absorption area in the future may be impossible, since extraordinary measures were required to permit the current repair area.

3. Non-Absorption Area Repair Permits Issued

Repair permits issued for septic tank repair/replacement comprise the majority of the 22 total permits in this category, with limited incidence of pipe replacement noted. No inference of sewage needs is possible from this permitting activity, since system components exclusive of the absorption area can generally be installed without regard to site limitations as may constrain absorption area designs. Parcels in this category are not appropriately considered as a sewage needs indicator. It should also be noted that no holding tank permits are specified in the available CCHD data.

4. Permit Application Submitted, Repair Feasibility Unresolved

This category includes parcels for which a permit application was submitted but no permit has been issued to date. In some cases, CCHD records indicate completed soils testing but no follow-up on the part of the property owner. Soils testing for these parcels indicate either incomplete investigation (e.g. satisfactory test pit conditions but no percolation testing) or findings which do not expressly indicate a non-suitable site, such as suitable test pits with a passing percolation test. In other cases, the application paperwork was submitted with no documentation of any subsequent activity. CCHD records indicate a total of 17 lots within this category.

No clear indication of long term sewage needs can be drawn from parcels in this category; however, the fact that permit applications were submitted suggest that problems have occurred which may remain unresolved. This category has been considered as an existing sewage need since ongoing problems may exist and a final CCHD determination on acceptability of specific absorption area replacements remains outstanding.

5. Permit Application Submitted, Repair Infeasible

In extreme cases, the CCHD SEO may conduct a site investigation which reveals that no legally permissible sewage system repair can be implemented. Soil conditions, slope, or insufficient area may all influence this determination.

The 8 parcels in this condition were identified based upon CCHD field reports which document failed soils testing and/or annotation indicating a conclusion of no suitable site for absorption area repair. Table II-2 lists available data for these parcels, including incidence of frequent system pumping per the CCHD septage management database where applicable.

TABLE II-2
REPAIR PERMIT APPLICATIONS WITH NO FEASIBLE REPAIR

Application No.	Application Date	Parcel No.	Address	Repair Reason	Conditions Noted
R18357	9/15/2003	67-2-4.2J	921 Hunt Dr	Malfunction	Test pits mottled 3" & 6", no suitable site, no perc conducted
Z112511	8/8/2011	67-2-4.2M	927 Hunt Dr	Malfunction	Test pits mottled at 16" and 41", rock at 10", no suitable site, no perc conducted
T021343	4/13/2004	67-2G-5	308 Diane Dr	Malfunction	Failed elevated sand mound perc, no additional information
T018739	10/12/2004	67-2H-22	1503 Charles Rd	Malfunction	No suitable site per CCHD, no suitable alternate site per soil scientist report, small flow treatment facility permit application submitted to DEP but not approved.
Z112000	11/10/2011	67-2H-27	419 Leslie La	Unsatisfactory Certification	Test pits indicate limiting zone < 20", no suitable perc test location, system pumped 8 times from 5/12/05 through 5/31/12 per CCHD database
Z64673	8/6/2008	67-2H-29	1511 Grant Rd	Unsatisfactory Certification	No suitable perc site per CCHD, soil scientist report indicate suitable drip irrigation area but SEO notes say insufficient area for drip, system pumped 7 times from 12/1/05 through 1/16/12 per CCHD database
T019034	2/10/2006	67-3-144.38	1090 Edgewood Chase Dr	Unsatisfactory Certification	Eight test pits evaluated, limiting zone < 20" for all, no suitable perc site identified
R19649	11/27/2002	67-3-148	1642 E. Street Rd	Malfunction	Test pits mottled at 8", 16", & 18", no suitable perc site

6. System Pumping More Than Once Per Year

CCHD septage management database information documents sewage system pumping activity since 2005. These data indicate that most residents in Westtown have had their on-lot sewage systems pumped at least once during this period, with some instances of relatively frequent pumping activity as may be an indicator of on-lot sewage system problems. For the purpose of this planning effort, only parcels with sewage systems that have been pumped more frequently than once per year on average have been considered as a possible sewage needs indicator. Less frequent pumping activities are assumed to primarily be a function of routine system maintenance.

Parcels in this condition were further evaluated in concert with absorption area repair permitting records. Several properties required numerous sewage system pumpings in the period spanning available CCHD data (2005 through June 2012), but pumping frequencies diminished markedly subsequent to installation of a new sewage system absorption area. Table II-3 summarizes applicable parcels, and Map II-1 does not illustrate these within the frequent pumping category. In these cases, no inference of existing sewage needs is applicable due to pumping frequency – the underlying condition was corrected. A resulting total of 62 parcels are noted within this frequent pumping category.

TABLE II-3
FREQUENT PUMPING CORRECTED BY COMPLETED REPAIRS

Permit No.	Final Approval Date	Parcel No.	Address	Repair Reason	Permitted Repair	Comments
Z015429	6/15/2006	67-2G-23	307 Diane Dr	Not specified	Septic Tank Only	CCHD database shows > 1 pump/year on average, but only 1 pump since tank installation completed 6/15/06
Z057223	3/25/2009	67-2M-1	412 Diane Dr	Malfunction	Standard Bed	Pumped 9 times from 0/6/05 - 2/6/09 per CCHD database, no pumping after new absorption area installation completed 3/25/09
Z106819	11/4/2010	67-2N-32	915 Hummingbird La	Malfunction	Standard Bed	Pumped 17 times from 6/6/05 - 10/19/10 per CCHD database, no pumping after new absorption area installation completed 11/4/10
Z047580	10/29/2010	67-2Q-15	901 Robin Dr	Malfunction	Drip Irrigation	Pumped 16 times 6/7/05 - 1/18/10 per CCHD database, no pumping after new absorption area installation completed 10/29/10
Z057241	11/10/2008	67-2Q-19	917 Shady Grove Way	Malfunction	Standard Bed	Pumped 7 times 8/25/05 - 1/30/12 per CCHD database, only 2 pumpings since new absorption area installation completed 11/10/08
Z086963	7/8/2010	67-2R-30	1103 Cardinal Dr	Malfunction	Standard Trench	Pumped 16 times 5/5/05 - 5/17/10 per CCHD database, no pumping after new absorption area installation completed 7/8/10
Z062522	12/22/2009	67-3-45	119 Hilltop Dr	Unsatisfactory Certification	Standard Bed	Pumped 13 times 2/9/06 - 4/3/12 per CCHD database, only 1 pumping after new absorption area installation completed 12/22/09
Z105857	8/5/2011	67-3-85	1005 Martone Dr	Malfunction	Standard Trench	Pumped 13 times 10/8/05 - 7/18/11 per CCHD database, no pumping after new absorption area installation completed 8/5/11
Z027750	7/2/2008	67-5A-46	1009 Carolyn Dr	Malfunction	Infiltrator System	Pumped 8 times 6/14/06 - 3/12/12 per CCHD database, only 2 pumpings after new absorption area installation completed 7/2/08

MAP II-1

CCHD RECORDS

B. Soils

Soils lying above the water table have a natural ability to attenuate pollutants. The effectiveness of a soil in attenuating pollutants depends on its composition, thickness, and degree of saturation with water. There are five separate processes operating in soils that can help to remove contaminants. The sixth, evaporation, can increase the concentration of contaminants. The six processes are:

1. Filtration processes depend on the soil acting as a physical filter to trap suspended solids.

2. Sorption and adsorption processes involve soil particles physically and chemically capturing dissolved or suspended compounds.

3. Oxidation and reduction of contaminants can render them chemically inert or may hasten their precipitation out of solution.

4. Biological assimilation processes involve the uptake of contaminants by plant material.

5. Dilution and volatilization processes can decrease the concentration of contaminants in soils to acceptable levels.

6. Evaporation processes can increase the concentration of contaminants.

The processes can be very effective in attenuating pollutants under the right conditions. Proper operation of on-site sewage disposal systems depends on these processes to treat wastewater effectively; if conditions are not suitable, potential pollution problems can result. For this reason, DEP has established minimum soil criteria which must be met when applying various on-lot treatment technologies. These criteria include such things as standards for percolation testing, soil morphology evaluations, and minimum depths of suitable soils. DEP regulations provide for on-lot system technologies with a minimum depth of suitable soil beneath system aggregate or tubing installation (in the case of options such as drip irrigation disposal) ranging from 10 inches to 48 inches.

Floodplains, very wet soils, shallow soils, steep slopes, and areas with fractured rock have been determined by DEP to be more susceptible to pollution because the contaminants can potentially reach the groundwater without sufficient opportunity or time for the above processes to operate. These conditions, in turn, can contaminate surface water resources. Surface water can also be easily contaminated by system malfunctions in areas adjacent to stream corridors if untreated wastewater is not filtered and allowed to run off.

According to soil data and information produced by the National Cooperative Soil Survey, operated by the USDA Natural Resources Conservation Service (NRCS), there are thirteen major soil series in the Study Area, with significant areas of urban land.

Urban lands are those which have been disturbed due to development activity, compromising a determination of soil type and characteristics. Within each major soil series are more discrete subsets with varying characteristics due to such factors as slope, degree of erosion, and coarse fragment (rock) content. The NRCS soil data includes interpretations regarding limitations for various types of on-lot sewage system technologies permissible in Pennsylvania for each of these subsets, or soil map units.

NRCS soil interpretations were evaluated for all soil map units in the Study Area with regard to the most commonly installed on-lot system technologies in Westtown as indicated by available CCHD repair permitting records. Conventional technologies considered were in-ground trenches, elevated sand mound beds or trenches, and subsurface sand filter trenches. Subsurface trench technologies were evaluated where applicable in lieu of beds since trenches can generally be utilized anytime slope and soil conditions would allow for a bed configuration. Alternate system designs evaluated were at-grade beds, drip irrigation, and at-grade beds with peat filter. A copy of the associated NRCS soil limitations reports can be found in Appendix D.

