

of this program by instituting a recurring “registration fee” required for the systems to be inspected.

Public Ownership of Private Treatment Facilities

Public ownership can be municipal, a local authority, or a regional authority. Public ownership, particularly for private systems with significant discharge, can assure the public of proper operation and maintenance and thereby protect surface waters and public health. Another advantage of public ownership is increased control over compliance with permit requirements, as well as state and federal regulations. Public ownership would also include the annual planning requirements of the Chapter 94 reporting process. Better performing facilities also mean benefits to public health and the environment. Public ownership of these facilities does allow the use of any excess capacity in these facilities to serve residents outside of the community for which it was originally built. Cost savings can be obtained through the shared managerial costs of a multi-municipal organization.

Disadvantages can include increased responsibility, which many municipalities are not willing to accept. Financial incentives should be offered to those municipalities willing to accept the responsibility.

No Action

Although a prescribed alternative, the no action alternative is not a viable option given the existing and proposed regulatory requirements of DEP and EPA. While doing nothing requires no decision making or funding, deteriorating sewage facilities will need to be repaired to meet regulatory commitments. With respect to economics, the no action alternative will be more expensive in the long term because of increased costs of repairs and the more extensive nature of the repairs due to further deterioration.

TECHNICAL AND ECONOMIC EVALUATION OF ALTERNATIVES FOR THE PROTECTION OF THE ENVIRONMENT FROM OVERLOADED OR MALFUNCTIONING ON-LOT DISPOSAL FACILITIES

Mandatory System Requirements

While system design requirements (issued by DEP) are already in place for new OLDS, it will be beneficial to introduce consistent maintenance standards for existing systems as well. Advantages include systems that are more efficient, environmentally safe, easier to maintain, and easier to inspect/manage.

A disadvantage is increased cost to the owners when system repair or replacement is required. Low-cost financing through loans is available from PENNVEST. See Appendix B for more information.

Management Programs

Advantages of this alternative include efficient and well-functioning OLDS, sludge disposal reporting, and fewer incidents of malfunctions. All of the advantages decrease the threat to human health and the environment and limit the public nuisance caused by overflowing septic systems. There are internet-based data tracking systems that provide maintenance information management. The type of information collected can include owner, occupant, type of system, date of service, name of service provider, any deficiencies noted, any repairs made, date of inspection, date for next service, etc. These systems make it possible for a private sludge hauler to enter the information for residents it services, thus eliminating data entry tasks for the municipality.

The main disadvantage is the cost of implementing the program. Financial incentives should be put in place for those municipalities taking the initiative in implementing such programs. These programs can be funded by homeowner registration fees for OLDS and/or a private sludge hauler registration fee. The dual fee structure helps remind homeowners that they need to perform regular maintenance on their systems and ensures that only reputable haulers are allowed to operate in the municipality. Intermunicipal programs operated by municipal employees, a contractor, or a regional authority are eligible for higher DEP reimbursement levels than those that serve a single municipality.

The implementation of a management system similar to that described has been recommended in previous planning documents. For example, the Chester Creek Conservation Plan prepared by the Chester-Ridley-Crum Watersheds Association and the Pennsylvania Environmental Council recommended that “septic system registration and maintenance programs” be implemented along with “fines or other approaches” to ensure that proper maintenance is conducted. The plan also recommended that educational materials be made available to homeowners with OLDS so that they may understand their systems and the impact on neighbors if the system fails. Examples of available public educational and information documents from DEP and EPA are provided in Appendix C.

Public Ownership of Community On-Lot Facilities

Like public ownership of private surface discharge facilities, municipal ownership can ensure proper operation and maintenance and protect groundwater and public health, particularly for subsurface systems with significant discharge. Public ownership of these facilities does allow the municipality to use any excess capacity in these facilities to serve residents outside of the community for which it was originally built. Disadvantages can include increased financial and legal responsibility, which many municipalities are not willing to take.

No Action

Taking no action will ignore existing problems with OLDS in western Delaware County. Overflowing systems and threats to groundwater quality and public health are just a few of the on-going problems that will continue to persist if no action is taken.

CHAPTER 8

RECOMMENDED ALTERNATIVES

INTRODUCTION

The potential alternatives for public facilities discussed in Chapters 6 and 7 cover a wide range of options and costs. Given the regulatory focus that infrastructure has been receiving in recent years, the No Action Alternatives are not viable. Ultimately, the recommended solution for western Delaware County will be the application of several of the alternatives on a case-by-case basis in each municipality.

The issues surrounding private facilities focus more on the need to ensure continued proper operation. Accordingly, it is recommended that communities with privately owned and operated facilities establish inspection and oversight programs. The purpose of these programs is to ensure that small treatment facilities are receiving proper maintenance and that they do not pose a threat to public health and the environment.

Public ownership of privately owned and operated facilities is listed as an alternative, but it should be used only in cases where there is no other option to ensure that public health and the environment are not threatened.

RECOMMENDED PUBLIC SEWAGE FACILITIES ALTERNATIVES

Correct Inflow and Infiltration Problems

In the areas of western Delaware County that have older sewer systems, it is important to begin a program to quantify the structural conditions of the system and thereby address I&I issues. This program will need to begin with a detailed assessment of the system to evaluate the appropriate corrective actions needed. As demonstrated in eastern Delaware County, savings can be found in the cooperative purchasing of goods and services (i.e., manhole inserts, sewer slip lining), and it is recommended that the municipalities consider developing a program of their own or participate in the program developed by DELCORA for eastern Delaware County municipalities. Some western Delaware County municipalities and authorities have already participated in the purchase program including BTSA, Brookhaven Borough, SDCA, and SWDCMA.

In areas with younger systems, the recommendation is to begin the formulation of an asset management system that incorporates periodic I&I evaluations and implementation of appropriate corrective measures on an as-needed basis. This type of system has been promoted by EPA in its CMOM requirements. Although these requirements are not yet mandated by EPA, many states have begun to implement these provisions under their own regulatory authority.

Section 122.42 (f) of the federal Clean Water Act may soon require municipalities with sanitary sewer systems to obtain permits for these systems. The General Standards subsection requires permittees to:

- (i) properly manage, operate, and maintain, at all times, all parts of a collection system over which the permittee has operational control;
- (ii) provide adequate capacity to convey base flows and peak flows for all parts of the collection system that the permittee owns or over which it has operational control;
- (iii) take all feasible steps to stop and to mitigate the impact of sanitary sewer overflows in portions of the collection system that the permittee owns or over which it has operational control; and
- (iv) provide notification to parties with a reasonable potential for exposure to pollutants associated with the overflow event.
- (v) develop a written summary of the permittee's CMOM program and make it, and the audit under section (5), available to any member of the public upon request.

This legislation may require municipalities to develop a management program to comply with the items noted. Elements of the program are to include legal mechanisms (ordinances, agreements, and other documents) for implementation, responsible parties for implementation of various measures required under the program, an overflow response plan, a system evaluation and capacity assurance plan, and provisions for audits and communication.

By voluntarily implementing the recommendations presented in this Act 537 plan, municipalities will help to satisfy the regulatory requirements that will be imposed on them under the CMOM program. For more information regarding some of the specifics of the required plan, refer to Appendix D.

Uniform Inspection and Maintenance Program for Privately-Operated Public Facilities

In areas where private contractors are hired to operate and maintain public facilities, annual or biennial inspections should be conducted to ensure that proper operation and maintenance has been performed.

Increased Conveyance and Treatment Capacity Studies

Increasing conveyance capacity is a necessary component of population growth and development. Each municipality needs to assess its own development planning with respect to the long-term use of collection systems and the capacity that these systems will need to transport.

Increasing treatment capacity through the development of new facilities is very expensive and should be considered as a last alternative. Before treatment capacity expansion is undertaken, it is recommended that other alternatives be developed to the fullest extent including I&I elimination and the regional balancing of facilities' capacity. This alternative will require the examination of several issues in addition to cost including:

- Capacity of existing conveyance and treatment facilities.
- Assimilative capacity of the receiving streams.
- Effectiveness of existing sludge disposal practices.
- The need to modify the existing sludge management program.
- Alternative of choice for sludge management as well as facilities for adequate treatment and disposal of sludge.
- Institutional, regulatory, and management modifications needed.

Before any decisions can be made, a comprehensive understanding of all public sewage facilities serving the study area must be developed. Accordingly, it is recommended that a process capacity analysis be conducted. Some analyses may have been completed in recent years and remain valid. In those cases where the process capacity study shows that the plant has available capacity beyond the current permit, a re-rating study is recommended.

Regional Balancing of Facilities' Capacity

The regional balancing of treatment facilities' capacity should be examined in detailed regional studies. Treatment capacity exists at certain facilities that could service the other parts of the study area. It may be more cost effective to construct additional conveyance systems and transfer flow to those facilities with capacity. Additionally, it may be more cost effective to add additional limited capacity at select facilities than to construct new plants. The studies recommended in this chapter's section on Increased Conveyance and Treatment Capacity Studies will provide key information for balancing long-term sewage needs.

Reuse of Reclaimed Water

As part of an ongoing strategy to manage future wastewater treatment needs, reclaimed water reuse should be evaluated as part of a wastewater treatment facility expansion and as part of the local land development process for new significant water users.

RECOMMENDED PLANNING ALTERNATIVES

Updating Comprehensive Plans

All of the municipalities within the planning area have comprehensive plans, although many are outdated (see Chapter 5). Some of the newer comprehensive plans contain innovative strategies for steering new land development toward areas of existing infrastructure. For example, Middletown Township's 2001 comprehensive plan outlines zoning requirements to promote a balance of developed and open areas. A low-density residential development category assigned to vacant parcels within areas of residential development is intended to guide housing development to areas where lots and infrastructure already exist. The zoning code allows for TDR, a program that directs growth to preferred locations through the sale and purchase of a property's development rights.

It is recommended that municipalities with comprehensive plans that are older than ten years develop current plans that address existing and projected development trends. These plans should contain strategies to encourage development near existing utilities and that preserve contiguous open spaces, such as the Middletown plan described above. This type of strategy can also be used to encourage redevelopment of declining areas by rezoning these parcels in a way that will attract more suitable land uses.

The draft Delaware County comprehensive plan contains objectives and policies that include:

- Repair and maintain the existing public sewer network to ensure its continued life and to provide capacity for extension to areas in need of connection to public sewer service.
- Promote coordinated planning and land use management in order to balance natural preservation with the economic and social needs of the County.
- Promote environmental resources protection through municipal and citizen education regarding existing environmental resources and their value to the community.
- Promote, where feasible, techniques for sewage treatment that involve infiltration or other means to restore and protect the local water regime.
- Adopt programs to manage existing and future on-lot, community, and public treatment systems.

Consistency of Municipal Ordinances with Comprehensive Planning

The revised municipal comprehensive plans should be consistent with the County's comprehensive plan and with updated municipal Act 537 plans. The comprehensive plans should consider the proliferation of small package plants and make recommendations for oversight of the operation of these facilities.

Comprehensive plan revisions need to reflect the current and future vision of the municipality. Zoning and subdivision and land development ordinances or other municipal ordinances that are not consistent with the comprehensive plan and Act 537 plan should be modified to remove outdated statements and reflect current planning. If the existing comprehensive plan is so outdated as to be of little or no value to existing municipal planning efforts, then an entirely new plan should be developed.

RECOMMENDED INSTITUTIONAL ALTERNATIVES

Experiences in other areas of Delaware County and Chester County demonstrate that shared resources and services are cost effective. Therefore, the sharing of resources and staff to perform wastewater management services is recommended.

Uniform Inspection and Maintenance of Private Facilities

In municipalities where an extensive inspection program is currently not already being implemented, it is recommended that all private facilities be inspected at a minimum biennially and preferably annually. The inspection should focus on condition and maintenance of the facilities as well as proper disposal of biosolids. A uniform maintenance program should be developed as a guideline for the contractor/consultant performing these tasks.

Management of On-Lot Disposal Facilities

OLDs are in widespread use in western Delaware County, and the marginal soils in the County can cause these systems to fail. Some communities have already been forced to address failing systems and to develop long-term solutions to replace them.

As with other private disposal facilities, a level of oversight is needed to ensure that they receive the preventative maintenance needed for continued safe operation. It is recommended that an inspection and maintenance tracking program be developed. This program, which could be shared by several municipalities, should include registration of all OLDs, annual submission of maintenance records, and periodic inspections to ensure compliance. Early detection of problems in an area can provide the municipality with valuable time in which to develop a cost-effective long-term solution to failing systems.

An important facet of this program will be a public information/education program. This program will focus on providing the homeowners with clear guidelines on the proper operation and maintenance of their OLDs. Examples of available public educational and information documents from DEP and EPA are provided in Appendix C.

RECOMMENDED ALTERNATIVES BY MUNICIPALITY

The recommended alternatives cover a wide range of issues over the entire study area but are not applicable to every municipality. Table 8-1 summarizes the alternatives that are recommended for each municipality.