As noted above, NRCS soil interpretation reports were designed to represent limitations for on-lot sewage disposal, as opposed to suitability. These limitations are based upon factors such as slope, seasonal high water table, and slow percolation. Numerical values ranging from 0.01 to 1.00 are assigned for each salient factor within each soil map unit, with larger values equivalent to greater potential limitations. Limitations are also more broadly summarized by categorizing each soil type as slightly limited, moderately limited, or very limited.

For the purpose of this planning effort, non-urban soils in Westtown have been classified into three on-lot disposal suitability categories based upon the NRCS interpretation of limitations: generally suitable (slightly limited), conditionally suitable (moderately limited), and generally unsuitable (very limited). Where a soil type had different NRCS limitation categories for the six system technologies evaluated, the least limiting technology was used for suitability classification. As with any broad scale assessment of soil conditions, site investigations are ultimately be required to confirm on-lot disposal suitability for any specific parcel.

Soil map units described by the NRCS data as urban land are not rated by the NRCS for specific on-lot sewage disposal system suitability. The majority of the soils in these areas have been disturbed by development activities and no determination of on-lot sewage disposal limitations is accordingly provided by the NRCS.

It should be noted that site-specific soils testing has been conducted on numerous parcels throughout the Study Area pursuant to CCHD repair permitting activities as discussed earlier in this Chapter and as illustrated on Map II-1. The repair permits that have been issued document permissible absorption area installations throughout many of the urban soils designated in the Study Area. Although this data does not provide sufficient detail to modify the NRCS soils mapping, large areas of potentially suitable soil appear to exist within the urban soils map units.

A summary of the soil suitability classification for on-lot disposal systems is as follows:

- Soils Generally Suitable for On-lot Disposal Systems

  Approximately 28 percent of the soils in the Study Area are considered to be generally suitable for on-lot disposal. The Glenelg and Gladstone soil series predominate in this category.

- Soils Conditionally Suitable for On-lot Disposal Systems

  Approximately 3 percent of the soils in the Study Area are considered to be conditionally suitable for on-lot disposal. As above, the Glenelg and Gladstone soil series predominate in this category.

- Soils Generally Unsuitable for On-lot Disposal Systems

  Approximately 9 percent of the soils in the Study Area are considered to be generally unsuitable for on-lot disposal. This group includes all floodplain soils, soils with a shallow or seasonal high water table, and soils indicative of steep (greater than 25%) slopes.

  NRCS soil interpretations reports analyzed for the current planning effort state that the Califon soil series is very limited, or generally unsuitable, for all sewage system types considered. Some discrepancy in the NRCS data is nonetheless noted; the more detailed NRCS soil series description indicates Califon soils to be moderately well drained (i.e. water or redoximorphic features deeper than 20" below the ground surface) and have slopes less than 8%. These conditions would more accurately describe a conditionally suitable soil. To preserve consistency with the specific NRCS reports for individual system types, the generally unsuitable designation has been retained for the purposes of this planning effort.

- Not Rated

  These soils encompass urban lands for which suitability cannot be accurately projected due to development disturbance. Approximately 59 percent of the Study Area is categorized as urban land.

Table II-4 presents soil series name, map unit, suitability classification, acreage, and percent of Study Area for all soils mapped by the NRCS, and Map II-2 illustrates the distribution of these soil suitability classes. The predominance of urban soils which are not rated for on-lot disposal suitability limits any neighborhood specific determination of public sewage need, although combining this data with the soils finding documented by satisfactory CCHD absorption area repair permits (which are distributed throughout the Study Area) suggests that the majority of the Study Area comprises either generally or conditionally suitable soils.

TABLE II-4
SOIL SUITABILITY FOR ON-LOT SEWAGE DISPOSAL

Soil Series	Map Unit	Suitability	Acres	% of Study Area
Baile	Ba	Generally Unsuitable	18.64	1.32%
Califon	CaA	Generally Unsuitable*	3.53	0.25%
Califon	CaB	Generally Unsuitable*	42.11	2.98%
Codorus	Co	Generally Unsuitable	1.45	0.10%
Cokesbury	CpA	Generally Unsuitable	21.62	1.53%
Cokesbury	CpB	Generally Unsuitable	0.23	0.02%
Cokesbury	CqB	Generally Unsuitable	0.44	0.03%
Gladstone	GdA	Generally Suitable	0.95	0.07%
Gladstone	GdB	Generally Suitable	203.31	14.39%
Gladstone	GdC	Generally Suitable	144.23	10.21%
Gladstone	GdD	Conditionally Suitable	21.92	1.55%
Gladstone	GeD	Conditionally Suitable	5.21	0.37%
Gladstone	GfD	Conditionally Suitable	8.72	0.62%
Glenelg	GgB	Generally Suitable	39.75	2.81%
Glenelg	GgC	Generally Suitable	0.92	0.07%
Glenville	GlB	Conditionally Suitable	4.89	0.35%
Hatboro	Ha	Generally Unsuitable	25.64	1.81%
Manor	MaD	Conditionally Suitable	14.84	1.05%
Neshaminy	NvB	Generally Suitable	6.32	0.45%
Neshaminy	NvC	Generally Suitable	3.30	0.23%
Parker	PaC	Generally Suitable	0.02	0.00%
Parker	PaE	Generally Unsuitable	13.83	0.98%
Urban Land	UrB	Not Rated	1.66	0.12%
Urban Land	UrcB	Not Rated	12.74	0.90%
Urban Land	UrlB	Not Rated	253.38	17.93%
Urban Land	UrlD	Not Rated	83.57	5.91%
Urban Land	UrmB	Not Rated	38.56	2.73%
Urban Land	UrnB	Not Rated	4.16	0.29%
Urban Land	Uro	Not Rated	0.10	0.01%
Urban Land	UrtB	Not Rated	1.32	0.09%
Urban Land	UruB	Not Rated	55.58	3.93%
Urban Land	UugB	Not Rated	268.33	18.99%
Urban Land	UugD	Not Rated	110.13	7.79%
Water	W	Generally Unsuitable	1.57	0.11%
Totals			**1,412.98**	**100%**

* Apparent conflict with NRCS data; generally unsuitable per soil interpretation reports for on-lot disposal, but moderately well drained per soil series description, suggesting conditional suitability instead.

MAP II-2

SOIL SUITABILITY FOR ON-LOT SEWAGE DISPOSAL

C. Age of Sewage Systems

On Jan. 24, 1966, the Pennsylvania Sewage Facilities Act (Act 537, as amended) was enacted to correct existing sewage disposal problems and prevent future problems. This legislation became effective on January 1, 1968, although the specific regulations needed to implement the provisions of Act 537 were prepared subsequent to this date.

Current Pennsylvania regulations for siting and design of individual on-lot sewage systems were initially set forth in 1972, with multiple revisions since that time. Prior to 1972, little or no detailed regulations for on-lot systems existed which were founded upon Act 537 requirements.

Modern on-lot sewage systems incorporate, at a minimum, two major treatment processes to mitigate threat of groundwater pollution and support long term function: primary treatment in a treatment tank and secondary treatment in the soil underlying a drain field, or absorption area. Older on-lot sewage systems may be deficient with regard to one or both of these treatment processes. Cesspools, for example, were frequently installed to serve older homes yet incorporate no effective treatment mechanisms. A typical cesspool is a cylindrical excavation with an open bottom and walls lined with unmortared stone or concrete block. Raw sewage is discharged into the cesspool from a sewer pipe connected the building drain. Most solids accumulate in the cesspool, and the remaining liquid sewage waste is absorbed into the soil through the open bottom and porous sides of the cesspool. With no treatment tank, cesspools do not allow for setting of solids and scum or anaerobic decomposition of the sewage wastes before introduction to the soil, as would a modern sewage system. The wastewater that is absorbed by the soil is also at a much greater depth than a modern sewage system, resulting in little or no aerobic bacterial treatment before coming in contact with groundwater. Lastly, a cesspool is often excavated to depths at or near groundwater, greatly diminishing the physical treatment of wastewater as occurs when moving through an adequate depth of unsaturated soil.

Other older on-lot systems may employ a treatment tank, but rely upon cesspools or obsolete absorption area designs for disposal. Many older absorption areas consisted of excavations with perforated pipe, often set in an aggregate bed similar to modern sewage systems, but these were typically installed without regard to soil percolation rates, depth to groundwater, or presence of excessive rock which could have open voids forming a direct conduit to groundwater.

Some of these older on-lot systems may appear to function well, in that no wastewater backs up into a home or on to the ground surface. An elevated risk for groundwater contamination may nonetheless exist due to potential treatment deficiencies.

In consideration of these factors, and in accordance with DEP sewage facilities planning guidance, the age of neighborhoods in the Study Area were evaluated to identify areas which may have sewage systems which were constructed prior to establishment of Act 537 design standards by Pennsylvania in 1972. In cases where these older homes have not had more modern sewage systems installed, a predominance of obsolete sewage

system technologies may exist.

Map II-3 illustrates the age of sewage systems relative to the establishment of Act 537 defined on-lot system design standards in 1972. This representation is based upon Township records for general development ages, with modification to reflect newer absorption area installations where documented by available CCHD sewage system repair data. A greater number of older homes with newer systems exist than indicated on Map II-3, but accurate identification of these parcels is not possible given that the available CCHD data does not include system repair permits issued prior to approximately 1999.

Some neighborhoods were under construction when the design standards were instituted, and other clusters of non-development lots were constructed over a wide range of time. Such areas have a mix of pre and post 1972 home construction, and are designated as such on Map II-3. In these cases, the general age of sewage systems cannot be incorporated in sewage needs evaluations since no area-wide determination can be made.

MAP II-3
AGE OF SEWAGE SYSTEMS

D. Lot Sizes

The size of a residential lot can be a significant factor in determining long term conditions for on-lot sewage disposal. If lot sizes in an area or neighborhood are generally large enough to allow for installation of replacement on-lot systems, limited problems may be expected for long term on-lot system use. Lot sizes of at least 1 acre in size are generally accepted by DEP as a threshold in meeting this standard, assuming soils mapping does not indicate unsuitable soils and lots are served by individual water supply wells.

The 1 acre standard has been modified for this planning effort to also consider areas constructed with public water service in lieu of individual wells. In these cases, a smaller lot size was used as a threshold to identify potential sewage needs areas. Use of an individual on-lot well requires a minimum isolation distance of 100 feet between the well and any sewage system absorption area per DEP regulations; by eliminating sewage system constraints for this significant portion of a lot, a lot smaller than 1 acre served by public water may allow for similar replacement sewage system feasibility as a 1 acre lot with a well. A minimum lot size of 0.75 acre was used to identify areas without individual wells which may have lots which are too small to accommodate replacement sewage system areas.

Map II-3 illustrates areas served by public water, areas where public water is available but some wells remain, and areas served by individual wells. It should be noted that most homes in the areas indicated as public water available (West Wynn I, the Grandview Acres area, Westover Farms and the West Lynn area) have connected to public water; however, Chester County Health Department data suggests that some individual wells are still in use (specific lot-by-lot records are not available from CCHD). Lot sizes for these areas were consequently evaluated at the more conservative 1 acre threshold.

Since soils which are generally unsuitable for on-lot sewage disposal would render any area infeasible for a replacement sewage system, all lot sizes have been further evaluated as net lot areas, exclusive of wetlands, 100 year floodplains, and any areas which NRCS soils data indicates to be generally unsuitable.

Map II-4 depicts lots of less than 1 acre net where on-lot water supplies are present (including areas where public water is available) and lots of less than 0.75 acres net where served exclusively by public water. All parcels in this condition have been categorized as a long term sewage needs indicator.

MAP II-4
WATER SUPPLIES

MAP II-5
NET LOT AREA

E. Sewage Needs Summary

As discussed in the preceding sections of this Chapter, various conditions have been identified as either existing or long-term sewage needs indicators per the criteria evaluated. Table II-5 summarizes all such data, and is followed by additional discussion of each salient category.

TABLE II-5
SEWAGE NEEDS SUMMARY

Sewage Needs Identified	Criteria	No. of Parcels	% of Study Area[(1)]	Comments
Existing	Repair permit application, unresolved	17	1.7%	Current on-lot repair difficulties possible
	Repair permit application, no feasible repair	8	0.8%	Current on-lot repair difficulties known
	Pumping more than once per year	62	6.1%	May be indicative of ongoing need for repair
	Total Existing Sewage Needs	83	8.1%	Total less than sum of each criteria; some parcels meet more than 1 criterion
Long Term	Absorption area permit issued	124	12.2%	Diminished ability to install another replacement area
	Absorption Area permit issued with BTG	3	0.3%	Unlikely to accommodate another replacement area
	Pre-1972 Lots/Systems	476	46.7%	Limited significance in the absence of other needs indicators
	Small Net Lot Sizes	360	35.3%	Soil suitability incorporated via net-out of unsuitable soils
	Total Long Term Sewage Needs	579	56.8%	Total less than sum of each criteria; some parcels meet more than 1 criterion
None		357	35.0%	Includes all remaining improved parcels

(1) Percent of 1,019 improved parcels in the Study Area. There are 29 vacant parcels excluded from calculation

Existing Sewage Needs

This classification represents those criteria which indicate either existing on-lot system malfunctions which cannot be repaired, or known conditions which suggest a repair may be warranted. A total of 83 lots exhibit one or more of the identified existing needs criteria, collectively comprising approximately 8.1% of the 1,019 improved parcels in the Study Area.

The specific criteria, all based on CCHD records, which have been deemed indicative of an existing sewage need by Westtown Township are summarized below.

1. Sewage system repair permit application submitted, repair feasibility unresolved – as previously noted, parcels included in this category represent those which have

submitted initial permit application paperwork but no documentation is available which confirms that a repair cannot be completed. Since no design information has been submitted to CCHD in order to secure a permit, problems may remain unresolved. Additional lot-by-lot investigation would be needed to confirm current status and identify regulatory malfunctions as may presently warrant repair.

There are a total of 17 parcels in this category, generally distributed throughout the Study Area with a somewhat higher concentration in the Grandview Acres area.

2. Sewage system repair permit application submitted, repair infeasible – this category represents parcels for which a CCHD repair permit application was submitted but no permit could be issued due to unsuitable site conditions. There are a total of 8 parcels in this category, and 4 of these are concentrated in the West Wynn I area.

3. System pumping more than once per year – the frequent pumping documented for the 62 parcels in this category may be indicative of ongoing on-lot sewage system problems. Additional lot-by-lot investigations would be needed to identify any incidence of malfunction and repair feasibility.

   Frequent pumping incidence is noted throughout the Study Area, with greater concentrations in the Grandview Acres/ West Lynn area, West Wynn I, Westtown Farms, Edgewood Chase, and Tyson Drive/Hummingbird Farm areas.

Long Term Sewage Needs

Long term sewage needs are those which do not suggest current problems but may nonetheless present challenges to on-lot sewage system use in the future. Parcels included in this classification are those not addressed as an existing needs indicator and which exhibit any of the following conditions:

1. CCHD absorption area repair permit issued – the 124 parcels in this category reflect relatively recent (since approximately 1999) absorption area installations completed in accordance with CCHD and DEP requirements. Although no significant incidence of current problems is likely, the ability for these lots to accommodate yet another new absorption area in the future may be reduced due to the area already consumed by the original and replacement absorption areas.

   These repairs are generally distributed throughout the Study Area, although reduced incidence is apparent in Plum Lea Farms, Shiloh Hills, Chateau Drive area, Avonlea, and Butternut Drive areas.

2. CCHD absorption area repair permit issued using BTG – Only 3 parcels are noted in this category. Despite various isolation distance compromises, these system are all relatively new (the oldest was installed in 2009) and may be expected to be functioning satisfactorily at this time. Installation of another absorption area in the

future may be impossible, however, since extraordinary measures were required to permit the current repair area.

Two of these repairs were conducted in the Pennwood South area, with the remaining permit issued for a parcel in the Westover Farms neighborhood.

3. Pre – 1972 sewage systems – in the absence of other needs indicators, a prevalence of older homes and sewage systems does not warrant consideration as an existing sewage need; however, a greater need for future sewage system repairs may be expected as older sewage systems need to be replaced.

   The available data indicates likelihood for older sewage system technologies in the following neighborhoods or areas: Tyson Drive, Hummingbird Lane, Carolyn Drive, Hunt Drive, West Wynn I, Westtown Farms, Pennwood, Grandview Acres, West Lynn, Westover Farms, and Butternut Lane.

4. Lot sizes – where lots may be too small and/or have inadequate area of suitable soil to allow for a replacement absorption area, long term planning is warranted to mitigate any incidence of malfunction. As previously noted, soil suitability considerations are also incorporated within this category via calculation of net lot areas exclusive of generally unsuitable soils.

   A high incidence of small net lot sizes is noted in the Tyson Drive area, West Wynn I, Westtown Farms, Grandview Acres, Westover Farms, and the West Lynn area.

Sewage Needs Conclusions and Planning Needed

As indicated on Map II-6, existing sewage needs indicators are generally dispersed throughout the Study Area and limited in number. Long term sewage needs comprise the majority of identified concerns, and are generally distinguished by areas with small net lot sizes and/or older residences.

DEP Act 537 planning regulations generally require identification of five and ten year sewage needs areas, i.e. those areas which may be in need of improved sewage facilities within the applicable time period. Given the limited incidence of existing sewage needs identified, Westtown Township has determined that no five year needs designation is appropriate for the Study Area. Sewage planning is needed primarily to address the long term needs of existing residences, and the Township has accordingly classified the entirety of the Study Area as a ten year needs area.

Alternatives to address the identified sewage needs are discussed in Chapter IV.

MAP II-6

SEWAGE NEEDS SUMMARY

CHAPTER III

EXISTING SEWAGE FACILITIES

Existing sewage facilities in the planning area, generally encompassing the eastern portion of the Township, consist of the Westtown-Chester Creek public sewerage system, the Westtown School sewerage system, and on-lot disposal systems.

A. Public Sewerage Facilities

The Westtown-Chester Creek WWTP was originally constructed by a private entity as part of a residential development project in the 1970's. Westtown Township acquired the WWTP in 1997 with a permitted annual average flow of 290,000 gallons per day (gpd). The wastewater treatment facility was upgraded to a permitted capacity of 495,000 gpd in 2002 and is presently operating under NPDES permit No. PA0031771. It is an extended aeration activated sludge plant that has flow equalization and effluent filtration. Discharge is to the east branch of Chester Creek.

Figure III-1 illustrates a schematic of the major treatment units of the WWTP, and the description below identifies the major components of the design:

1. Influent Screen

   A self-cleaning mechanical fine screen removes debris from the wastewater. Manual slide gates are used to control the flow to the screen channel or bypass channel. Design information for the mechanical screen:

   Bar spacing = 1/4"
   Flow Capacity = 2.97 MGD

2. Influent Grit Removal

   From the screen room the flow travels to aerated grit chambers. These are rectangular concrete tanks with coarse bubble air diffusers in them. Grit is removed by a vacuum truck.