TABLE 8-1
SUMMARY OF RECOMMENDED ALTERNATIVES BY MUNICIPALITY

<div style="text-align: center;"> <div>Alternative</div> <div>Municipality</div> </div>	Correct I&I Problems and Develop CMOM Program	Private Facility Uniform Inspection & Maintenance Program	Conveyance & Capacity Studies	Regional Balancing	Reuse of Reclaimed Water	Comprehensive Plan Update (>10 years old)	Municipal Ordinance Consistency with Comprehensive Plan	OLDS Management Program
Aston Township	✓		✓	✓	✓	✓	✓	✓
Bethel Township	✓		✓		✓	✓	✓	✓
Brookhaven Borough	✓		✓	✓	✓	✓	✓	
Chadds Ford Township	✓	✓	✓	✓	✓	✓	✓	✓
Chester Heights Borough	✓	✓		✓	✓	✓	✓	✓
Concord Township	✓		✓	✓	✓		✓	✓
Edgmont Township	✓	✓		✓	✓		✓	✓
Media Borough	✓	✓	✓		✓	✓	✓	
Middletown Township	✓		✓	✓	✓		✓	✓
Newtown Township	✓	✓		✓	✓		✓	✓
Rose Valley Borough	✓		✓	✓	✓	✓	✓	✓
Thornbury Township	✓	✓	✓	✓	✓	✓	✓	✓
Upper Chichester Township	✓		✓	✓	✓	✓	✓	✓
Upper Providence Township	✓	✓		✓	✓	✓	✓	✓

Source: DELCORA, 2003

CHAPTER 9

IMPLEMENTATION OF RECOMMENDED ALTERNATIVES

INTRODUCTION

The purpose of this chapter is to provide a framework and schedule for the implementation of the recommended alternatives highlighted in Chapter 8 of this document. The alternatives are widely varied between municipalities depending upon individual needs; therefore, the implementation schedules vary among the municipalities. For example, the comprehensive plan update alternative will require significant municipal focus to accomplish; however, evaluating reclaimed water use as part of industrial/commercial land development is a relatively simple modification to existing ordinances.

IMPLEMENTATION SCHEDULE

Individual Municipal Schedule

The first step in this process is for each municipality to assess its own individual priorities and to develop a schedule to suit its needs and complement existing individual Act 537 planning. Each municipality should accomplish this assessment during the first year following adoption of this plan. Once priorities and schedules are outlined, funding for longer-term programs can be developed, and mechanisms can be put in place to provide the needed funds when required.

Regional Alternatives Implementation

Several alternatives include multi-municipal programs or special studies. While not every community may rank these alternatives at the top of their list, their implementation can provide benefits for all Delaware County residents. Accordingly, it is recommended that a feasibility study for a regional OLDS management program be undertaken by interested parties beginning early in Year 2 after adoption of this plan.

A second regional alternative involves a study of regional treatment balancing. This study logically follows the individual conveyance and capacity studies, and its schedule will be driven by the individual municipal schedules. The conveyance and capacity studies are also a component of the CMOM program and will likely need to be conducted within three years of implementation to meet anticipated regulatory requirements. Accordingly, the regional balancing study could begin during Year 3 following adoption and should be completed by the beginning of Year 5.

MODEL RESOLUTION FOR ADOPTION

The following is a model resolution for municipal adoption of this Act 537 Sewage Facilities Plan Update.

**RESOLUTION ADOPTING THE DELAWARE COUNTY
SEWAGE FACILITIES PLAN, WESTERN PLAN OF STUDY**

RESOLUTION OF THE (Commissioners/Supervisors/Council) OF _____
(Township/Borough), DELAWARE COUNTY, PENNSYLVANIA (hereinafter "the
municipality").

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

WHEREAS, the Delaware County Planning Department, acting upon authorization from the
Pennsylvania Department of Environmental Protection, did offer assistance to the municipalities
in meeting their Act 537 requirements on a sub-County basis; and

WHEREAS, the (Township/Borough) of _____ did by formal resolution
dated _____, authorize the County of Delaware to prepare the sewage facilities plan
on its behalf; and

WHEREAS, the appropriate municipal officials of the (Township/Borough) have reviewed the
findings and recommendations of that plan and find it to conform to applicable zoning,
subdivision, and other municipal ordinances and plans and to a comprehensive program of
pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED THAT THE (Commissioners/Supervisors/Council) of
(Township/Borough) hereby accept(s) and adopt(s) the *Delaware County Act 537 Sewage
Facilities Plan Revision, Western Plan of Study*, prepared by the Delaware County Planning
Department, April 2004, as an official plan revision for sewage facilities in compliance with the
Pennsylvania Sewage Facilities Act of 1966. The (Township/Borough) hereby assures the
Department of the complete and timely implementation of the said plan as required by law.
(Section 5, Pennsylvania Sewage Facilities Act, as amended).

I, _____, Secretary, _____
(Township/Borough) (Commissioners/Supervisors/Council) hereby certify that the foregoing is a
true copy of the (Township's/Borough's) Resolution No. _____, adopted
_____, 2004.

AUTHORIZED SIGNATURE

TOWNSHIP/BOROUGH SEAL

ACRONYMS

BOD ₅	Biochemical oxygen demand (5-day test)
BTSA	Bethel Township Sewer Authority
CDBG	Community Development Block Grant
CDCA	Central Delaware County Authority
CFTSA	Chadds Ford Township Sewer Authority
CMOM	Capacity, Management, Operation, and Maintenance
COWAMP	Comprehensive Water Quality Management Plan for Southeastern Pennsylvania
CSO	Combined sewer overflow
CTSA	Concord Township Sewer Authority
CWF	Cold water fishes
DCED	Department of Community and Economic Development
DCJA	Darby Creek Joint Authority
DCPC	Delaware County Planning Commission
DCPD	Delaware County Planning Department
DELCORA	Delaware County Regional Water Quality Control Authority
DEP	Pennsylvania Department of Environmental Protection
DER	Pennsylvania Department of Environmental Resources
DRBC	Delaware River Basin Commission
DVRPC	Delaware Valley Regional Planning Commission
EDU	Equivalent dwelling unit
EPA	U.S. Environmental Protection Agency

**ACRONYMS
(Continued)**

FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
gpd	Gallons per day
gpm	Gallons per minute
HDT	Hydraulic detention time
HUD	U.S. Department of Housing and Urban Development
HQ	High quality
I&I	Inflow and infiltration
LF	Linear feet
LS	Lift station
LUPTAP	Land Use Planning and Technical Assistance Program
MF	Migratory fishes
MGD	Million gallons per day
MPC	Municipalities Planning Code
MTSA	Middletown Township Sewer Authority
NPDES	National Pollutant Discharge Elimination System
OLDS	On-lot disposal system
PDH	Pennsylvania Department of Health
PENNVEST	Pennsylvania Infrastructure Investment Authority
PRD	Planned residential development
PS	Pump station

ACRONYMS
(Continued)

PSWPCP	Philadelphia Southwest Water Pollution Control Plant
RHM	Radnor-Haverford-Marple Sewer Authority
S&LD	Subdivision and land development
SAOR	Standard actual oxygen requirement
SDCA	Southern Delaware County Authority
SEO	Sewage Enforcement Officer
SMSA	Standard metropolitan statistical area
SSO	Sanitary sewer overflows
STP	Sewage Treatment Plant
SWDCMA	Southwest Delaware County Municipal Authority
SWMP	Stormwater Management Plan
TMDL	Total Maximum Daily Load
TDR	Transferable Development Rights
TSF	Trout stocking fishes
UNT	Unnamed tributary
UPTSA	Upper Providence Township Sewer Authority
WRTP	Western Regional Treatment Plant
WWF	Warm water fishes
WWTP	Wastewater Treatment Plant

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APPENDIX A

GEOGRAPHIC INFORMATION SYSTEM (GIS) MAPPING

APPENDIX A

GEOGRAPHIC INFORMATION SYSTEM (GIS) MAPPING

Preparation of both the eastern and western Act 537 plans involved the collection, storage, manipulation, and analysis of a great deal of information. Through the use of GIS technology available at DCPD, planning staff were able to compile and evaluate a number of data layers, some of which include zoning (for western build-out analysis), soils (to determine suitability for on-lot septic systems), and most importantly, existing sewage facilities. The degree to which each of these layers was utilized for analysis in the eastern and western areas was a function of the planning issues relative to those areas.

Sewage Facilities Mapping

One of the most significant, and ultimately most useful, products of this Act 537 planning effort is an up-to-date map of the County's sewage facilities. Therefore, as part of this planning effort, DCPD undertook a project to prepare a sewage facilities coverage for the entire County. Since expansion of the sewer system in the West and repair and replacement of the sewer lines in the East are on-going, maps prepared for this effort can be considered a 1999-2000 snapshot of the County's sewer systems.

Through the use of GIS to compile and catalog municipal and authority sewer line maps, the GIS sewer coverage serves as a dynamic tool which can, with periodic updates, serve both local government and the private sector for years to come. While only selected sewer features have been provided in "hard copy" in the document, full access to the sewage facilities coverage and associated attribute tables is available in digital form.

The following is a brief description of the methodology for mapping the sewage facilities for the eastern and western study areas.

East

Most portions of eastern Delaware County have been served by public sewers for many years. There is an extensive regional network of sewer lines and interceptors responsible for collection and conveyance of flows to the two major regional plants (located in the City of Philadelphia and the City of Chester) for treatment of wastewater generated in the eastern study area. For the purposes of GIS mapping, the area was considered almost fully sewered, and decisions made regarding level of detail for the maps were based on issues associated with sewer line extension, maintenance, and repair of the existing system.

Since varying sizes of sewer lines run below almost every residential street in much of eastern Delaware County, a decision was made early in the process to limit the number of sewer lines to be mapped (based in part on cost for digitizing). Generally speaking, all individual gravity lines ten inches or larger and force mains of all sizes were mapped. Attributes relating to size, material, and flow direction of the various lines were

also entered into the GIS database. Large expanses of sewer areas containing lines smaller than ten inches are indicated by shading. All manholes were mapped, and attribute tables containing placeholders for entry of additional data in the future were included as part of the GIS coverage. Pump stations and sewage treatment plants were mapped, and attribute tables containing their associated specifications were attached to the GIS.

Sewer authority boundaries were mapped based on information provided by DELCORA and the various conveyance authorities serving the area. When discrepancies arose between sewer authority maps, a decision was made to delineate the boundaries based on a number of factors including topography, the location of lines, and direction of flow within those lines.

The problem areas coverage for the eastern study area was based on the results of the individual I&I studies conducted by the municipalities and the various sewer authorities. In most cases, the problems are associated with individual lines or line segments. Such areas have been identified on individual municipal maps contained in the document. More information on the specific nature of the various problems can be found in digital form.

West

As noted previously, a major rationale for dividing the County into two study areas was the availability of public sewer service to serve the various municipalities. A secondary issue, not discussed in any detail, was the nature and scope of the sewer network serving each of the study areas (i.e., number of areas utilizing on-lot systems, number of individual municipal sewage treatment authorities, etc.). The western study area is not served by any single regional sewer system. The ages of the various sewer systems, as well as their geographic extent, vary greatly. Many portions of the study area are almost completely unsewered.

Issues associated with the western study area are varied. However, most of the issues are associated with growth and development and the provision of adequate sewage facilities to serve this development. In many of the far northern and western reaches of the County, zoning density and soil suitability for on-lot systems needs to be balanced with water resources and the ability to expand or construct new sewer systems to individually or locally serve the needs of expected development.

In light of the need to fully evaluate the nature and extent of the various sewage facilities serving the western study area, the decision was made to map all of the sewer lines (without size limitation), pump stations, and treatment plants. As with the eastern study area, all sewer authority boundaries have been indicated, and attribute tables are attached to the various features. However, in contrast to the eastern study area, the problem areas mapped are those with on-lot septic systems or other related malfunctions. Information associated with the nature of the various problem areas indicated on the map is available in digital form.

Access to Municipal Sewage Facility Maps

Each municipality and sewer authority will receive the following upon request:

- A CD containing a JPEG version of its sewage facilities for distribution to the public, developers, etc.
- A digital (shapefile) or paper display copy of the map for updating by the appropriate party (municipality, municipal engineer, etc.)

Please contact DCPD's GIS & Information Services section (610-891-5200) to indicate the format you wish to have. At the same time, you may also request data on sewage facilities in adjacent municipalities for analysis purposes.

For acquisition of the digital parcel layer generated and maintained by the County's Board of Assessments GIS Unit, contact Norma Cairo at 610-891-4793, cairon@co.delaware.pa.us. The cost will depend on the density of the linework in the municipality, i.e., the number of megabites per tile. The County's soil layer may be accessed from the following website: <http://mcdc.cas.psu.edu>.

DCPD will be updating the Countywide sewage facilities map approximately every two years. At that time, staff will be requesting a copy of each municipality's current sewage facilities map for inclusion in the Countywide map.

APPENDIX B

LOW-COST FINANCING FOR ON-LOT DISPOSAL SYSTEMS

APPENDIX B

LOW-COST FINANCING FOR ON-LOT DISPOSAL SYSTEMS

Pennsylvania Infrastructure Investment Authority (PENNVEST) provides low-cost financing for wastewater systems across the Commonwealth. In some parts of the Commonwealth, particularly rural areas, it may be more cost effective for individual homeowners to use their own OLDS rather than incur the high costs of constructing long collection lines to service widely scattered properties. As with larger systems, however, these individual OLDS may require improvement, repair, or replacement to meet public health and environment standards.

PENNVEST does have the following requirements and restrictions on the use of these funds:

Eligibility

- All citizens of the Commonwealth, with limited exceptions. Detailed information on eligibility requirements can be obtained from any of the agencies involved in the program by either sending in an information request form or by calling the numbers listed in this section. Alternatively, eligibility information can be obtained from a participating local lending institution or your local SEO.
- Family income must not exceed 150% of the statewide median household income, adjusted annually for inflation. The applicable maximum through December 31, 2001 is \$57,993.
- All areas are eligible for project location unless a community wastewater collection and treatment system is either in place or will be constructed in the next five years.