   Nominal capacity = 6,000 gallons (3,000 gallons each)
   Maximum air flow rate = 160 SCFM

3. Influent Lift Station

   The screened and grit-free influent flows into a lift station. The station has a duplex system of submersible pumps. The pumps deliver the wastewater to the equalization tank. Each pump is sized to accommodate the peak influent flow. Lift station design information:

Pump flow rate	=	1,875 gpm
TDH	=	32.5 ft.
Forcemain diameter	=	16 in.
Forcemain velocity	=	2.8 ft/s

4. Equalization Tank (EQ tank)

   The EQ tank was designed to dampen the flow rate variations. A submersible pump conveys the wastewater to the aeration basins for secondary treatment. EQ tank design information:

Available volume	=	352,150 gal
Detention time	=	17 hours
Air flow rate	=	440 SCFM
Water depth	=	16′
Freeboard	=	2′

5. Flow Splitter

   Wastewater from the EQ tank is divided by the flow splitter with adjustable weirs to deliver a constant flow rate to each train of aeration basins. Overflow from the flow splitter is returned to the EQ tank.

6. Aeration Basins

   The wastewater receives biological treatment by the extended aeration activated sludge process in the dual train aeration basins. Each train consists of two equally sized compartments, in series. Air is supplied to the basins through submerged, flexible membrane diffusers. Aeration basin design information:

Total volume (2 trains)	=	511,800 gallons
Total detention time	=	24.8 hours
Air supply	=	1,955 SCFM (mixing limited)
Sidewater depth	=	16'
Freeboard	=	24"
Return sludge capacity	=	100%

7. Secondary Clarifiers

   Wastewater from the aeration basins enters one of two center-fed, circular clarifiers. Solids at the bottom of the clarifier are plowed to the center hopper where they are withdrawn and returned to the aeration basins or wasted to the sludge basin. The clarified effluent overflows to a weir along the perimeter of the tank and flows by gravity to the disk filter. Clarifier design information:

Clarifier diameter	=	34 ft. each
Sludge return rate	=	100%
Volume	=	91,680 gallons each
Hydraulic detention time	=	8.9 hr (@495,000 gpd)
Side water depth	=	15 ft
Freeboard	=	3 ft

8. Sludge Basin

Wasted sludge is held in the sludge basin for removal by a sludge hauler. Air supply is introduced to the sludge basin to keep it odor free and to initiate digestion of volatile solids. The supernatant is removed from the sludge basin.

Volume	=	352,150 gallons
Water depth	=	16 ft
Freeboard	=	2 ft

9. Effluent Filter

Suspended solids remaining in the clarifier effluent are removed by a cloth membrane disk filter. The filter consists of four disks, covered by the cloth membrane, and mounted vertically in a steel tank. The disk filter has a hydraulic capacity of 1 MGD average daily flow. A separate tank holds water for high pressure backwash.

10. Disinfection

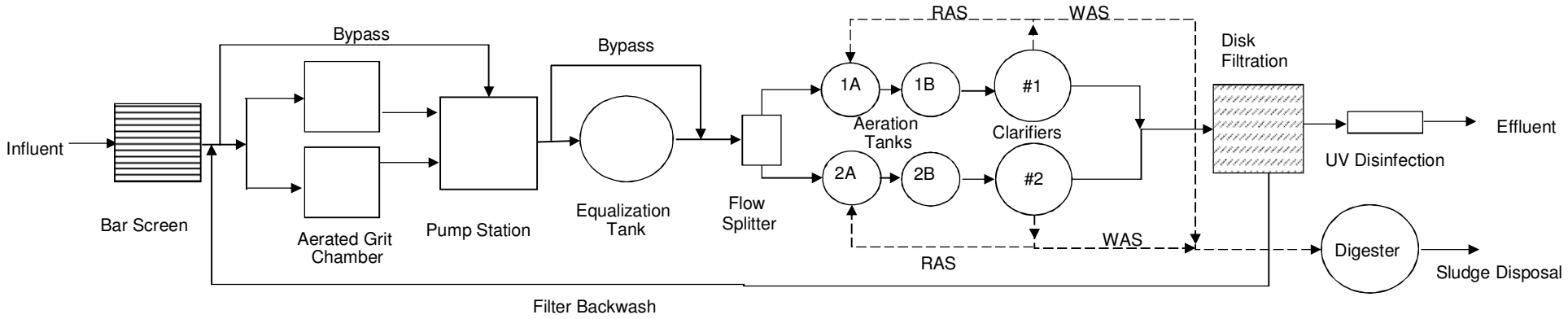
The UV disinfection system consists of multiple modules, made up of UV lamps, in a stainless steel channel. The lamps are submerged in the water and arranged parallel to the flow direction for maximum transmittance of the UV radiation to the effluent. The water depth in the UV system channel is maintained by a weir. The UV system has a hydraulic capacity of 800,000 gpd. The disinfected effluent flows by gravity to the replacement outfall and discharges to the east branch of Chester Creek.

11. Residual Management

Grit is regularly removed from the grit chambers by a vacuum truck. Scum at the surface of the secondary clarifiers is returned to the influent. The sludge is wasted to the sludge basin by airlift pumps. All wastewater residuals are hauled off-site and sent to a DEP approved disposal facility.

FIGURE III-1

WESTTOWN-CHESTER CREEK WWTP TREATMENT SCHEMATIC



The collection & conveyance system serving the Westtown-Chester Creek WWTP includes approximately 10.5 miles of gravity sewers and two municipally owned pump stations. Additional description of the collection & conveyance system can be found in the 2011 Wasteload Management Report (Chapter 94 Report) located in Appendix E.

The 2011 Wasteload Management Report indicates that the majority of the collection and conveyance system is in satisfactory condition and has adequate design capacity for existing and projected flows as identified therein. However, a projected hydraulic overload was identified for the Kirkwood pump station due to a significant wet weather event. Report projections indicate that the pump station cannot accommodate instantaneous peak flows with one pump out of service, as required by DEP.

B. Private Sewerage Facilities.

The Westtown School owns and operates a stream discharge wastewater treatment plant under NPDES permit No. PA0050652. This facility has a permitted capacity of 30,000 gallons per day and serves various school and associated residential uses with a discharge to the east branch of the Chester Creek.

DEP issued Water Quality management Permit No. 1507404 in 2007 which provided for abandonment of the Westtown School treatment facility and construction of a pump station and force main to direct wastewater flows to the Township owned Westtown-Chester Creek WWTP conveyance system. The Township is currently in discussion with the school regarding these actions.

C. On-Lot Sewage Systems

Discussion of existing on-lot sewage systems in the Study Area can be found in Chapter II.

CHAPTER IV

WASTEWATER ALTERNATIVES

As discussed in Chapter II, sewage planning alternatives are needed to address the long term needs of existing residences in the Study Area. Alternatives to address this condition are identified and discussed below.

A. Public Sewage Collection, Conveyance, Treatment, and Disposal Alternatives

1. Regional Wastewater Treatment

   The Study Area is proximate to the Westtown-Chester Creek Wastewater Treatment Plant (WCC WWTP) and excess treatment capacity exists in this Township owned facility to serve portions of the Study Area if and when needed. No consideration of regional wastewater treatment is consequently warranted for this planning effort.

2. Extension of Existing Municipal Sewage Facilities to Areas in Need

   As discussed in Chapter II, existing on-lot sewage system conditions do not appear to represent a significant existing need for extension of public sewage facilities. This alternative was nonetheless considered in the course of this planning effort to identify costs and feasibility of addressing the long term sewage needs of the Study Area via public sewage service.

   Extension of public sewer to the entirety of the Study Area was not considered within this alternative; it is neither administratively nor economically feasible for the following reasons:

   - A project of this scope would require a capacity increase at the Westtown-Chester Creek WWTP. More stringent treatment criteria for this facility as may result from ongoing Chester Creek TMDL determinations by the EPA and/or DEP could render an upgrade at this time inadequate in the near future, rendering an informed and cost effective upgrade infeasible at this time.

   - An area-wide sewer extension project would place significant burden on the Township's administrative and financial capabilities, resulting in a project which could not be reliably implemented by the Township at this time.

   - Prior Westtown Township planning has demonstrated that a project of this scope cannot be afforded by the residents.

   Westtown-Chester Creek WWTP expansion would be needed were the entire Study Area so served. This capacity upgrade would increase costs to affected residents and compromise the Township's ability to investigate a cost-effective alternative.

For the purposes of alternatives evaluation, a more limited sewer extension capturing only the neighborhoods generally proximate to the existing collection system was considered (see Map IV-1). This more limited scope would result in WCC WWTP flows within available capacity, mitigating costs and risks due to capacity upgrades and unknown TMDL constraints respectively.

Westtown-Chester Creek WWTP conveyance was considered via both gravity sewer extensions and a low pressure sewer system.

Gravity sewers have historically been the most common method used for the collection and conveyance of wastewater. The pipe is installed on a slope to enable the wastewater to flow from the house site to the treatment facility. Pipes are usually a minimum of 8" in diameter and must be installed below the frost line. Manholes are located at regular intervals and at changes of direction or changes in elevation to allow for access and maintenance. In areas of hilly terrain, pump stations are needed to convey the wastewater at points where gravity flow cannot be maintained.

Prior Westtown Act 537 planning proposed an all gravity sewer extension to the entirety of the Study Area. Subsequent design efforts documented costs of approximately $63,000 per home for such a project, a cost which was too high for most residents to afford. Excessive costs were primarily driven by pipe depth, which would have exceeded 30 feet deep in areas in order to maintain gravity flow through hilly terrain. The Township consequently investigated a mostly gravity sewer extension, which included some individual grinder pump units (approximately 6%) in an effort to reduce pipe depths to a maximum of approximately 25 feet. The resultant project costs were nonetheless in excess of $53,000 per home, a figure the Township still deemed to be economically infeasible.

In consideration of the high costs of the prior gravity sewer evaluations, the Township elected to consider a low pressure sewer system alternative for the current planning effort to reduce costs for the more limited area studied under this alternative. A low pressure sewer system has a grinder pump at each service connection. The pumps considered for a Westtown public sewer extension are one horsepower (0.75 kilowatts), typically require 220 volts, and are equipped with a grinding mechanism that macerates the solids. The head and flow rate provided by the selected pumps vary depending upon the elevation, number of pumps operating simultaneously, and length of the discharge line, but can operate satisfactorily up to 185 feet of discharge head. The pumps discharge into a completely pressurized pipe system terminating at a treatment plant or conventional sewer. Because the mains are pressurized, there will be no infiltration into them, but infiltration and inflow into the house sewers and the pump wells can occur. The discharge line from the pump is equipped with at least one check valve and one manual valve. Electrical service is required at each service connection. The sewer profile usually parallels the ground surface profile. Horizontal alignment can be curvilinear. PVC or HDPE pipe is typically used since it is economical in small sizes, and it resists corrosion. The minimum diameter is 1-1/4 inches for service connections and the smallest mains. Cleanouts are used to provide access for flushing. Automatic air release valves are required at summits in the sewer profile.

Upgrades to existing conveyance system components were also identified as a necessary component of any such sewer extension. Low pressure sewer system service to the subset of the Study Area considered would necessitate conveying additional flows through the Kirkwood pump station and the main interceptor serving the WCC WWTP. Upgrades to these components would be needed to provide capacity for the additional sewage flows and address peak flow concerns with the Kirkwood Pump Station, as identified in the 2011 Chapter 94 Report for the WCC WWTP..

Map IV-2 illustrates the low pressure sewer system extension and downstream conveyance improvements identified under this alternative. Detailed projections of Township costs can be found in Appendix F.

This scenario would provide sewer service to 392 existing residences at a total Township project cost of approximately $12,292,000 (in 2012 dollars), a cost which includes the purchase price of all individual grinder pump units. The total Township project costs per home would be approximately $31,300. Additional homeowner costs of approximately $4,000 to $5,000 would also be incurred for on-lot sewage system abandonment, grinder pump installation, and lateral installation.

MAP IV-1

ALTERNATIVE A.2 AREA

MAP IV-2

LOW PRESSURE SEWER SYSTEM ALTERNATIVE

After reviewing additional data recently obtained from the Chester County Health Department, Westtown Township has determined that a public sewer alternative is not warranted at this time for the following reasons:

- Limited existing sewage needs have been identified which would justify a sewer extension at this time (see Table II-5).

- The majority of existing sewage needs identified remain indeterminate with regard to viability of suitable on-lot system repairs, suggesting additional detailed lot-by-lot inspections are needed to clarify conditions.

- Available CCHD data indicates that most properties which have needed on-lot system repair or replacement have been able to do so.

A public sewer alternative has furthermore been deemed to be economically infeasible. The following economic conditions indicate that a public sewer alternative may not be implementable at this time:

- Since public sewers were proposed in the 2006 approved Westtown Act 537 planning, the severe economic downturn has significantly compromised both municipal and individual budgets. Both nationally and locally, home values and real wages have decreased while unemployment and underemployment have increased. As previously noted, public sewer costs as would result from the 2006 approved planning are too high and that planning consequently cannot be implemented. Although costs for the more limited sewer extension project considered for the purpose of the current planning effort are less, the burden on residents relative to general economic conditions would be similar.

- Consistent with the general economic conditions noted above, many residents have directly indicated to the Township that they cannot afford public sewer costs. A total of 103 letters and emails were received by the Township pursuant to the public notice for this Act 537 Plan. Approximately 83% of these expressly indicated that they would be unable to afford public sewer costs and/or that such costs would be a financial hardship. This condition is further quantified via survey data as collected by the Concerned Citizens for Westtown Sewers, a residents group that has been actively involved in the current planning effort. Approximately 95% of the 226 survey respondents indicated that having to pay for public sewers would be a financial hardship, and significant incidence of respondents also noted various household economic challenges which would contribute to this hardship. Public comment letters and the Concerned Citizens for Westtown Sewers survey results can be found in Appendices L and M respectively.

- Westtown Township is currently facing budgetary conditions which could further constrain the residents' ability to afford public sewer costs. The Township currently has approximately $16 million in total debt and no significant cash reserves to address any budget shortfall. From 2007 to 2011, real estate transfer

tax revenues decreased by approximately 31%, earned income tax revenues decreased by approximately 16%, and local service tax revenues decreased by approximately 20%. Westtown is nonetheless face with several very significant potential expenditures to address fundamental health, safety, and welfare issues as well as state and federal regulatory requirements. Anticipated expenditures include:

- Costs to provide police service to Westtown residents, which currently comprise approximately 50% of the Township budget, may increase markedly due to contractual issues with the current multi-municipal police force or the need to create an entirely new Westtown Township police force.

- Significant monies are needed for Township roadway repair and maintenance, which have to a large extent been deferred due to prior years' budget constraints but cannot be deferred for much longer.

- Compliance with pending DEP MS4 stormwater requirements will require substantial Township funding.

Faced with the financial reality of diminished revenues and crucial pending expenses, the Township may be forced to consider an increased tax burden on residents in the future. Residents' already compromised ability to pay for public sewer costs would be exacerbated as a result.

- With little or no grant funding presently available, Westtown would need to rely upon bond issuance to finance a public sewer project. Due to Township financial conditions noted above, any such debt would need to be fully funded via collection of tapping fees and user fees from all proposed sewer users; deferring some connections to a later date or absorbing some portion of the costs by the Township are not financially sound options. As discussed above, many residents have indicated that they cannot afford the costs for a sewer connection. In the absence of enforcement of mandatory sewer costs by the Township via property liens or other means, a Township sewer project may be consequently substantially unfunded. It should be noted that the Township is opposed to enforcement of mandatory sewer costs to residents at this time; limited documented on-lot sewage system problems coupled with the economic challenges inherent in the current economy do not support any such action.

Due to the sewage needs conditions and economic constraints noted above, this alternative is discounted from further consideration.

3. Continued Use of Existing Municipal Sewage Facilities

As documented in the 2011 Wasteload Management Report for the WCC WWTP (Appendix E), this facility is relatively new and is generally operating in accordance with all permitted requirements. Continued use of this facility to serve existing connections is warranted.

4. Repair or Replacement of Existing Collection and Conveyance System Components

   The WCC WWTP Wasteload Management Report documents peak flow concerns with the Kirkwood pump station. Since no feasible Act 537 planning alternative has been identified which would convey additional flows through this pumping station, Westtown Township will address the identified pump station concern as required by DEP and independent of the Act 537 planning process.

5. Construction of New Sewer Systems or Treatment Facilities

   Construction of new sewer systems to serve existing residences was addressed by alternative A.2 above. No further need has been identified to consider construction of new sewer systems or treatment facilities.

6. Use of Alternative Methods of Collection and Conveyance

   No new or extended collection and conveyance improvements are proposed and consideration of alternative methods is not applicable.

B. Continued Use of On-Lot Sewage Systems

All improved parcels in the Study Area presently rely on on-lot sewage systems. Under this alternative, use of existing sewage systems would continue with repair or replacement as needed to abate malfunction.

As discussed in Chapter II, Chester County Health Department repair permit data documents a range of known absorption area types which have been used in the Study Area. These records suggest a historic general feasibility of installing new absorption areas to correct a malfunction; of the 152 total permit applications documented for absorption area replacement, 127 (84%) resulted in permits for new absorption areas, 17 (11%) remain unresolved, and 8 (5%) were deemed unsuitable for a repair by CCHD.

Various options are available to repair or replace on-lot sewage systems in the Study Area. For the purposes of this planning effort, all technologies which are approved in Pennsylvania for individual residential sewage disposal have been considered. Repair alternatives available to properties in the Study Area are discussed more fully below. Any demonstrated instance of system applicability per CCHD permitting data is also noted.

1. Subsurface Beds and Trenches

   Subsurface beds and trenches are the most conventional on-lot sewage system absorption area configuration. In both cases, perforated pipe is placed in a layer of stone within an excavation in the ground. Wastewater from a treatment tank flows into the perforated pipe and seeps through the stone to the underlying soil. The technology is essentially the same for both beds (single large rectangular excavation) and trenches (multiple narrower rectangular excavations), and the type used is largely

a function of site slope; at slopes of greater than 8%, trenches are required in Pennsylvania.
These designs may also include a pump and associated pump tank to convey wastewater from the septic tank to the bed or trenches in cases where gravity flow is not possible, or in cases where a poor percolation rate requires the piping in the bed or trenches to be pressurized.

Two additional variations of subsurface beds and trenches are included in this category: subsurface sand filters and use of leaching chambers.

Subsurface sand filters include sand placement over the entire excavated area to bypass soils with unacceptable permeability prior to placement of stone and pipe. Minimum sand depth is 12 inches and all such designs require pressure dosed distribution.

Leaching chambers are semi-cylindrical plastic chambers installed with the open face on the bottom of a seepage bed or trench excavation. Multiple rows of chambers connected end-to-end may be installed in lieu of stone and pipe. Wastewater flows through the void space created by the chambers and is absorbed by the soil at the bottom of the absorption area excavation. DEP has approved a reduction of up to 40% in minimum absorption area square footage when using leaching chambers to repair an existing on-lot sewage system, which can facilitate installation where limited space is available. Although this area reduction can be beneficial in repairing on-lot systems, leaching chambers are also commonly used due to homeowner preference and site access concerns; it is much easier for an installer to transport plastic chambers than truckloads of stone to a site with difficult access.