Eligible Uses

- Rehabilitation, improvement, repair, or replacement of an existing system located on a single-family, owner-occupied property which is the primary residence of the owner.
- Project costs may include construction fees and expenses, permit fees, loan origination fees, and legal fees.

Ineligible Uses

- Construction may **NOT** begin on a repair or replacement project before receiving approval of the loan. Projects will be ineligible for funding from this program if construction starts prior to approval.

Amounts

- Loans up to a maximum of \$25,000.
- Loans at an interest rate of 1% annum.
- Loans must be secured through financial ability to repay the loan, as demonstrated by credit worthiness.

Terms and Conditions

- Loans must be secured by a mortgage on the borrower's home.
- The maximum term of a loan is twenty years, and loan repayment commences within sixty days after the date of loan closing.
- A loan must be immediately repaid in full if the property on which the project is located is either sold or transferred.
- Loan origination and servicing fees will also be charged in connection with a loan.
- A basic requirement of the program is that you keep your upgraded or new OLDS in good repair, have it pumped out regularly, and ensure that it does not malfunction and fail to adequately treat wastewater or cause a public health hazard. A pumping frequency schedule and reporting requirements will be included in your loan agreement.

APPENDIX C

EXAMPLES OF PUBLIC INFORMATION/EDUCATIONAL DOCUMENTS



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

Act 537 #1

UNDERSTANDING SEPTIC SYSTEMS

What is a septic system?

Septic systems (also called “onlot” disposal systems or OLDS) are sewage systems located on the property of the homeowner. They treat and dispose of domestic sewage through natural processes. Liquid waste from a treatment tank percolates through the soil, where it is neutralized and broken down further. Septic system operation and maintenance is the responsibility of the homeowner. In contrast, a centralized sewage system collects and treats sewage from many homes and/or businesses and disposes it off site. Centralized systems often use complex mechanical and chemical treatment methods.

Who uses septic systems?

For many Pennsylvanians, centralized sewage disposal is not an option. In fact, one-third of Pennsylvania residents currently depend on septic systems to treat their sewage. In some cases, this is because many rural areas have no central sewage facility. In other cases, a central facility may have reached capacity due to development, requiring new homes to use septic systems on an interim basis.

How do I obtain a septic system permit?

Anyone who intends to install a septic system with a flow of less than 10,000 gallons per day must use the following generalized process:

1. The lot owner or an agent for the owner applies for a permit through the local agency* Sewage Enforcement Officer (SEO);
2. The SEO for the local agency conducts soil profile examination and percolation tests to determine site suitability;
3. The lot owner or agent completes the permit application by including a septic system design based upon the results of the site suitability testing;
4. The SEO approves or denies the permit within seven days of receipt of a completed application; and
5. If approved, the SEO issues a permit. Installation of a system may begin. If denied, the SEO notifies the applicant and provides opportunity for an appeal hearing.
6. The SEO may oversee any step of installation and must inspect the completed system before coverage and use.

What is an SEO and what are his/her duties?

Certified Sewage Enforcement Officers working for local governing bodies handle the septic system permitting process. This includes the review of soil profiles (deep probes) and percolation tests and the issuance of permits.

What is DEP’s role in the permitting process?

DEP can review, monitor and assist local agencies' administration of the permitting process.

What is a deep probe test?

The first test on the site is a deep probe test. In this test, a backhoe pit is dug as deep as eight feet. The SEO enters this pit to examine the make up of the soil (soil profile). From this, the SEO will determine the suitability of the soil for a septic system. If the soil is determined suitable for a type of system (standard or alternate), then a percolation test will be performed. If the soil is determined unsuitable, no permit will be issued.

What is a percolation test?

A percolation (“perc”) test measures the rate at which water moves through soil. The test is to determine if the soil will allow water to drain quickly enough to support a properly working septic system. The following process is used to perform a percolation test:

1. A minimum of six holes are dug in the area of the proposed absorption field;
2. The soil is soaked before the actual test to reproduce wet season operation;
3. The day of the test, a final soaking is completed for one hour; and
4. The actual test then begins with a series of measurements of water level drop done at 10 or 30 minute intervals. This test may take as long as four hours or as little as 40 minutes, depending upon the type of soil. (Very sandy soils usually take less time to test than soils with a lot of clay.)

It is very important to realize that although the effluent from a septic or aerobic tank is partially treated, it still contains substances that can affect the groundwater, such as viruses, pathogens and nitrates. The soil is a critical component of an efficiently running system. Regular maintenance of the system also is necessary to ensure long-term operation.

* The local agency may be the municipality, a multi-municipal organization, county or joint county Department of Health.

There are several variations to the standard septic system depending on soil, site and operational conditions. They are:

- | | |
|---------------------------|---------------------------|
| 1. Standard trench | 4. Elevated sand mound |
| 2. Seepage bed system | 5. Individual residential |
| 3. Subsurface sand filter | spray irrigation |
| | system (IRSIS) |

For more information on these variations, please contact your local SEO (obtain address/phone number from your municipality's government office).

How does a septic system function?

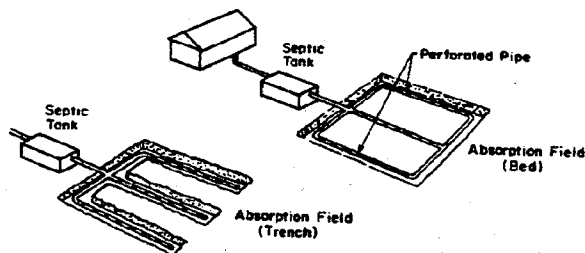


Figure A: Gravity Distribution Systems

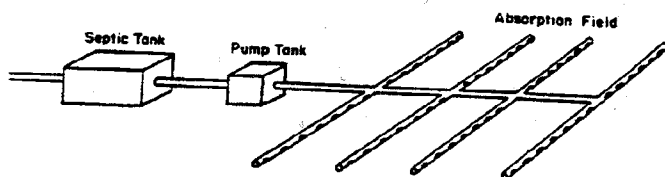


Figure B: Pressure Distribution Systems

1. Sewage, both human waste and water used for bathing and washing, flows to the **septic tank**. Here, primary treatment of the sewage takes place. The heaviest matter falls to the bottom of the tank forming **sludge**. Lighter matter (**scum**) floats on top of the liquid (**effluent**). Sludge and scum must be pumped out regularly.
2. Septic tank effluent then flows to a **distribution box** or a **solid header** in gravity flow systems (see Figure A) or to a **pump tank** in pressurized systems (see Figure B).
3. In both types of systems, the septic tank effluent is then directed to an **absorption area** constructed of pipe placed within a layer of gravel, and percolates through the soil for additional treatment. The soil neutralizes many of the contents of the wastewater and converts the others to different forms.

How often must my septic tank be pumped?

Up to 50 percent of the solids retained in the tank decompose; the remainder accumulate in the tank. A septic tank should be pumped out at least every three to five years, or according to your local sewage management program which may require more frequent pumping.

Under current Pennsylvania law, a 900-gallon septic tank must be used for a home with three bedrooms or fewer. If six people reside in a three-bedroom house, the tank should be pumped every 1.3 years. If the same system serves a family of two, the tank would be pumped every 5.2 years. Systems installed before 1971 may have septic tanks smaller than 900 gallons. These tanks may need to be pumped more than once a year.

What if my lot conditions do not meet the requirements for a standard septic system?

If your particular lot conditions do not allow the installation of a standard septic system, some alternates may be available. Your local SEO can help find the best system for you depending on your specific site, soil and operational conditions.

How do state and local actions protect Pennsylvania's public health and water quality?

The Pennsylvania Sewage Facilities Act (Act 537) was enacted in 1966 to set uniform standards for the construction or repair of any sewage disposal facility. The two main goals of Act 537 are to correct existing disposal system problems and to prevent future problems. To reach this goal, Act 537 requires the planning of all sewage facilities and the permitting of on-lot sewage disposal systems.

Provisions of Act 537 administered by DEP include:

1. Training and certifying SEOs;
2. Providing technical assistance;
3. Reviewing official sewage plans and revisions;
4. Awarding planning grants to local agencies; and
5. Reimbursing local agencies for permitting expenses.

Where can I obtain more information on septic-related questions?

For more information on onlot sewage disposal systems, contact your local SEO or the DEP regional office serving your county.



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

ACT 537 #4

PROCESS FOR RESOLVING COMPLAINTS ABOUT MALFUNCTIONING ONLOT SEWAGE DISPOSAL SYSTEMS

Under the Pennsylvania Sewage Facilities Act (Act 537 of 1966, as amended), local governments have substantial powers and primary responsibilities for administering and enforcing major portions of the Act 537 sewage facilities program. Among the many responsibilities:

- A municipal government (such as township board of supervisors, borough council or city council) must develop and implement an approved official sewage facilities plan that addresses existing sewage disposal needs or problems, accounts for future land development and provides for future sewage disposal needs of the entire municipality. The official plan must be revised when new subdivisions are proposed or when the plan becomes outdated for various reasons.
- A local agency must handle the permitting program for the installation or repair of individual and community onlot sewage disposal systems with a flow of 10,000 gallons or less each day. ***The local agency, through its Sewage Enforcement Officer (SEO), must investigate complaints about malfunctioning onlot systems and, if necessary, take enforcement actions to ensure proper repairs.***

This fact sheet provides information on the roles and responsibilities of local agencies and their SEOs in handling and resolving complaints about malfunctioning onlot sewage disposal systems. (Onlot systems are more commonly referred to as septic systems.)

What is a Local Agency?

A local government that is able to administer its onlot sewage disposal permit program is called a local agency. To qualify as a local agency, the local government must employ a certified Sewage Enforcement Officer (SEO) to perform activities including: 1) issue, deny or revoke septic system permits in accordance with state regulations and standards; 2) inspect newly-installed systems to ensure proper installation; and 3) investigate and resolve septic system malfunction problems. The certified SEO is employed by and works for the local agency, not the PA Department of Environmental Protection (DEP).

Qualifying local agencies can be one of the following:

- A single municipality;
- A combination of municipalities acting jointly; or
- A county or joint-county Department of Health.

Local agencies, usually through their SEOs, are by law responsible for investigating complaints of malfunctioning septic systems and ensuring that the malfunctions are properly repaired. Where system repairs are not made voluntarily, local agencies must take enforcement actions against responsible property owners. (The local agency also is responsible for taking action against property owners with illegal septic systems that were installed without prior permit approval.)

Where and how should septic system malfunctions be reported?

Complaints about malfunctioning septic systems should be reported directly to the local agency, SEO or the local government officials (township, borough or city officials) with jurisdiction in the municipality where the malfunction exists. Depending on each municipality's rules and procedures, complaints may have to be made in writing. Complaints received by DEP's service representatives will be directed to the appropriate local agency and/or SEO.

What should happen once a complaint is received?

When a certified SEO or local official receives a complaint, the local government should take certain steps, including:

- Local official may issue a letter notifying the property owner of the alleged malfunction and allowing for voluntary compliance if a malfunction exists. Some local agencies bypass this step and first require the certified SEO to conduct an initial site investigation to document the conditions. If there is a malfunction, the SEO will try to determine the causes of the malfunction and to decide the extent of the repair needed to correct the problem. Corrective action may be as simple as requiring a septic tank to be cleaned or as complex as installing a new system at a new location.

- Local agency issues a Notice of Violation to the responsible property owner requiring the submission of a sewage permit application for the proper system repair. The local agency can often persuade the responsible property owner to take appropriate corrective action. If the responsible property owner fails to voluntarily take proper corrective action, the local agency and SEO should take appropriate legal actions, generally with the assistance of the municipal solicitor.
- SEO issues the responsible property owner a permit to repair or replace the malfunctioning system after any necessary site testing has been done and an acceptable system design has been submitted.
- Responsible property owner begins the repair/replacement activities as approved by the permit. Heavy rains or frozen soils could delay the repair/replacement activities until conditions improve.

What should the person making a complaint expect from the local agency and SEO?

The local agency or SEO should acknowledge a complaint and investigate serious complaints in a timely fashion. Normally, the SEO should contact the owner of the alleged malfunction within one week of receiving the complaint. An actual site visit, if necessary, should be scheduled promptly.

The person making the complaint should not expect a final resolution of a serious malfunction to occur "overnight." The various steps to resolving a serious malfunction take time; investigating the site, testing soils, processing the sewage permit application, designing the repair system and conducting the repair. Also, the timing of the field activities are dependent on the weather.

If legal action is required by the local agency to get the responsible property owner to resolve the serious malfunction, additional delays can be expected. Complainants need to give their local officials time to do the job.

What happens if the malfunction problem is not resolved?

If the responsible property owner fails to repair the malfunction, the person making the complaint should go back to the local agency and renew the complaint. That person also may wish to seek private legal assistance to help resolve the matter.

What are DEP's roles and responsibilities for resolving malfunction problems?

DEP's role in the onlot sewage disposal program is one of oversight. Under Act 537 and its regulations, the responsibility for investigating and resolving malfunction problems was explicitly given to local agencies, not to DEP. For that reason, DEP does not ordinarily get

directly involved in matters that are strictly the responsibility of local agencies. DEP's responsibilities under the onlot sewage program include:

- Training and providing technical assistance to SEOs and local agencies to ensure that they can effectively perform their activities;
- Routinely evaluating the performance of each certified SEO and each local agency. Appropriate action is taken where an evaluation reveals inadequate or inappropriate municipal or SEO response to complaints about system malfunctions or other violations of Act 537 or the rules and regulations; and
- Providing grants and reimbursements to local agencies and SEOs for permitting and enforcement activities which are consistent with Act 537 and DEP's rules and regulations.