Specific design standards for all subsurface bed and trench variations discussed above can be found in Chapter 73 of the DEP regulations, with the exception of leaching chamber use which is addressed in the DEP Alternate Systems Guidance.

Of the 152 permit applications submitted for absorption area repair per available CCHD records, 113 (approximately 74%) were permitted using the subsurface bed or trench variations discussed above, suggesting large areas with soil and slope conditions favorable for use of these technologies.

2. Elevated Sand Mounds

An elevated sand mound is typically used when rock or a water table is too close to the ground surface to allow for an in-ground system. Sand is placed on top of the ground to make up for the lack of soil depth, and the stone and pipe are placed on top of the sand. All of this is covered and surrounded by a soil berm. As with subsurface sand filters, DEP regulations require that all elevated sand mounds be pressure dosed. Specific design standards for elevated sand mounds can be found in Chapter 73 of the DEP regulations

Six elevated sand mound permits are indicated by the available CCHD data, comprising approximately 4% of all absorption area repair applications submitted.

3. Drip Irrigation

Drip irrigation technology employs the use of small diameter flexible tubing to distribute effluent into the upper 12 inches of the soil. Its primary advantage is applicability for sites that may otherwise require an elevated sand mound; homeowners often prefer the buried drip tubing over an elevated sand mound for aesthetic reasons. Other advantages include use on up to 25% slopes with soils that are otherwise suitable for an elevated sand mound, and increased soil oxygen (due to shallow tubing depth) for more efficient renovation. Standards for drip irrigation are defined in the DEP Alternate Systems Guidance.

Five drip irrigation permits are indicated by the available CCHD data, comprising approximately 3% of all absorption area repair applications submitted.

4. At-Grade Beds

An at grade bed is similar to an elevated sand mound with no sand - the stone and pipe is placed directly on the ground surface and the resulting mound is covered and surrounded by a soil berm. Where the limiting zone is between 20 and 48 inches below the ground surface, the additional filtration as would be provided in an elevated sand mound is accommodated by filter technologies, including free access sand filters, peat filters, or the recently approved Eljen geotextile sand filter. At grade beds can be a viable technology where space is too limited for an elevated sand mound (the decreased mound depth results in a smaller soil berm footprint). Standards for at-grade beds are defined in the DEP Alternate Systems Guidance.

Very limited use of this technology is evident in the available CCHD records – three at grade absorption area permits are indicated, comprising approximately 2% of all absorption area repair applications submitted.

5. Individual Residential Spray Irrigation

Individual residential spray irrigation systems (IRSIS) utilize a stationary sprinkler irrigation system, similar to those used on golf courses, to spray treated effluent over the ground surface. Treated and disinfected wastewater is sprayed on vegetated soils. Effluent is further treated as it travels through the soil matrix by filtration, absorption, ion exchange, microbial action and plant uptake. Vegetation is a vital part of the process and serves to extract nutrients (primarily nitrogen), reduce erosion and maintain soil permeability. The spray system is generally designed to discharge a pre-determined volume of effluent for a short period of time each day. This is generally done at night to avoid a potential nuisance situation with people or domestic animals. Specific design standards are found in Chapter 73 of the DEP regulations.

IRSIS typically require significantly more land area than other individual sewage system options, making applicability to the Study Area limited due to the relatively small lot sizes. No incidence of IRSIS permitting is noted in the available CCHD data.

6. Additional Alternate Sewage Systems

In addition to the various alternate system technologies discussed above, other alternate system technologies have been approved by DEP which may be considered as needed for any on-lot sewage system repair. These include several technologies which can facilitate system installation on smaller lots with limited available space, such as the Orenco Advantex treatment system, peat filters, and the Eljen geotextile sand filter. In certain conditions, an absorption area size reduction of up to 40% is permitted when using these treatment and filtration systems.

7. Experimental Sewage Systems

Chapter 73, Section 73.1 defines *experimental sewage system* as a method of on-lot sewage treatment and disposal not described in the DEP regulations which may be proposed for testing and observation. DEP administers these provisions through the Experimental Onlot Wastewater Technology Verification Program, whereby new or innovative technologies may be proposed, approved, and monitored. Although time consuming and often expensive, an experimental system option may be considered as a last resort to correct a malfunction in the Study Area.

8. Small Flow Treatment Facilities

In floodplain soils, areas of an extremely high seasonal water table, or areas where the soils will not support soils-based effluent disposal methods, an on-site treatment system with stream discharge may be installed as an individual on-lot system.

Small flow treatment facilities (SFTF's) discharge to surface waters, requiring issuance of a National Pollution Discharge Elimination System (NPDES) permit. Improved effluent quality is required to meet the standards set for discharges to surface waters. These systems cannot discharge into a stream designated under Pa Code Title 25, Chapter 93 as Exceptional Value (EV) and may only discharge into a High Quality (HQ) stream when used to repair a malfunctioning system. There are no EV watersheds in Westtown, although the portion of the Study Area generally east of Chester Road is within the Ridley Creek watershed with an HQ designation.

The use of multiple SFTF's is generally not a viable solution to correct significant incidence of on-lot sewage system malfunction, as this creates a proliferation of sewage discharges which require regular operation, maintenance, and Township administration issues. Use of SFTF's may nonetheless be a viable option in Westtown for limited cases of on-lot system malfunction when other soil-based options cannot be used and where appropriate discharge areas exist. Treatment and permitting requirements would need to be evaluated on a case-by-case basis.

Since DEP issues permits directly for small flow treatment facilities, no incidence of this technology is noted in the available CCHD data.

9. Holding Tanks

As defined by DEP on-lot sewage system regulations, a holding tank is a water-tight receptacle which receives and retains sewage by a water-carrying system and is designed and constructed to facilitate ultimate disposal of the sewage at another site. Holding tanks require regular and frequent pumping to prevent tank contents from overflowing on the ground surface.

The term 'holding tank' should not be confused with the term 'retaining tank', which by current DEP definition includes holding tanks as well as chemical toilets, privies, incinerating toilets, composting toilets, and recycling toilets; as described, the term 'retaining tank' embodies treatment methodologies as well.

Although costly over time and maintenance intensive, holding tanks may be considered to repair a malfunctioning on-lot sewage system in Westtown where no other option exists and aggressive system pumping fails to adequately abate a malfunction.

Although many alternatives are potentially available to repair or replace a malfunctioning on-lot sewage system in the Study Area, a prevalence of relatively small lots in the Study Area may still compromise repair abilities. It should be noted that public water availability may alleviate this concern in some cases, as public water is generally available in several neighborhoods where individual on-lot water supplies remain (see Map II-4). In these cases, well abandonment and connection to public water may alleviate well isolation distance constraints and expand available lot area for any needed sewage system repair. In order to more fully meet the long term needs of the Study Area, however, additional consideration of an on-lot sewage management program may be warranted to mitigate the need for future sewage system repairs.

C. Sewage Management Program

Chapter 71, section 71.71 of the DEP regulations states "Municipalities are required to assure the proper operation and maintenance of sewage facilities within their borders. Proper operation and maintenance of sewage facilities is essential to the provision of adequate sewage treatment and disposal over the functional life of a sewage treatment system." An on-lot sewage management program would provide for Township and property owner activities as needed to effect the noted requirements.

The 2002 Westtown Township Act 537 Plan, as approved by DEP in 2006, provided for an on-lot sewage management program with the following features:

- Township administration of a public education program which would inform residents of the need for and benefits of regular sewage system maintenance.

- Annual (or other specified period) certification of all on-lot sewage systems.

- Mandatory sewage system pumping at least once every two years or at the direction of the certifier.

Implementation of a program generally consistent with the scope above would promote the longevity of existing sewage systems, augmenting Alternative B (Continued Use of On-Lot Sewage Systems) by mitigating the need for future sewage system replacement or repair.

Although the general program scope from prior Act 537 planning may remain valid, it was originally proposed under the assumption that all unsewered properties in the Township would be eventually connected to public sewer. As discussed under alternative A.2 in this Chapter, Westtown Township has not determined any extension of public sewer to be feasible at this time. The Township has accordingly identified more detailed sewage management program provisions as appropriate to address the long term sewage needs of the planning area.

The on-lot sewage management program, as refined, would include the following Township and property owner responsibilities:

- Township administration of a public education program which would inform residents of the need for and benefits of regular sewage system maintenance.

- Detailed initial sewage system inspections to identify sewage system type, functional status, and maintenance needs. Qualified maintenance contractors such as those certified by the Pennsylvania Septage Management Association (PSMA) would be hired by the property owner to complete these inspections using Township supplied forms. Inspection methods will generally be in accordance with PSMA standards, which are the only generally accepted industry-wide standards in Pennsylvania. Detailed initial inspections will be required to be completed within three years of Township adoption of an on-lot sewage management ordinance.

- Ongoing routine inspections will be required every three years after initial inspections to maintain oversight of maintenance and operational measures that impact sewage system function. These inspections would not need to be as intensive as the initial inspections, since baseline data such as system type and general maintenance needs will have been established. Qualified maintenance contractors hired by the property owner would complete routine inspections using Township supplied forms.

- Property owners will be responsible for having on-lot systems pumped at least once every three years, unless a modified schedule is deemed appropriate by the Township due to inspection findings, operational conditions, or functional status.

A draft On-Lot Management Ordinance can be found in Appendix G which memorializes the sewage management program activities. A draft form for initial inspection reports can be found in Appendix H which illustrates the general scope of anticipated inspection requirements.

Some individual sewage system technologies may require more detailed maintenance activities than a typical septic system. The initial inspection process will serve to identify any such systems types, including certain alternate systems, experimental systems, and

small flow treatment facilities. In these cases, the Township will require specific maintenance activities as recommended by the equipment manufacturer and/or DEP and may require the payment of a fee by the property owner to cover Township costs for increased oversight. The draft On-Lot Management Ordinance in Appendix G includes provisions for these specific maintenance activities.

Holding tanks would also require specific maintenance oversight, as specified in the draft On-Lot Management Ordinance.

Implementation of the sewage management program described above would facilitate the long term use of on-lot sewage systems by the following means:

- Current malfunctions – the initial inspections will provide detailed information regarding functional status. Any instance of suspected regulatory malfunction will be referred to CCHD for follow-up investigation and corrective measures. Should a repair be deemed infeasible, the Township will enforce water conservation and more aggressive system pumping requirements as necessary to abate any incidence of malfunction. Subsequent routine inspections will also serve to monitor conditions where any such increased maintenance is needed.

- Current system function – the initial inspections will identify a wide range of recommended repair and/or maintenance activities to improve current on-lot system performance. Initiation of periodic pumping requirements will further improve system function.

- Long term system function – rigorous oversight of maintenance activities, in some cases tailored to system type, will be provided by the inspection processes, the pumping requirements, and the additional measures specified in the draft On-Lot Management Ordinance. By ensuring adequate maintenance for all sewage systems, system longevity will increase, system performance with regard to environmental impacts will be improved, and future incidence of malfunction will be minimized.

D. Community Sewage Systems

No community systems are known to exist in the Study Area, and no discussion of community system rehabilitation or repair is applicable.

E. Non-Structural Planning Alternatives

Non-structural planning alternatives include revision to the Township's Comprehensive Plan, Zoning Ordinance, or Subdivision and Land Development Ordinance to improve consistency with Act 537 planning for the Study Area. Since this planning effort focuses solely on existing residences, most land use planning documents are inapplicable and consideration of these alternatives is discounted from further consideration.

F. No-Action Alternative

A no-action alternative would necessitate implementation of the currently approved Act 537 Plan, which was approved by DEP in 2006 and provided for a gravity sewer system extension serving all residences in the Study Area.

The Township has determined that public sewer connection for all existing residences as provided for by the 2006 Plan approval is neither warranted nor implementable for the following reasons:

- Sewage needs – identification of public sewage needs in the 2006 approved Act 537 Plan was predicated upon the results of a mail survey conducted by West Chester University to identify existing sewage system concerns, with additional consideration of other factors such as lot sizes and soils to establish long term needs conditions. New and updated information is provided in Chapter II of the current planning effort which suggests that the majority of parcels in the Study Area which have needed on-lot system repairs have been able to effect those repairs in accordance with applicable DEP and CCHD requirements. The ability to effect needed on-lot system repairs does not support the prior public sewage needs determination.

- Costs – Westtown initiated design efforts for gravity sewer extensions subsequent to the 2006 Act 537 Plan approval. Additional detailed information required as part of final engineering design efforts, coupled with construction cost escalation subsequent to preparation of the prior Plan, resulted in a 2007 total project cost per household of approximately $63,000 for service to all residences via gravity sewer. The Township attempted to mitigate this cost burden to residents by pursuing a modified sewer extension project which would reduce costs by lessening the depth of gravity sewers and connecting some homes by individual grinder pump units. The total project cost per household for this modified project approach would have been approximately $53,000. The Township has determined the costs under either scenario to be economically infeasible.

- Implementation – the 2006 approved Act 537 Planning cannot be implemented by the Township due to excessive costs. Many residents would simply not be able to afford the requisite sewer connections. The Township project would consequently be substantially unfunded and thereby rendered infeasible from a financing perspective.

A no action alternative is accordingly deemed without merit and discounted from further consideration.

CHAPTER V

ALTERNATIVES EVALUATION

A. Consistency Evaluation

Under the Act 537 planning process, feasible alternatives as identified in Chapter IV must be further evaluated for consistency with other environmental planning and regulatory programs, financial feasibility, and administrative requirements. As discussed in Chapter IV, the only feasible alternative identified by Westtown Township is the continued use of on-lot systems with the implementation of an on-lot management program for those areas served by on-lot systems. The consistency of this alternative relative to applicable planning and regulatory programs is discussed in the following sections.

1. COWAMP/208 Water Quality Management Plan

   A Comprehensive Water Quality Plan (COWAMP) has been developed under Sections 4 and 5 of the Clean Streams Law and 208 of the Clean Water Act. For purposes of identification with the COWAMP/208 Water Quality Management Plan for southeastern Pennsylvania prepared in 1978, Westtown Township falls within the Brandywine Sub-basin and the Delaware County Sub-basin (Figure 1-2, Study Area Reference Map). For the purposes of this Special Study, the Westtown-Chester Creek Study Area falls entirely within the Delaware County Sub-basin. The continued use of on-lot systems and the implementation of an on-lot management program as described in Chapter IV is not in conflict with the water quality goals of the COWAMP, which are predicated on the mandates established in the Federal Water Pollution Control Act Amendments of 1972, the Pennsylvania Clean Streams Law, and the Pennsylvania Sewage Facilities Act (Act 537).

2. Chapter 94 Municipal Wasteload Management Plan

   Per the 2011 Chapter 94 Report for the Westtown Chester Creek WWTP, no hydraulic or organic overload is projected within the 5-year period for the treatment facility. A hydraulic overload is noted for the Kirkwood pump station due to significant wet weather events in 2011.

   Since the Township has identified the continued use of on-lot systems and the implementation of an on-lot management program as the only feasible alternatives for this Special Study, there will be no increased flows to the Kirkwood pump station or the Westtown Chester Creek WWTP; therefore, no inconsistency with Chapter 94 Reporting appears to exist. The Township will address Kirkwood pump station wet weather peak flows as required by DEP and independent of the Act 537 planning process.

3. Title II and VI of the Water Quality Act of 1987

The Water Pollution Control Revolving Loan Fund Component of the PennVest Program provides for capitalization under the Federal Water Quality Act of 1987. The Township will not be seeking PennVest funding to implement the proposed alternatives.

4. Comprehensive Plans

The current Township comprehensive plan, entitled Westtown Township Growth Management Plan, was adopted in July 2001 and noted the following goals regarding sewage facilities:

- Work to address sewage needs in a regionally coordinated manner.

- Carry out the Township's Sewage Facilities Plan, including extensions to serve concentrations of failing sewage systems.

The Sewage Facilities Plan referenced among the goals above was the draft Township-wide Act 537 Base Plan, as was subsequently finalized and adopted by the Township in 2002. Consistent with the 2002 Act 537 Plan, the Comprehensive Plan includes recommendations to extend public sewer to most existing residences served by on-lot sewage systems. The continued use of on-lot systems and the implementation of an on-lot sewage management program are consequently inconsistent with the Township Comprehensive Plan.

The Chester County Comprehensive Plan, *Landscapes2,* identifies the Westtown-Chester Creek Study Area as Suburban Landscape. The continued use of on-lot systems and the implementation of an on-lot management program as identified in Chapter IV appear to be consistent with *Landscapes2* goals and policies.

Chester County has also adopted a water resources plan, *Watersheds,* as an element of the County Comprehensive Plan. The identified selected alternative appears to be consistent with salient objectives and strategies *Watersheds.*

5. Anti-degradation Requirements of Chapters 93, 95, and 102

Chapters 93 and 95 of Pa Code Title 25 address water quality criteria of receiving streams and wastewater treatment requirements, respectively. Any on-lot system improvements or repairs as a result of the continued use of on-lot systems and the implementation of an on-lot management program will be consistent with DEP water quality standards and permitting requirements for individual sewage systems.

Chapter 102, which relates to erosion and sediment control measures, is applicable to alternatives that may result in earth disturbance activities of greater than 5,000 square feet. The feasible alternatives do not directly involve any earth disturbance and no inconsistency with Chapter 102 exists.

6. State Water Plan

The current State Water Plan, approved by the Secretary of DEP in 2009, provides a set of tools and principles to decision-makers responsible for the management of water resources within the Commonwealth. The State Plan identifies Westtown Township as falling within the Brandywine Creek Watershed of the Delaware Sub-basin within the Delaware Region. The most relevant objective of the State Water Plan relative to this Act 537 Plan is:

- Reduce point source discharges of toxics and wastewater and promote land application and appropriately scaled wastewater treatment systems.

The continued use of on-lot systems and the implementation of an on-lot management program as discussed herein appear to be consistent with the 2009 State Water Plan.

7. Pennsylvania Prime Agricultural Land Policy

It is the policy of the Commonwealth to conserve, protect, and encourage the development and improvement of its agricultural lands for the production of food and other agricultural products. It is also the policy of the Commonwealth to protect and conserve agricultural lands as valued natural and ecological resources, which provide needed open spaces for clean air as well as for aesthetic purposes. None of the proposed alternatives is inconsistent with these goals.

8. Stormwater Management Plan(s)

A portion of the Westtown-Chester Creek Study Area falls within the Chester Creek Watershed. The Act 167 Plan for the Chester Creek Watershed was adopted in 2002 and addresses the impact of runoff from new development on the watershed. The continued use of on-lot systems and implementation of an on-lot management programs does not impact the Chester Creek Act 167 Plan.

A County-wide Act 167 Plan for Chester County is currently being prepared. The continued use of on-lot systems and implementation of an on-lot management programs does not impact the draft County-wide Act 167 planning completed thus far.

9. Wetland Protection Standards

No wetland disturbance is anticipated by the continued use of on-lot systems and the implementation of an on-lot management program, and no inconsistency exists.

10. Pennsylvania Natural Diversity Inventory (PNDI)

    No site disturbance that would involve PNDI review is anticipated as a result of the continued use of on-lot systems and the implementation of an on-lot management program.