While DEP will not ordinarily intervene in individual complaints, it is DEP's responsibility to take action where a pattern of unresponsiveness on the part of an SEO or municipality is observed. DEP action could include:

- The suspension or revocation of an SEO's certification;
- The withholding or reduction of a local agency's reimbursement for the administration of the program; and/or
- The issuance of a formal order to compel a local agency to adequately administer the program.

In addition to providing training and technical guidance to handle individual septic system problems, DEP works cooperatively with municipal governments to correct areas with multiple malfunctions. During the process of updating an official municipal plan, a schedule is developed either to provide comprehensive municipal repair and management of area-wide problems, or to construct community sewage collection and treatment systems to replace the failed septic systems.

Are there indications of a septic system in trouble?

Yes. There are many indicators of a malfunctioning septic system. Some indicators can be very obvious to the property owner while others may require more careful observation. The indicators may include:

- Toilet runs sluggishly;
- Sewer odors in the house and/or drinking water;
- Sponginess around septic tank, distribution box, dosing tank or absorption area;
- Surfacing raw sewage;

- Dosing pump runs constantly or not at all;
- Dosing tank alarm light is on; and/or
- Backup of sewage into laundry tubs or other fixtures.

What can property owners do to prevent septic system malfunctions?

Properly designed and installed sewage disposal systems function better and longer with proper maintenance. Most of the following recommended maintenance activities are simple and inexpensive for the property owner to implement:

- Conserve water and reduce wastewater flow into the septic tank;
- Have the septic tank pumped at least every three-five years, depending on tank size and household size;
- Avoid putting harsh chemicals in the septic system;
- Do not use the toilet to dispose of bulky, slowly decomposing wastes'
- Divert run-off from downspouts, sump pumps, and paved surfaces away from septic tank and sewage disposal area;
- Keep heavy vehicles, equipment and livestock away from the septic system; and
- Do not plant trees and shrubs over or close to the septic system.



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

ACT 537 #7

APPEALING A LOCAL AGENCY DECISION UNDER ACT 537

What is a local agency?

A **local agency** may be a municipality, a combination of municipalities acting cooperatively or jointly, a county, a county department of health or a joint county department of health that administers the provisions of the Pennsylvania Sewage Facilities Act (Act 537) on the local level. One of the administrative functions of the local agency is to review applications and issue permits for the installation of onlot sewage disposal systems. The local agency official who reviews applications for onlot sewage disposal system permits and issues the permits on behalf of the local agency is known as the **Sewage Enforcement Officer**, or SEO.

What permitting actions of the local agency are appealable?

If the local agency either issues or denies a permit for an onlot sewage disposal system after review of a permit application, either of these actions would be appealable. The revocation of a previously issued permit also is an appealable action. However, a local agency finding that the application for an onlot sewage disposal system permit is incomplete is not an appealable action.

Who may appeal a local agency permitting decision?

Anyone who disagrees with a local agency permitting decision may appeal that action. For example, neighboring property owners may appeal the issuance of a permit on an adjoining lot. If an application for a permit has been denied, the affected property owner may appeal the denial. If the local agency revokes a permit that it has previously issued, the affected property owner may appeal the revocation action.

How much time do I have to appeal a local agency permitting action?

The filing deadlines vary depending upon the action being appealed. A written appeal of the issuance or denial of a permit must be filed within 30 days of the action (issuance of the permit or receipt of the written notice of permit denial) or the right to a local agency hearing expires. In the case of a permit revocation, the appeal must be filed within 10 days of receipt of the written notice of revocation or the revocation action becomes final.

Where do I file an appeal of local agency permitting action?

The appeal must be filed with the local agency serving the area in which the permit was issued.

If I am opposed to the issuance of a permit, how will I know when the permit has been issued?

In order to know when a permit has been issued, you may request to be notified by the local agency. Alternatively, you may check for the posting of the permit on the lot. This is required prior to the start of construction of the onlot sewage disposal system.

If I file an appeal of a permit issuance, must construction on the lot stop?

Appeal of an issued permit does not stop construction on the lot; therefore, the appeal should be filed as soon as possible following permit issuance.

If my permit is revoked and I file an appeal of the revocation, may I continue to construct my home or sewage system?

Appeal of a revocation does NOT allow construction on the lot to continue. No further construction or use of the sewage system or the structure it is to serve may occur until a new permit is issued.

How soon can I expect a hearing of my appeal to be held?

The local agency must hold a hearing within 30 days of receipt of an appeal. The local agency must inform both the appellant and DEP of the date, time and location of the hearing, and must be prepared to defend its actions during the course of this and any subsequent appeal.

How should I prepare for the hearing?

You should gather any evidence that is available to support your contention that the local agency action was unjustified. You should also make arrangements with any experts or witnesses that you may want to have testify at the hearing in support of your position.

What will happen at the hearing?

At the hearing, you will be given the opportunity to formally present the reasons that you think the local agency decision was unjustified. You may have experts

or witnesses testify in support of your position, and submit evidence gathered by you or your expert(s). You also may question the SEO or any experts providing testimony or evidence for the local agency. The local agency, its SEO and experts, if any, also will be given the opportunity to present evidence and testimony in support of the local agency's position. After all evidence and testimony has been presented, the local agency will render its decision on the appeal.

How will I know what the local agency has decided?

The local agency will inform you of its decision in writing within a reasonable time, usually two to four weeks.

What are my options if the local agency does not find in my favor?

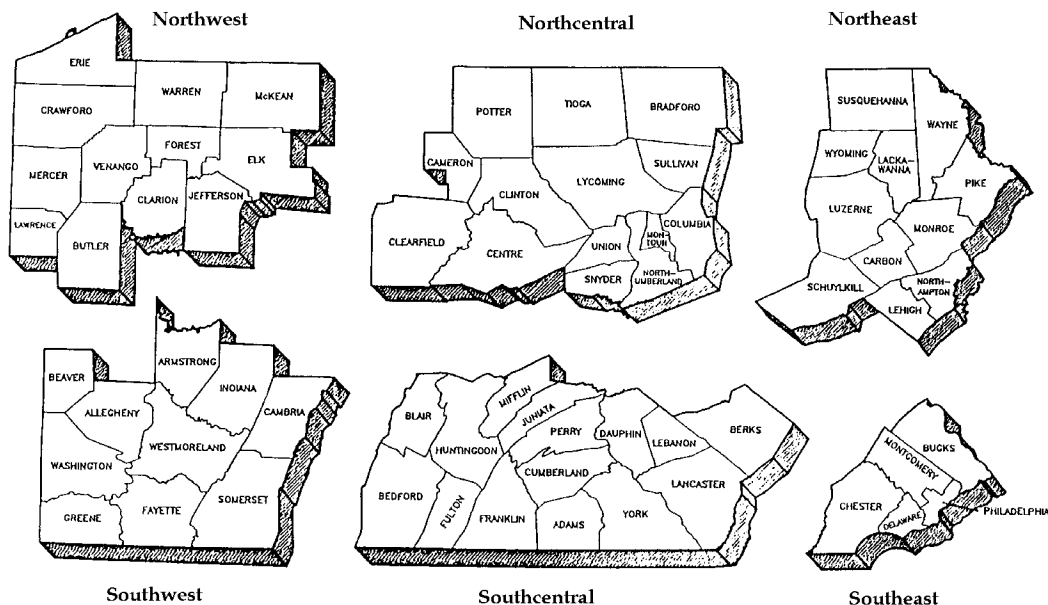
In the event of an unfavorable decision, you may choose to appeal the local agency's decision to the county Court of Common Pleas.

Whom should I contact if I want additional information regarding filing an appeal of a permitting action?

The local agency is solely responsible for appeals of permitting actions. You or your representative should contact the local agency for more information.

For more information,
call the DEP regional office in your area or contact:

Department of Environmental Protection
Bureau of Water Supply and Wastewater Management
P.O. Box 8467
Harrisburg, PA 17105-8467
(717) 783-3795



This fact sheet and related environmental information are available electronically via Internet. For more information, visit us through the PA PowerPort at <http://www.state.pa.us> or visit DEP directly at <http://www.dep.state.pa.us> (directLINK "Wastewater").



www.GreenWorks.tv - A web space dedicated to helping you learn how to protect and improve the environment. The site features the largest collection of environmental videos available on the Internet and is produced by the nonprofit Environmental Fund for Pennsylvania, with financial support from the Pennsylvania Department of Environmental Protection, 877-PA-GREEN.



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

ACT 537 #8

BONDED DISPOSAL SYSTEMS AND SOIL MOTTLING

This fact sheet addresses some commonly asked questions regarding the bonded sewage disposal system process described in Act 537, and in Title 25, Pennsylvania Code, Chapter 73 §73.77. This regulation, as well as others, may be found at www.pacode.com. If you choose the “bonded disposal system” process, the “Bonded Disposal System Confirmation” form (3800-FM-WSWM0148), while not required to be used, may be helpful. This form is available electronically on DEP’s website at www.dep.pa.state.us (directLINK “Wastewater”).

Note: For more information on soils, soil mottling and onlot sewage disposal, please see the DEP Fact Sheet - “Understanding the Importance of Soils in Siting an Onlot System” on the DEP website at www.dep.state.pa.us (directLINK “Wastewater”).

What is soil mottling and why is it important?

The Pennsylvania Sewage Facilities Act (Act 537) defines soil mottling as “a soil color pattern consisting of patches of different color or shades of color interspersed with the dominant soil color which results from prolonged saturation of the soil.” The presence of soil mottling is a strong indicator of a “seasonal” or “perched” water table (the water table’s highest level reached during wet periods of the year). The water table may rise to within 20 inches of the soil’s surface inside the absorption area of a septic system. If this occurs, then the soil depth necessary for proper sewage treatment will not be available because the soil will become saturated. In saturated soils, the oxygen needed for sewage treatment has been replaced by water. The bacteria necessary to treat the sewage need oxygen to survive. This condition can result in untreated or insufficiently treated sewage polluting the groundwater (often the only source of potable water), pooling on the surface of the ground and/or backing up into the house. Such conditions can pose a serious health hazard.

If I have soil mottling on my lot, is there anything I can do?

There are rare instances when soil mottling is **NOT** the result of a seasonal or perched high water table. To determine if this is the case on an individual lot, Act 537 provides a procedure by which a property owner can have his lot tested when they detect soil mottling. If the testing procedure is used and demonstrates that the soil mottling is not the result of a seasonal or perched high water table, the property owner may be able to obtain a permit from the municipality or local agency to install a type of onlot system called a **bonded disposal system**. The

remainder of this fact sheet discusses the bonded disposal system application process.

Under what conditions may the bonded disposal system process be used?

The bonded disposal system process can be used if the **ONLY** reason a lot does not meet the requirements for the installation of an individual onlot system is evidence of soil mottling that is **NOT** the result of a seasonal or perched high water table.

What is a bonded disposal system?

A bonded disposal system is an individual sewage disposal system serving a single family residence located on an individual lot where soil mottling exists within 20 inches of the mineral soil surface. The installation, operation and replacement of this type of system is guaranteed by the property owner through the posting of a bond. Please note that the individual residential spray irrigation system (IRSIS), a different type of system that can also be installed on soils having soil mottling within 20 inches of the mineral soil surface, is **NOT** included in this definition. A property owner whose lot has soil mottling within 20 inches of the surface may want to investigate the possibility of installing an IRSIS before proceeding with the bonded disposal system process.

How can I find out if the only reason my lot failed was the presence of soil mottling?

While the Sewage Enforcement Officer (SEO) must make several determinations on a given lot to evaluate its suitability for onlot sewage disposal, most of these measurements should have been completed and found acceptable before conducting the soil profile evaluation that revealed the soil mottling.

The remaining test is called a **percolation**, or “perc,” test. This test is completed last because the depth of the holes used in the percolation test will depend upon the results of the soil profile evaluation.

The SEO uses the soil profile evaluation to determine the soil’s depth to **limiting zone**. DEP regulations define a limiting zone as a soil horizon or condition in the soil profile or underlying strata which includes one of the following:

1. A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling;
2. A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments; and
3. A rock formation, other stratum or soil condition that is so slowly permeable that it effectively limits downward passage of effluent.

If the SEO examines the soil profile and finds any of the above three conditions within 20 inches of the mineral soil surface, the lot is deemed unsuitable for installation of an onlot sewage disposal system. Normally, the percolation test is not scheduled and a permit for an onlot sewage disposal system is denied. However, under the bonded disposal system process, if the lot failed due to the presence of soil mottling (case #1), the permit applicant can request that the percolation test be completed despite the results of the soil profile examination. The percolation test is required before a permit can be issued because the results of the test help determine the proper size and design of the onlot system.

How do I go about requesting a percolation test?

A written request must be submitted to the local agency. If this procedure is followed, the local agency is required by law to conduct the percolation test, at the expense of the applicant.

A note of caution: Although the law says that the applicant’s first step is to request a percolation test, it is advisable for the applicant to hire a soil consultant to re-evaluate the soil profile first for several reasons. First, it is almost impossible to know the depth at which to run the percolation test without knowing the correct depth to limiting zone. If the percolation test is completed at the wrong depth, it cannot be used in sizing the onlot system and must be reconducted at the correct depth. Since the percolation test is generally the more expensive of the two tests, it is best to run it only once. Second, if the soils expert you hire agrees with the SEO’s determination that the mottling is due to a perched or seasonal high water

table, the onlot disposal system will not work properly and there is no reason to run the percolation test. For these reasons, DEP suggests that the applicant have his/her soils expert examine the soil profile first.

You must notify the local agency in writing at least seven days before any testing is conducted at your site, so that the local agency representative may observe the evaluations and/or review the results.

Who would be considered a qualified soils expert?

You can hire any qualified soil scientist, qualified registered professional geologist, certified sewage enforcement officer or qualified registered professional engineer to evaluate your soils, provided the person is not employed by the local agency with control over your property.

What do I do after my site has been evaluated by the soils expert?

If your expert determines that the original soil profile evaluation was accurate and that the soil mottling on your site displays evidence of a perched or seasonal high water table, you have the option of appealing the original permit denial to the local agency. You must file for this appeal within 30 days of the date of the permit denial. The DEP Fact Sheet, “Appealing a Local Agency Decision Under Act 537” on the DEP website www.dep.state.pa.us (directLINK “Wastewater”) describes the appeal process in detail.

While it is unlikely in this case that the local agency’s decision will be overturned, you can also work with your local agency SEO to investigate other possible sewage disposal options.

If, however, your expert finds that the mottling on your site is not an indication of a seasonal or perched high water table, and the expert is willing to put his or her findings in writing, you have two options:

1. You may choose to appeal the original permit denial, as described above. You may use your expert’s soil profile appraisal, as well as any other available evidence, to argue for a reversal of the local agency’s decision; or
2. You may request a permit to be issued by the local agency under the bonded disposal system procedure. In this option, you would pose a written request for the local agency to perform a percolation test based on the written findings of your soils expert. Your expert may actually conduct the percolation test as long as the local agency’s SEO is present to observe the test. If the results of the test are unsuitable per DEP regulations, this demonstrates that the soil

mottling present on the lot is not the only reason for the lot's unsuitability for onlot sewage disposal. The process stops at this point if the local agency cannot issue a permit for an individual residential onlot disposal system that meets DEP regulatory standards (as required by law). If, however, the percolation test results fall within acceptable standards as defined in DEP regulations, Act 537 requires the local agency to issue a permit if all of the following requirements are met:

- The individual residential onlot sewage system must be designed in accordance with DEP regulations. The property owner is required to obtain the design, which the local agency SEO will review to determine if it is in compliance with the Act and regulations.
- The property owner must provide, and the local agency must accept, evidence of financial assurance (bond) in an amount sufficient to cover the reasonably anticipated cost to repair or replace the onlot system, clean up contaminated groundwater and replace any contaminated water supplies in the event of a system malfunction. The minimum amount the local agency may accept under the law is \$20,000 or 15 percent of the appraised value of the lot and proposed house, annually, up to three years. At its discretion, the local agency may require an additional two years of financial assurance. The local agency must also establish the procedures to be followed if the financial assurances must be forfeited due to a system malfunction and/or the type of additional financial assurance required if the original system is replaced. By law, the local agency may offer, for a fee, financial assurance for bonded disposal systems. This is a choice of the individual agency; you should check with your local agency to see if they offer this option; and
- The property owner must document that the property deed contains a clause clearly stating the presence of soil mottling on the property and that an individual onlot sewage system meeting the requirements of Section 7.2 of Act 537 was installed on the property.

Who is responsible for the local agency's costs incurred in review of my application?

The permit applicant must pay for any costs incurred by the local agency for review of the application. These costs can include those incurred for technical and legal review of the application, as well as consultant or legal fees for establishing the term or amount of the financial assurances and forfeiture procedures.

How long must I maintain the financial assurances?

The law requires the local agency to waive the financial assurance requirements five years after the date they were established.

Who is liable for the bonded disposal system in the event of a malfunction?

The law excuses the municipality, local agency SEO and DEP from liability for the performance of bonded disposal systems. The local agency that issued the permit for the system could be liable if it chose to offer the financial assurance itself. In this case, the local agency would only be liable for the amount established in the financial assurance agreement.

If the bonded disposal system malfunctions to the ground surface or pollutes the groundwater while the financial assurances are in effect, the financial assurances must be forfeited to the local agency. The funds must be used to correct the malfunction, clean up any contaminated groundwater and replace any contaminated water supplies. If the amount of the financial assurance is insufficient to cover these costs, the property owner is liable for any additional costs. If the system malfunctions after the financial assurances are waived by the local agency (three to five years following permitting of the system), the property owner is liable for the costs.

If I need additional information on this process, whom can I contact?

The local agency is solely responsible for administering the Act 537 permitting program. DEP recommends that you direct any specific questions to your local agency and/or SEO.



Fact Sheet

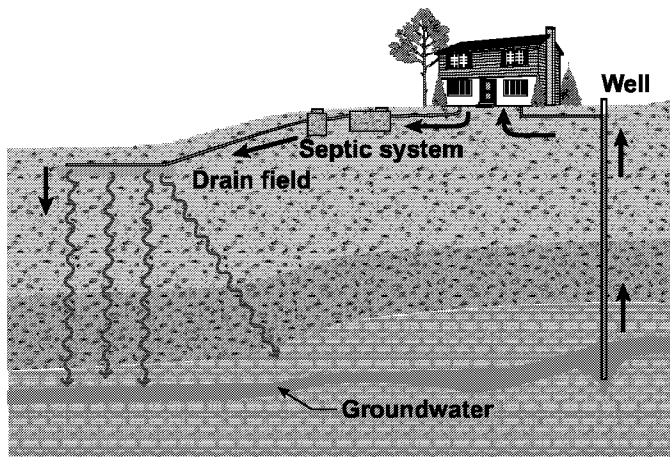
Commonwealth of Pennsylvania • Department of Environmental Protection

ACT 537 #9

UNDERSTANDING THE IMPORTANCE OF SOILS IN SITING AN ONLOT SYSTEM

Why is having a properly functioning onlot system important?

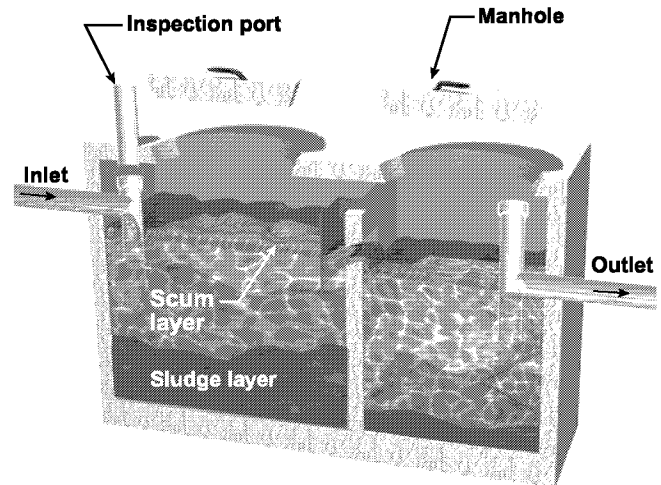
Groundwater is the primary source of drinking water in areas served by individual and community wells; therefore, keeping the groundwater free of contamination is very important. Water that carries sewage from a household or business to an onlot sewage disposal system (sometimes called a septic system) will eventually re-enter this same groundwater. Onlot systems, when properly designed, operated and maintained, will treat this wastewater so that it may safely be used again. Onlot systems that are not functioning properly do not treat sewage to a level that is safe and can discharge improperly treated sewage to the surface of the ground and/or to groundwater. Improperly treated sewage carries bacteria and viruses known to cause may human diseases, such as gastroenteritis, diarrhea and dysentery.



Groundwater Flow
Onlot Sewage Disposal System

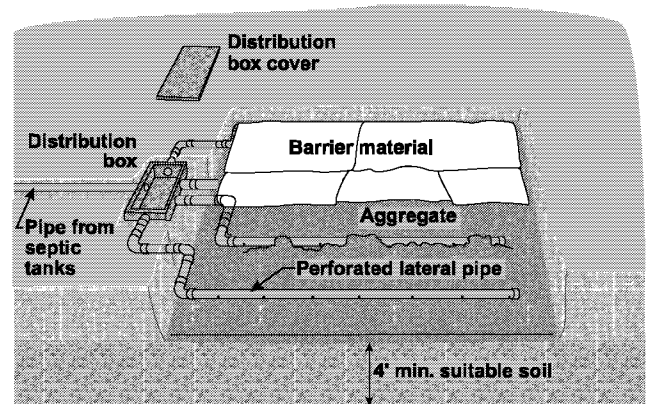
How does an onlot system treat sewage?

The sewage from household plumbing first enters a treatment tank, where primary treatment occurs. The heavier solid matter settles to the bottom of the tank, where microorganisms feed on and break down the waste. Lighter fats, oils and greases float to the top of the tank, forming a scum layer. Wastewater leaving the treatment tank is cleaner, but still contains disease-causing bacteria and viruses, as well as other contaminants, which must be further treated before reaching groundwater or other water supplies.



Treatment Tank

From the treatment tank, the partially-treated sewage passes through a distribution system of piping and into a bed of gravel (aggregate). The sewage flows over the gravel and then into the underlying soil. In a properly sited onlot system, further treatment is provided by this soil. The soils are the most important part of your onlot system because they provide a treatment "barrier" between untreated sewage and water supplies.



Soil Absorption Area

What soil conditions are needed to treat sewage?

About four feet of suitable soil is needed under the gravel layer to treat sewage. Good soil for sewage treatment is relatively free of rock and not saturated with water. The soil structure must allow the liquid waste to

pass through at a suitable rate. The waste must pass slowly enough to allow the microorganisms time to feed on the harmful material, yet fast enough to dispose of the amount of liquid waste entering the absorption area. While soils rich in clay treat sewage most effectively, the fine pores of many of these soils slow the downward movement or percolation of sewage, which may cause backups to the surface of the ground. Soils rich in sand allow rapid percolation to dispose of sewage but do not hold the sewage long enough to treat it adequately before it reaches groundwater. Treatment continues in the soil until rock or soil saturated with liquid is encountered. Rock allows sewage to move quickly into groundwater without proper treatment. Saturated soils do not provide the aerobic (oxygen rich) conditions needed by microorganisms to treat sewage.

Partially treated sewage reaching either rock or saturated soils will enter the water supply. Any contaminants or disease-producing organisms present in the sewage will be in the glass of water you drink from your polluted well. Viruses can survive in groundwater in excess of one year.

How do I know if my soils will properly treat sewage?

As part of the evaluation of a building lot to be served by a septic system, the sewage enforcement officer (SEO) employed by your local or county government evaluates soils by examining a soil profile. This is an excavation (commonly called a soil profile or deep probe) of the soil near the proposed location of the absorption area. The SEO enters the excavation to evaluate the soil's texture, structure and color. The SEO also looks for signs of rock and saturated soils. A percolation test is performed to determine soil permeability (the rate of water movement through the soil). If the results of these soil tests show that the soils can properly treat sewage, a system may be installed. If there are problems with the soils, systems designed to overcome these soil limitations, such as an elevated sand mound, may have to be used. If the soils are unsuitable, no septic system may be installed. This is why it is important to have soils testing done before committing to the purchase of a building lot.

How does water move through the soil?

Rain and other sources of water move through the soil until the water reaches a barrier (called a limiting zone). In some cases, rock or tight layers of clay will slow down water movement and cause saturation of the soil above the barrier. During wet periods in the fall or spring, these water levels rise close to the surface of the soil. The closest the water table comes to the surface of the ground is called the seasonal high water table. In drier periods of the year, the water level drops. If the water table rises close to the surface within a septic system's absorption area, the soils will become saturated and cannot treat sewage. If the depth of this seasonal high

water table is too close to the surface, the site may be unsuitable for any soil-dependent onlot system.

If an SEO evaluates a soil profile during the wettest part of the year, water will usually fill the hole to the level of the seasonal high water table. At other times of the year, this water table may be below its highest level, and the SEO must look for other evidence of the highest level the water will reach. The SEO looks for soil structure, signs of restrictive layers of soil, depth of root penetration and soil mottling.

What is soil mottling and why is it important?

Soil mottling is a contrasting or "blotchy" color pattern within the dominant soil color. It is formed when the seasonal high water table rises into aerobic soils changing the conditions in the soils from aerobic (oxygen rich) to anoxic (without oxygen). The types of bacteria that can live under these two conditions are different. Bacteria living under aerobic conditions die when the water table rises because the oxygen in the soil is replaced by water. Anoxic bacteria begin to thrive because they can use certain oxides (oxygen bonded to iron and manganese) in the soil to survive. When the bacteria use the oxygen bonded to the iron and manganese, these minerals change color and dissolve into the water around them. When the water level begins to drop, these dissolved minerals stick to the surface of soil particles as yellow, red, orange, brown, blue or black coatings or a combination of these colors. Areas from which all of these minerals were removed because of long saturation periods become gray in color (called soil gleying).

The SEO can use soil mottling and soil gleying as indicators of a seasonal high water table regardless of what time of year the soils are evaluated. Any sewage reaching this water table, without first passing through a minimum of four feet of suitable soil, will enter the water table improperly treated. In saturated soils caused by seasonal high water table, sewage often backs up onto the surface of the ground because the soil already contains all of the liquid it can absorb. Soil clogging also occurs in the absorption area as slime produced by anoxic bacteria accumulating in the soil, gravel and piping.

Is mottling the reason a site is not suitable for use of a septic system?

No. The reason a site would be found to be unsuitable for an onlot system is that the mottling found at a specific depth documents that the seasonal high water table reaches that level. The seasonal high water table is the reason the site is unsuitable.

Are the colors of mottled soils and the amount of color the same in all soils?