11. Pennsylvania Historic Preservation Act

    No site disturbance that would impact historic resources or review by the Pennsylvania Historical and Museum Commission (PHMC) is anticipated as a result of the continued use of on-lot systems and the implementation of an on-lot management program.

B. Resolution of Inconsistencies

Inconsistency with the Township's Comprehensive Plan is noted above. This inconsistency is based upon apparent Comprehensive Plan reliance on prior Act 537 planning, which has been revised by virtue of the current planning effort. Adoption of the current planning effort by the Board of Supervisors will document resolution of the inconsistency.

The continued use of on-lot systems and the implementation of an on-lot management program appear to be consistent with all other programs and policies discussed above.

C. Water Quality Standards and Effluent Limitations

Any on-lot system improvements or repairs as a result of the continued use of on-lot systems and the implementation of an on-lot management program will be consistent with DEP water quality standards and permitting requirements for individual sewage systems.

D. Costs

Of the feasible alternatives discussed in Chapter IV, only implementation of an on-lot sewage management program will result in direct costs to the Township. It should be noted that the Pennsylvania Code provides for DEP reimbursement of Act 537 approved sewage management programs up to 85% of program costs where sewage system permitting is administered by a local agency, such as the Chester County Health Department. Recent State budget constraints have significantly limited funding for this program, and actual reimbursement amounts may be very limited or nonexistent for the foreseeable future. Estimated costs for implementation and ongoing administration of the sewage management program are consequently presented below exclusive of any DEP reimbursements.

Implementation (1st Year)

Preparation and dissemination of public education materials	$1,000
Completion and adoption of ordinance	$1,000
Prepare database for pumping oversight and inspection findings	$4,700
Administration of database, pumping, and inspection requirements	$80,000
Total	$86,700

Annual Costs (Years 2 and 3)

Administration of database, pumping, and initial inspection requirements	$70,000

Annual Costs (Year 4 onward)

Administration of database, pumping, and routine inspection requirements	$40,000

Actual costs may vary widely in proportion to problems identified in system inspections and needed Township follow-up. The Township may consider implementation of a fee to applicable property owners for administration of the sewage management program, as deemed appropriate when actual program costs and DEP reimbursement amounts are determined. The ordinance in Appendix G includes provision for the establishment of such a fee.

E. Funding

It is not anticipated that the Township will seek funding from outside sources to implement the selected alternative.

As noted above, funding assistance for Township costs related to the on-lot sewage management program is available through DEP at an annual reimbursement rate of up to 85%, although funding for this program has been cut due to State budget constraints and actual funding as may be available for the foreseeable future is indeterminate at this time.

F. Phasing

No phasing is necessary to implement the feasible alternatives identified in Chapter IV.

G. Administrative Requirements and Legal Authority

All on-lot systems will be subject to the sewage management program. It is anticipated that existing Township staff, in coordination with a qualified consultant as may be utilized by the Township, will be capable of program administration. Legal authority for the sewage management program is provided by Title 25, Chapter 71 of the Pennsylvania Code.

CHAPTER VI

INSTITUTIONAL EVALUATION

A. Existing Authorities

No Municipal Authorities currently own or operate any wastewater facilities within the Township.

Westtown Township owns and operates existing public sewerage facilities in the Township, and has the financial capability, staff, administrative resources, and legal authority to implement the on-lot sewage management program described in Chapter IV.

B. Institutional Alternatives

As described in Chapter IV, the feasible technical alternatives to address the needs of existing residences are the continued use of on-lot systems and the implementation of an on-lot sewage management program. A draft On-Lot Sewage Management Ordinance is located in Appendix G which describes program requirements.

No need exists to analyze institutional alternatives; Township administration of the on-lot sewage management program is anticipated in accordance with Chapter 71 of the DEP regulations, and primary responsibility for on-lot system operation and maintenance will rest with property owners, as is inherent in the feasible technical alternatives identified in Chapter IV.

As indicated in Chapter V, the continued use of on-lot systems and the implementation of an on-lot management ordinance do not require any new municipal departments or authorities.

C. New Administrative and Legal Activities

1. Incorporation of Authorities or Agencies

   No new authorities or agencies are required to implement the feasible alternatives.

2. Development of Required Ordinances, Regulations, Standards, and Inter-Municipal Agreements

   The draft On-Lot Management Ordinance is attached as Appendix G. A draft initial inspection report can be found in Appendix H. No other new regulations, standards, or inter-municipal agreements are needed to implement the selected alternative.

3. Activities to Provide For Rights-of-Way, Easements, or Land Transfers

   No rights-of-way, easements or land transfers are necessary to implement the selected alternative.

4. Adoption of Other Municipal Sewage Facilities Plans

   No multi-municipal planning is contemplated by this Special Study.

5. Other Legal Documents

   No additional legal documents appear to be needed to implement the identified feasible alternatives.

6. Timeframes for Items 1-5 Above

   See the Implementation Schedule in Chapter VII for time frame to adopt the required On-Lot Management Ordinance.

D. Selected Institutional Alternative

The selected method of implementing this Special Study is Township administration of the on-lot sewage management program, with primary responsibility for on-lot system operation and maintenance resting with property owners.

CHAPTER VII

SELECTED ALTERNATIVES AND IMPLEMENTATION SCHEDULE

A. Selected Alternatives

The alternatives selected by Westtown Township to best meet the needs of the Study Area are as follows:

1. Public Sewage Collection, Conveyance, Treatment, and Disposal Alternatives

   The Township has determined that no extension of public sewage facilities to existing residences served by on-lot sewage systems is appropriate at this time. Properties presently approved for public sewer service will continue to be so served, with new development connections addressed as needed through the planning module process.

2. Continued Use of On-Lot Sewage Systems

   Existing lots served by on-lot sewage systems will continue to be so served, with repair or replacement as needed to abate malfunction. All available system technologies may be considered when addressing any malfunction, including small flow treatment facilities and holding tanks.

3. Sewage Management Program

   All existing on-lot systems will be subject to an on-lot sewage management program as described in Chapter IV. A draft ordinance governing associated requirements can be found in Appendix G.

All selected alternatives noted above are also deemed appropriate for the balance of the Township, i.e. properties served by on-lot sewage systems in Westtown which are not specifically within the defined Study Area. The Act 537 planning approved by DEP in 2006 provided for continued use of on-lot sewage systems with an on-lot sewage management program in these areas. The 2006 planning approval also incorporated a Township commitment to conduct additional planning for these areas which would consider public sewage connection alternatives. The Township has determined that additional planning is warranted instead to revisit sewage needs in these areas, and the selected alternatives described above shall apply until such time as this additional planning is conducted.

Justifications for the selected alternatives are:

1. Existing wastewater disposal needs – although the Township has identified a limited incidence of existing sewage needs (see Chapter II), implementation of the on-lot sewage management program will improve functioning of all on-lot sewage systems and provide oversight to manage or mitigate any existing incidence of malfunction.

2. Future wastewater disposal needs – the selected on-lot sewage management program will provide for regular system pumping and system inspections will identify additional recommended operational, maintenance, and repair activities that will extend the functional life of systems. These activities, in conjunction with system repair or replacement as needed, have been deemed appropriate by Westtown Township to address the long term sewage needs of existing residences.

3. Operation and maintenance considerations – the selected on-lot sewage management program will ensure that operational and maintenance considerations are fully addressed for all on-lot sewage systems.

4. Cost effectiveness – the costs evaluated for public sewer extensions have been deemed economically infeasible by the Township, and implementation of the on-lot sewage management program is consequently the only cost-effective and implementable alternative to meet the long term needs of existing residences. The following excerpt is noted from the DEP fact sheet entitled Act 537-Sewage Management Programs-Part II, Ensuring Long-Term Use of Onlot Systems Through Proper Operation and Maintenance

   Is management of onlot treatment systems cost-effective?

   Yes. Maintaining properly installed sewage systems can extend the life of these systems and may save the homeowner the cost of repairing or replacing an abused, malfunctioning onlot system. Sewage management programs can also help prevent future problems from occurring with systems that have been repaired following malfunction.

5. Available management and administrative systems – the Township has the administrative capability to implement the on-lot sewage management program.

6. Available financing methods – no financing is needed to implement the selected alternatives; Township costs for implementation and administration of the on-lot sewage management program will be funded by the Township and/or fees to applicable property owners.

7. Environmental soundness – proper operation and maintenance of on-lot sewage systems will improve system performance and reduce incidence of malfunction, resulting in diminished potential for groundwater contamination and environmental health risks.

B. Financing Plan

No capital financing will be required to implement the selected alternatives. Implementation and administration of the on-lot sewage management program will be financed by the Township's general fund, with collection of an annual fee from residents with an on-lot system as a back-up measure if deemed necessary by the Township.

C. Implementation Schedule

Implementation subsequent to DEP approval will consist primarily of on-lot sewage management program activities. Approximately six months are anticipated to evaluate available Township and CCHD data, prepare finalized inspection requirements, prepare a database for pumping oversight and inspection findings, train Township staff, and finalize and adopt an ordinance.

Future Act 537 planning is also inherent in implementation of this Special Study. The detailed lot-by-lot conditions as will be documented via the on-lot sewage management program will be analyzed to revisit whether any area may be in need of public sewer in five to ten years.

The Implementation Schedule is presented below.

Implementation Schedule

Complete Draft Plan	August 2012
Public Agency Reviews	August – September 2012
30 Day Public Comment Period (Comments must be in writing)	August – September 2012
Board Adopts Plan and submits to DEP	September 2012
DEP Approves Act 537 Plan (10 day completeness + 120 day technical reviews)	February 2013
Board Adopts On-Lot Management Ordinance* (Six months after DEP approval)	August 2013
Complete updated planning for all existing residences (Five to ten years after DEP approval)	2018 - 2023

*Copy to be submitted to DEP upon adoption.