No. Factors such as the length of time the soil is saturated each year, the original soil color, the amount of iron and manganese oxides in the soil, the amount of

oxygen trapped in the soil during saturation periods, the soil temperature, and the types of bacterial populations in the soil all can influence the color and intensity of mottling in the soil.

Does the amount of mottling or the intensity of the color influence the SEO's decision regarding suitability of the lot for septic system use?

No. The tests for other factors that influence mottling are unreliable and complex. The SEO must make a decision regarding seasonal high water table based primarily on the presence or absence of a uniform depth of soil mottling or direct observation of water in the soil profile. This determination may be supported in some cases by additional information, such as the presence of deeper restrictive layers of soil or rock which would cause the seasonal water table to rise in the soil.

Doesn't mottling only occur in clay soils in lowland areas or flat areas near streams where drainage is poor?

All soils containing manganese or iron oxides, even sandy soil or well drained soils, will produce mottling when saturated because of a seasonal high water table. While lowlands, flat areas and areas near streams commonly have mottled soils, many other areas, including uplands, hillsides, farmland and wooded land, may also have mottled soils. This is because the presence of restrictive layers in the soil is very common in this state. These restrictive layers, as discussed before, often cause seasonal high water tables and the accompanying mottled soils.

My property has a seasonal high water table, so I conducted a percolation test during dry weather. The percolation test passed. Does that mean that the system will work even though there is a seasonal high water table at a depth which makes the lot unsuitable for an onlot system?

No. A percolation test conducted during dry weather may result in an average rate that falls within the acceptable range. This may occur when the water table has dropped below the depth of the percolation test holes. However, when the water table is high, saturated

soils will be found closer to the surface. Saturated soils cannot treat sewage effluent.

I don't have four feet of suitable soil on my property, but the SEO issued a permit for an elevated sand mound. How does this system work?

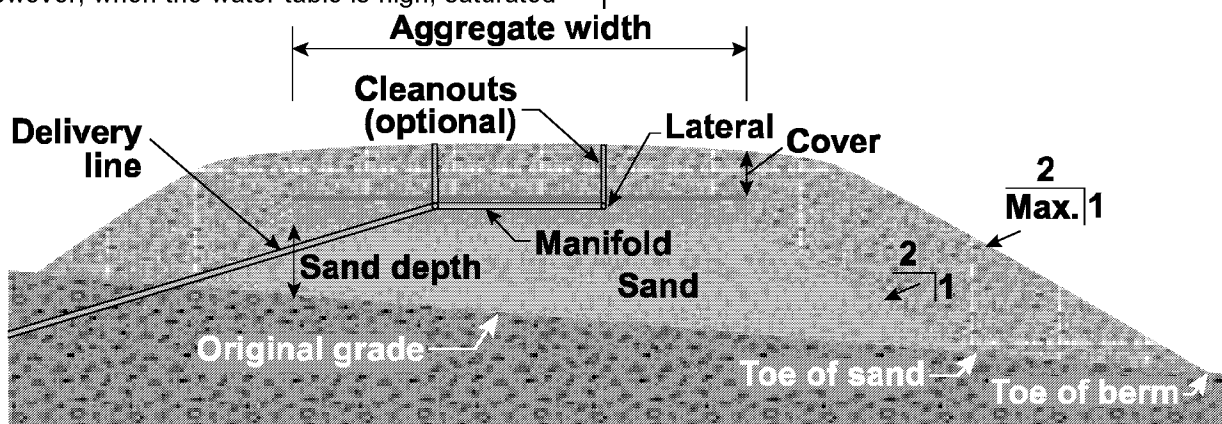
The elevated sand mound system (illustrated below) makes up for the lack of natural suitable soil by using a special blend of sandy fill material. The sandy fill material is placed on top of the natural soil. The piping and gravel are then placed on top of this fill material and a mound is formed above the original ground level. A property with as little as 20 inches of suitable natural soil may use an elevated sand mound, depending on slope. The required four feet of suitable soil in this case is made up of 20 inches of natural soil and 28 inches of sandy fill material.

I understand the need for an elevated sand mound for my lot but don't like the idea of a big mound in the middle of my yard. Can it be blended into the landscape?

Yes, if possible, the system should be located in a position that will make it easy to blend into the landscape. Fill soils may be used to blend the system into the landscape after installation, as long as care is taken not to damage the system or compact the soils around the system. Elevated sand mound systems, however, are never "cut" into a hillside.

What if I disagree with the SEO's evaluation of my soils?

A process has been established for the appeal of decisions made by an SEO and is discussed under DEP fact sheet, "Appealing a Local Agency Decision Under Act 537" at the DEP website www.dep.state.pa.us (directLINK "wastewater"). An additional process specifically for disagreements regarding mottling is discussed under DEP fact sheet, "Bonded Disposal Systems and Soil Mottling" at the DEP website www.dep.state.pa.us (directLINK "wastewater").



Typical Elevated Sand Mound System



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

ACT 537 #10

SALES CONTRACT REQUIREMENTS UNDER ACT 537

Act 537 (the Pennsylvania Sewage Facilities Act) requires every contract for the sale of a lot where there is no currently existing community sewage system available, to contain language notifying the buyer of this fact. Other language indicating what actions are necessary to obtain a sewage disposal permit for the lot or notifying the buyer of unusual circumstances surrounding sewage disposal on the lot may also be required. This fact sheet answers frequently asked questions about required sales contract language.

When does Act 537 require sales contract language?

Act 537 (the Pennsylvania Sewage Facilities Act) requires the inclusion of advisory language in the sales contract for a building lot whenever certain specified situations occur. These include:

- the sale of a lot that does not have access to a community sewage system, and therefore must be served by an individual sewage system;
- the sale of a lot that is served by an individual sewage system installed under the 10-acre permit exemption provisions of Act 537;
- the sale of a lot served by a holding tank, whether permanent or temporary;
- the sale of a lot where the required horizontal isolation distance between the well and sewage system is not met;
- the sale of a lot located within an area where limitations on permit issuance are in effect; or
- the sale of a lot where a required revision for new land development, exception to the requirement to revise or supplement has not been approved by DEP or a delegated local agency.

Why does the act require sales contract language in these situations?

The intent of the sales contract language is to ensure that the buyer of the lot is aware of any unusual circumstances surrounding sewage disposal on the lot. However, it does not substitute for careful investigation on the buyer's part.

If a lot does not have access to a currently existing community sewage system, what language must appear in the sales contract?

Language similar to the following must be included in the sales contract:

"This lot does not have access to a currently existing community sewage system. A permit for an individual sewage system must be obtained from the local agency in accordance with Section 7 of the Pennsylvania

Sewage Facilities Act. The buyer should contact the local agency charged with administering the act before signing this contract, to determine the procedure and requirements for obtaining a permit for an individual sewage system if one has not already been obtained."

What language is required if the lot in question was created under the 10-acre exemption provision of Act 537?

Language similar to the following is required:

"Soils and site testing relating to the suitability of this lot for the installation of a sewage disposal system have not been conducted. The owner of the property served by the sewage disposal system installed on this lot at the time of a malfunction may be liable for any contamination, pollution, public health hazard or nuisance which may occur as a result of the malfunction."

What language must be included in sales contracts for lots served by holding tanks?

The sales contract for a lot served by a holding tank must contain language similar to the following:

"With respect to sewage disposal, this property is served by a holding tank instead of a conventional sewage disposal system. The holding tank is designed and constructed for the temporary storage of sewage and to facilitate ultimate disposal of the sewage at another site approved by the Department of Environmental Protection. It has cost \$_____ per year to maintain the holding tank since the date of its installation."

If a lot received a waiver of the isolation distance between the well and onlot sewage disposal system components, what advisory language must appear on the sales contract?

Sales contract language similar to the following is required:

"With respect to a well located on this property (or at a designated location on this property), the onlot sewage disposal system components were not installed in conformance with the minimum isolation distances between onlot sewage systems and wells specified in

regulations of the Department of Environmental Protection at Title 25 Pennsylvania Code Chapter 73."

If a lot was created in an area subject to the limitations on permit issuance contained in Act 537, what language must appear in the sales contract?

The contract of sale must include a statement similar to:

"Sewage facilities are not available for Lot #___ in the _____ Subdivision, and sewage facilities will not be available and construction of any structure requiring sewage facilities may not begin until _____ Township has completed and DEP has approved, a major planning requirement in accordance with the provisions of Section 7(b)(4.1)(ii) of the Pennsylvania Sewage Facilities Act (25 P.S. Sec. 750.7(b)(4.1)(ii))."

If sewage facilities planning (a revision, exception or supplement to the municipal Official Sewage Facilities Plan) has not been approved by DEP or a delegated local agency for a lot, what language must appear in the lot's sales contract?

"Sewage facilities are not available to serve this lot. Sewage facilities will not be available, nor may construction begin on this lot, until sewage facilities planning has been approved by DEP or a delegated local agency serving this area, as appropriate."

Must the sales contract language be included only in the sales contracts for new lots, or must it be included for every sale of a lot affected by one of the specified conditions?

The sales contract language must be included in the contract for each sale of the affected lot for as long as the condition remains. If the condition triggering the sales contract language requirement is removed, the language is no longer required.

What happens if the required language is not in the contract?

If the required sales contract language does not appear in the sales contract, the contract is not enforceable by the seller against the buyer. Further, should the contract contain language that attempts to waive the buyer's rights to any of the required disclosures, the contract is void.

**For more information,
call the DEP regional office in your area or contact:**

**Department of Environmental Protection
Bureau of Water Supply and Wastewater Management
P.O. Box 8467
Harrisburg, PA 17105-8467
(717) 783-3795**

DEP REGIONAL OFFICES

Southeast Region

Suite 6010, Lee Park
555 North Lane
Conshohocken, PA 19428
Water Supply: 610-832-6060
Wastewater: 610-832-6131

Counties: Bucks, Chester, Delaware, Montgomery and Philadelphia

Northwest Region

230 Chestnut St.
Meadville, PA 16335-3481
Water Supply: 814-332-6899
Wastewater: 814-332-6942

Counties: Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango and Warren

Southwest Region

400 Waterfront Drive
Pittsburgh, PA 15222-4745
Water Supply: 412-442-4217
Wastewater: 412-442-4035

Counties: Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington and Westmoreland

Northeast Region

2 Public Square
Wilkes-Barre, PA 18711-0790
Water Supply: 570-826-2511
Wastewater: 570-826-2553

Counties: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne and Wyoming

Southcentral Region

909 Elmerton Ave.
Harrisburg, PA 17110
Water Supply: 717-705-4708
Wastewater: 717-705-4707

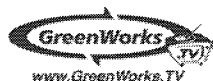
Counties: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry and York

Northcentral Region

208 W. Third St., Suite 101
Williamsport, PA 17701
Water Supply: 570-327-3636
Wastewater: 570-327-3670

Counties: Bradford, Cameron, Clearfield, Centre, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga and Union

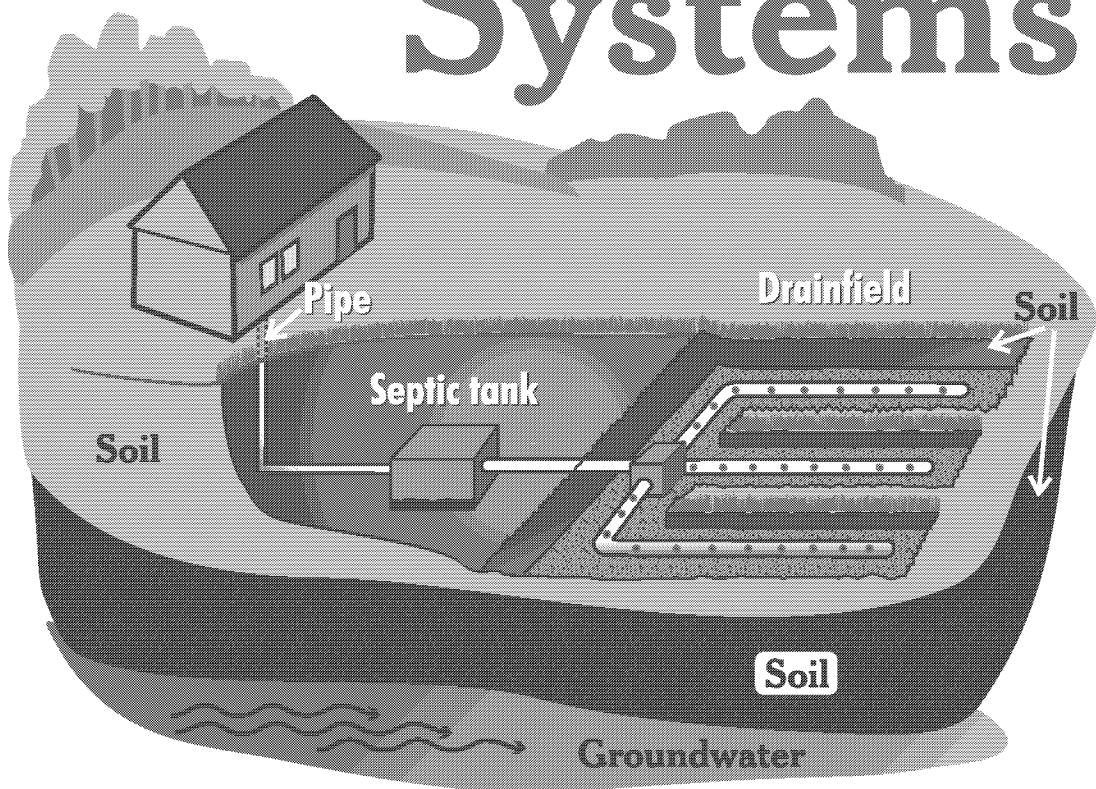
This fact sheet and related environmental information are available electronically via Internet. For more information, visit us through the PA PowerPort at <http://www.state.pa.us> or visit DEP directly at <http://www.dep.state.pa.us> (directLINK "Wastewater").



www.GreenWorks.tv - A web space dedicated to helping you learn how to protect and improve the environment. The site features the largest collection of environmental videos available on the Internet and is produced by the nonprofit Environmental Fund for Pennsylvania, with financial support from the Pennsylvania Department of Environmental Protection, 877-PA-GREEN.



A Homeowner's Guide to Septic Systems



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Your Septic System is your responsibility!

Did you know that as a homeowner you're responsible for maintaining your septic system? Did you know that maintaining your septic system protects your investment in your home? Did you know that you should periodically inspect your system and pump out your septic tank?

If properly designed, constructed and maintained, your septic system can provide long-term, effective treatment of household wastewater. If your septic system isn't maintained, you might need to replace it, costing you thousands of dollars. A malfunctioning system can contaminate groundwater that might be a source of drinking water. And if you sell your home, your septic system must be in good working order.

This guide will help you care for your septic system. It will help you understand how your system works and what steps you can take as a homeowner to ensure your system will work properly. To help you learn more, consult the resources listed at the back of this booklet. A helpful checklist is also included at the end of the booklet to help you keep track of your septic system maintenance.

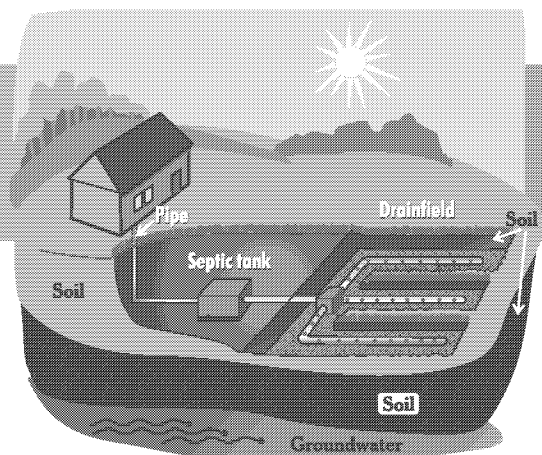
Top Four Things You Can Do to Protect Your Septic System

1. **Inspect your system (every 3 years) and pump your tank as necessary (generally every 3 to 5 years).**
2. **Use water efficiently.**
3. **Don't dispose of household hazardous wastes in sinks or toilets.**
4. **Care for your drainfield.**

How does it work?

Components

A typical septic system has four main components: a pipe from the home, a septic tank, a drainfield, and the soil. Microbes in the soil digest or remove most contaminants from wastewater before it eventually reaches groundwater.



Typical onsite wastewater treatment system

Septic system aliases:

- On-lot system
- Onsite system
- Individual sewage disposal system
- Onsite sewage disposal system
- Onsite wastewater treatment system

Pipe from the home

All of your household wastewater exits your home through a pipe to the septic tank.

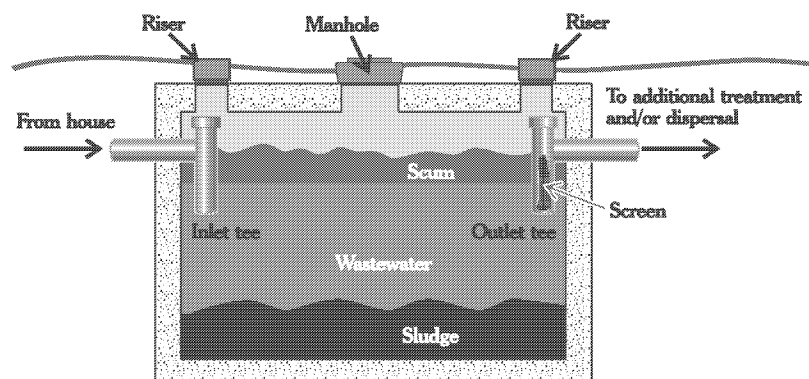
Septic tank

The septic tank is a buried, watertight container typically made of concrete, fiberglass, or polyethylene. It holds the wastewater long enough to allow solids to settle out (forming sludge) and oil and grease to float to the surface (as scum). It also allows partial decomposition of the solid materials. Compartments and a T-shaped outlet in the

septic tank prevent the sludge and scum from leaving the tank and traveling into the drainfield area. Screens are also recommended to keep solids from entering the drainfield.

Newer tanks generally have risers with lids at the ground surface to allow easy location, inspection, and pumping of the tank.

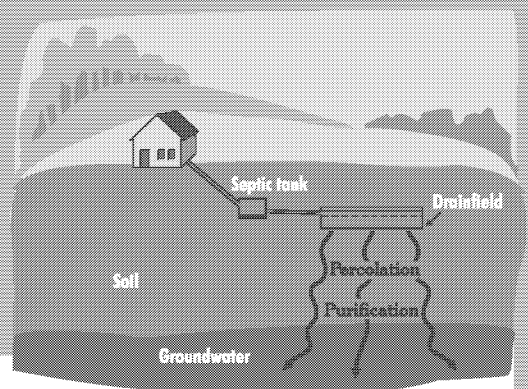
Typical single-compartment septic tank with ground-level inspection risers and screen



T**ip** To prevent buildup, sludge and floating scum need to be removed through periodic pumping of the septic tank. Regular inspections and pumping as necessary (generally every 3 to 5 years) are the best and cheapest way to keep your septic system in good working order.

Finding Your System

Your septic tank, drainfield, and reserve drainfield should be clearly designated on the “as-built” drawing for your home. (An “as-built” drawing is a line drawing that accurately portrays the buildings on your property and is usually filed in your local land records.) You might also see lids or manhole covers for your septic tank. Older tanks are often hard to find because there are no visible parts. An inspector/pumper can help you locate your septic system if your septic tank has no risers.



Drainfield

The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. The partially treated wastewater is pushed along into the drainfield for further treatment every time new wastewater enters the tank.

If the drainfield is overloaded with too much liquid, it will flood, causing sewage to flow to the ground surface or create backups in plumbing fixtures and prevent treatment of all wastewater.

A reserve drainfield, required by many states, is an area on your property suitable for a new drainfield system if your current drainfield fails. Treat this area with the same care as your septic system.

Soil

Septic tank wastewater flows to the drainfield, where it percolates into the soil, which provides final treatment by removing harmful bacteria, viruses, and nutrients. Suitable soil is necessary for successful wastewater treatment.

Alternative systems

Because many areas don't have soils suitable for typical septic systems, you might have or need an alternative system. You might also have or need an alternative system if there are too many typical septic systems in one area or the systems are too close to groundwater or surface waters. Alternative septic

systems use new technology to improve treatment processes and might need special care and maintenance. Some alternative systems use sand, peat, or plastic media instead of soil to promote wastewater treatment. Other systems might use wetlands, lagoons, aerators, or disinfection devices. Float switches, pumps, and other electrical or mechanical components are often used in alternative systems. Alternative systems should be inspected annually. Check with your local health department or installer for more information on operation and maintenance needs if you have or need an alternative system.

Why should I maintain my septic system?

When septic systems are properly designed, constructed, and maintained, they effectively reduce or eliminate most human health or environmental threats posed by pollutants in household wastewater. However, they require regular maintenance or they can fail. Septic systems need to be monitored to ensure that they work properly throughout their service lives.

Saving money

A key reason to maintain your septic system is to save money! Failing septic systems are expensive to repair or replace, and poor maintenance is often the culprit. Having your septic system inspected regularly (at least every 3 years) is a bargain when you consider the cost of replacing the entire system. Your system will need pumping (generally every 3 to 5 years), depending on how many people live in the house and the size of the system. An unusable septic system or one in disrepair will lower your property value and could pose a legal liability.

Protecting health and the environment

Other good reasons for safe treatment of sewage include preventing the spread of infection and disease and protecting water resources. Typical pollutants in household wastewater are nitrogen, phosphorus, and disease-

causing bacteria and viruses. If a septic system is working properly, it will effectively remove most of these pollutants.

With one-fourth of U.S. homes using septic systems, more than 4 billion gallons of wastewater per day is dispersed below the ground's surface. Inadequately treated sewage from septic systems can be a cause of ground-water contamination. It poses a significant threat to drinking water and human health because it can contaminate drinking water wells and cause diseases and infections in people and animals. Improperly treated sewage that contaminates nearby surface waters also increases the chance of swimmers contracting a variety of infectious diseases. These range from eye and ear infections to acute gastrointestinal illness and diseases like hepatitis.

How do I maintain my septic system?

Inspect and pump frequently

You should have your septic system inspected at least every 3 years by a professional and your tank pumped as recommended by the inspector (generally every 3 to 5 years). Systems with electrical float switches, pumps, or mechanical components need to be inspected more often. Your service provider should inspect for leaks and look at the scum and sludge layers in your septic tank. If the bottom of the scum layer is within 6 inches of the bottom of the outlet tee or the top of the sludge layer is within 12 inches of the outlet tee, your tank needs to be pumped. Remember to note the sludge and scum levels determined by your service provider in your operation and maintenance records. This information will help you decide how often pumping is necessary. (See the checklist included at the end of the booklet.)

What Does an Inspection Include?

- Locating the system.
- Uncovering access holes.
- Flushing the toilets.
- Checking for signs of backup.
- Measuring scum and sludge layers.
- Identifying any leaks.
- Inspecting mechanical components.
- Pumping the tank if necessary.

Four major factors influence the frequency of pumping: the number of people in your household, the amount of wastewater generated (based on the number of people in the household and the amount of water used), the volume of solids in the wastewater (for example, using a garbage disposal increases the amount of solids), and septic tank size.

Some makers of septic tank additives claim that their products break down the sludge in septic tanks so the tanks never need to be pumped. Not everyone agrees on the effectiveness of additives. In fact, septic tanks already contain the microbes they need for effective treatment. Periodic pumping is a much better way to ensure that septic systems work properly and provide many years of service. Regardless, every septic tank requires periodic pumping.

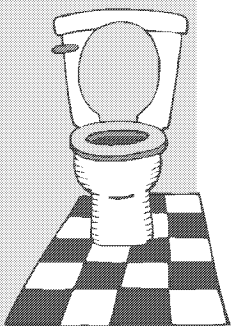
In the service report, the pumper should note any repairs completed and whether the tank is in good condition. If the pumper recommends additional repairs he or she can't perform, hire someone to make the repairs as soon as possible.

Use water efficiently

Average indoor water use in the typical single-family home is almost 70 gallons per person per day. Leaky toilets can waste as much as 200 gallons each day. The more water a household conserves, the less water enters the septic system. Efficient water use can improve the operation of the septic system and reduce the risk of failure.

High-efficiency toilets

Toilet use accounts for 25 to 30 percent of household water use. Do you know how many gallons of water your toilet uses to empty the bowl? Most older homes have toilets with 3.5- to 5-gallon reservoirs, while newer high-efficiency toilets use 1.6 gallons of water or less per flush. If you have problems with your septic system being flooded with household water, consider reducing the volume of water in the toilet tank if you don't have a high-efficiency model. Plastic containers (such as ½-gallon plastic milk jugs) can be filled with small rocks and placed in a toilet tank to reduce the



amount of water used per flush. (Be sure that the plastic containers do not interfere with the flushing mechanisms or the flow of water.) You'll save about ½ gallon of water per flush! You might also consider replacing your existing toilet with a high-efficiency model to achieve even more water savings.

Faucet aerators and high-efficiency showerheads

Faucet aerators help reduce water use and the volume of water entering your septic system. High-efficiency showerheads or shower flow restrictors also reduce water use.

Water fixtures

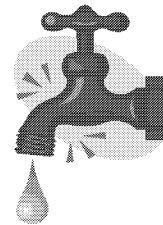
Check to make sure your toilet's reservoir isn't leaking into the bowl. Add five drops of liquid food coloring to the reservoir before bed. If the dye is in the bowl the next morning, the reservoir is leaking and repairs are needed.

A small drip from a faucet adds many gallons of unnecessary water to your system every day. To see how much a leak adds to your water usage, place a cup under the drip for 10 minutes. Multiply the amount of water in the cup by 144 (the number of minutes in 24 hours, divided by 10). This is the total amount of clean water traveling to your septic system each day from that little leak.

Use Water Efficiently!

- **Install high-efficiency showerheads**
- **Fill the bathtub with only as much water as you need**
- **Turn off faucets while shaving or brushing your teeth**
- **Run the dishwasher and clothes washer only when they're full**
- **Use toilets to flush sanitary waste only (not kitty litter, diapers, or other trash)**
- **Make sure all faucets are completely turned off when not in use**
- **Maintain your plumbing to eliminate leaks**
- **Install aerators in the faucets in your kitchen and bathroom**
- **Replace old dishwashers, toilets, and clothes washers with new, high-efficiency models.**

For more information on water conservation, please visit www.epa.gov/owm/water-efficiency/index.htm



Watch your drains

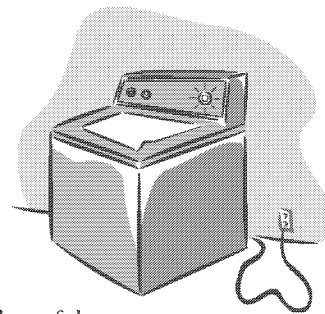
What goes down the drain can have a major impact on how well your septic system works.

Waste disposal

What shouldn't you flush down your toilet? Dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, and other kitchen and bathroom items that can clog and potentially damage septic system components if they become trapped. Flushing household chemicals, gasoline, oil, pesticides, antifreeze, and paint can stress or destroy the biological treatment taking place in the system or might contaminate surface waters and groundwater. If your septic tank pumper is concerned about quickly accumulating scum layers, reduce the flow of floatable materials like fats, oils, and grease into your tank or be prepared to pay for more frequent inspections and pumping.

Washing machines

By selecting the proper load size, you'll reduce water waste. Washing small loads of laundry on the large-load cycle wastes precious water and energy. If you can't select load size, run only full loads of laundry.



Doing all the household laundry in one day might seem like a time-saver, but it could be harmful to your septic system. Doing load after load does not allow your septic tank time to adequately treat wastes. You could be flooding your drainfield without allowing sufficient recovery time. Try to spread water usage throughout the week. A new Energy Star clothes washer uses 35 percent less energy and 50 percent less water than a standard model.

Care for your drainfield

Your drainfield is an important part of your septic system. Here are a few things you should do to maintain it:

- Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.
- Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage the pipes, tank, or other septic system components.
- Keep roof drains, basement sump pump drains, and other rainwater or surface water drainage systems away from the drainfield. Flooding the drainfield with excessive water slows down or stops treatment processes and can cause plumbing fixtures to back up.

What can make my system fail?

If the amount of wastewater entering the system is more than the system can handle, the wastewater backs up into the house or yard and creates a health hazard.

You can suspect a system failure not only when a foul odor is emitted but also when partially treated wastewater flows up to the ground surface. By the time you can smell or see a problem, however, the damage might already be done.

By limiting your water use, you can reduce the amount of wastewater your system must treat. When you have your system inspected and pumped as needed, you reduce the chance of system failure.

A system installed in unsuitable soils can also fail. Other failure risks include tanks that are inaccessible for maintenance, drainfields that are paved or parked on, and tree roots or defective components that interfere with the treatment process.

Failure symptoms

The most obvious septic system failures are easy to spot. Check for pooling water or muddy soil around your septic system or in your basement. Notice whether your toilet or sink backs up when you flush or do laundry. You might also notice strips of bright green grass over the drainfield. Septic systems also fail when partially treated wastewater comes into contact with groundwater. This type of failure is not easy to detect, but it can result in the pollution of wells, nearby streams, or other bodies of water. Check with a

septic system professional and the local health department if you suspect such a failure, and remember to have your septic system inspected by a professional at least every 3 years.

Stop, look, and smell!

Failure causes

Household toxics

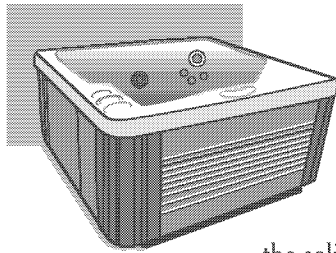
Does someone in your house use the utility sink to clean out paint rollers or flush toxic cleaners? Oil-based paints, solvents, and large volumes of toxic cleaners should not enter your septic system. Even latex paint cleanup waste should be minimized. Squeeze all excess paint and stain from brushes and rollers on several layers of newspaper before rinsing. Leftover paints and wood stains should be taken to your local household hazardous waste collection center. Remember that your septic system contains a living collection of organisms that digest and treat waste.

Household cleaners

For the most part, your septic system's bacteria should recover quickly after small amounts of household cleaning products have entered the system. Of course, some cleaning products are less toxic to your system than others. Labels can help key you into the potential toxicity of various products. The word "Danger" or "Poison" on a label indicates that the product is highly hazardous. "Warning" tells you the product is moderately hazardous. "Caution" means the product is slightly hazardous. ("Nontoxic" and "Septic Safe"



are terms created by advertisers to sell products.) Regardless of the type of product, use it only in the amounts shown on the label instructions and minimize the amount discharged into your septic system.



Hot tubs

Hot tubs are a great way to relax.

Unfortunately, your septic system was not designed to handle large quantities of water from your hot tub. Emptying

hot tub water into your septic system stirs

the solids in the tank and pushes them out into the drainfield, causing it to clog and fail. Draining your hot tub

into a septic system or over the drainfield can overload the system. Instead, drain cooled hot tub water onto turf or landscaped areas well away from the septic tank and drainfield, and in accordance with local regulations.

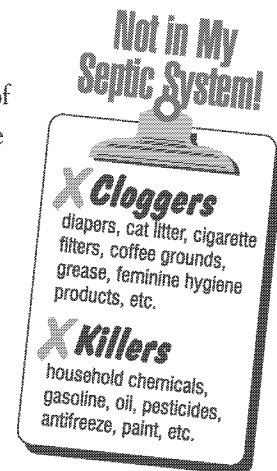
Use the same caution when draining your swimming pool.

Water Purification Systems

Some freshwater purification systems, including water softeners, unnecessarily pump water into the septic system. This can contribute hundreds of gallons of water to the septic tank, causing agitation of solids and excess flow to the drainfield. Check with your licensed plumbing professional about alternative routing for such freshwater treatment systems.

Garbage disposals

Eliminating the use of a garbage disposal can reduce the amount of grease and solids entering the septic tank and possibly clogging the drainfield. A garbage disposal grinds up kitchen scraps, suspends them in water, and sends the mixture to the septic tank. Once in the septic tank, some of the materials are broken down by bacterial action, but most of the grindings have to be pumped out of the tank. Using a garbage disposal frequently can significantly increase the accumulation of sludge and scum in your septic tank, resulting in the need for more frequent pumping.



Improper design or installation

Some soils provide excellent wastewater treatment; others don't. For this reason, the design of the drainfield of a septic system is based on the results of soil analysis. Homeowners and system designers sometimes underestimate the significance of good soils or believe soils can handle any volume of wastewater applied to them. Many failures can be attributed to having an undersized drainfield or high seasonal groundwater table. Undersized septic tanks—another design failure—allow solids to clog the drainfield and result in system failure.

If a septic tank isn't watertight, water can leak into and out of the system. Usually, water from the environment leaking into the system causes hydraulic overloading, taxing the system beyond its capabilities and causing inadequate treatment and sometimes sewage to flow up to the ground surface. Water leaking out of the septic tank is a significant health hazard because the leaking wastewater has not yet been treated.

Even when systems are properly designed, failures due to poor installation practices can occur. If the drainfield is not properly leveled, wastewater can overload the system. Heavy equipment can damage the drainfield during installation which can lead to soil compaction and reduce the wastewater infiltration rate. And if surface drainage isn't diverted away from the field, it can flow into and saturate the drainfield.



For more information

Local Health Department

Name

Agency

Address

Address 1

Phone and e-mail

EPA Onsite/Decentralized Management Homepage

www.epa.gov/owm/onsite

EPA developed this Web site to provide tools for communities investigating and implementing onsite/decentralized management programs. The Web site contains fact sheets, program summaries, case studies, links to design and other manuals, and a list of state health department contacts that can put you in touch with your local health department.

National Small Flows Clearinghouse

www.nesc.wvu.edu

Funded by grants from EPA, the NSFC helps America's small communities and individuals solve their wastewater problems. Its activities include a Web site, online discussion groups, a toll-free assistance line (800-624-8301), informative publications, and a free quarterly newsletter and magazine.

Rural Community Assistance Program

www.rcap.org

RCAP is a resource for community leaders and others looking for technical assistance services and training related to rural drinking water supply and wastewater treatment needs, rural solid waste programs, housing, economic development, comprehensive community assessment and planning, and environmental regulations.

National Onsite Wastewater Recycling Association, Inc.
www.nowra.org

NOWRA is a national professional organization to advance and promote the onsite wastewater industry. The association promotes the need for regular service and educates the public on the need for properly designed and maintained septic systems.

Septic Yellow Pages
www.septicyellowpages.com

The Septic Yellow Pages provides listings by state for professional septic pumpers, installers, inspectors, and tank manufacturers throughout the United States. This Web site is designed to answer simple septic system questions and put homeowners in contact with local septic system professionals.

National Association of Wastewater Transporters
www.nawt.org

NAWT offers a forum for the wastewater industry to exchange ideas and concerns. The NAWT Web site lists state associations and local inspectors and pumpers.



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Office of Water

U.S. Environmental Protection Agency

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Septic System Dos and Don'ts

(adapted from National Small Flows Clearinghouse)

Dos

- Check with the local regulatory agency or inspector/pumper if you have a garbage disposal unit to make sure that your septic system can handle this additional waste.
- Check with your local health department before using additives. Commercial septic tank additives do not eliminate the need for periodic pumping and can be harmful to the system.
- Use water efficiently to avoid overloading the septic system. Be sure to repair leaky faucets or toilets. Use high-efficiency fixtures.
- Use commercial bathroom cleaners and laundry detergents in moderation. Many people prefer to clean their toilets, sinks, showers, and tubs with a mild detergent or baking soda.
- Check with your local regulatory agency or inspector/pumper before allowing water softener backwash to enter your septic tank.
- Keep records of repairs, pumpings, inspections, permits issued, and other system maintenance activities.
- Learn the location of your septic system. Keep a sketch of it with your maintenance record for service visits.
- Have your septic system inspected at least every 3 years and pumped periodically (generally every 3 to 5 years) by a licensed inspector/contractor.
- Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.

Don'ts

- Your septic system is not a trash can. Don't put dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, latex paint, pesticides, or other hazardous chemicals into your system.
- Don't use caustic drain openers for a clogged drain. Instead, use boiling water or a drain snake to open clogs.
- Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage the pipes, tank, or other septic system components.

Place on electrical box (fuse box) or other convenient location.

APPENDIX D

CAPACITY, MANAGEMENT, OPERATION, AND MAINTENANCE PROGRAMS (CMOM)



Proposed Rule To Protect Communities From Overflowing Sewers

The Environmental Protection Agency (EPA) is proposing to clarify and expand permit requirements under the Clean Water Act for 19,000 municipal sanitary sewer collection systems in order to reduce sanitary sewer overflows. The proposed requirements will help communities improve some of our Nation's most valuable infrastructure—our wastewater collection systems—by requiring facilities to develop and implement new capacity, management, operation, and maintenance programs and public notification programs. The 19,000 systems covered by this rule include 4,800 municipal satellite collection systems which will be directly regulated under the Clean Water Act for the first time. The proposed requirements will result in fewer sewer overflows, leading to healthier communities, fewer beach closures, and fish and shellfish that are safer to eat.

Background

Sanitary sewer collection systems perform the critical task of collecting sewage and other wastewater from places where people live, work, and recreate, and transport it to the treatment facility for proper treatment and disposal. These systems are essential for protecting public health and the environment.

A combination of factors has resulted in releases of untreated sewage from some parts of the collection systems before it reaches treatment facilities, known as sanitary sewer overflows. Most cities and towns started building sewer collection systems over 100 years ago and many of these systems have not received adequate upgrades, maintenance and repair over time. Cities have used a wide variety of materials, designs, and installation practices. Even well-operated systems may be subject to occasional blockages or structural, mechanical, or electrical failures. Problems with sewer overflows can be particularly severe where portions of a system have fallen into disrepair or where an older system is inferior to more modern systems.

EPA estimates that there are at least 40,000 overflows of sanitary sewers each year. The untreated sewage from these overflows can contaminate our waters, causing serious water quality problems and threatening drinking water supplies and fish and shellfish. It can also back up into basements, causing property damage and creating threats to public health for those who come in contact with the untreated sewage.

Sanitary sewer overflows that discharge to surface waters have been prohibited under the Clean Water Act since 1972. Municipal wastewater treatment plants that discharge are currently required to comply with National Pollutant Discharge Elimination System (NPDES) permits, which require record-keeping and reporting of overflows and maintenance of their collection system. Most satellite sewage collection systems do not currently have NPDES permits.

Proposed Rule to Reduce Sewer Overflows

EPA is proposing revisions to the NPDES permit regulations to improve the operation of municipal sanitary sewer collection systems, reduce the frequency and occurrence of sewer overflows, and provide more effective public notification when overflows do occur. This proposal will provide communities with a framework for reducing health and environmental risks associated with overflowing sewers. The result will be fewer overflows, better information for local communities, and extended lifetime for the Nation's infrastructure. This rule primarily addresses sanitary sewer overflows, not combined sewer overflows.

Capacity Assurance, Management, Operation, and Maintenance Programs. These programs will help communities ensure they have adequate wastewater collection and treatment capacity and incorporate many standard operation and maintenance activities for good system performance. When implemented, these programs will provide for efficient operation of sanitary sewer collection systems.

Notifying the Public and Health Authorities. Municipalities and other local interests will establish a locally-tailored program that notifies the public of overflows according to the risk associated with specific overflow events. EPA is also proposing that annual summaries of sewer overflows be made available to the public. The proposal also clarifies existing record-keeping requirements and requirements to report to the state.

Prohibition of Overflows. The existing Clean Water Act prohibition of sanitary sewer overflows that discharge to surface waters is clarified to provide communities with limited protection from enforcement in cases where overflows are caused by factors beyond their reasonable control or severe natural conditions, provided there are no feasible alternatives.

Expanding Permit Coverage to Satellite Systems. Satellite municipal collection systems are those collection systems where the owner or operator is different than the owner or operator of the treatment facility. Some 4,800 satellite collection systems will be required to obtain NPDES permit coverage to include the requirements under this proposal.

Cost

EPA estimates that this rule would impose an additional total cost for municipalities of \$93.5 million to \$126.5 million each year, including costs associated with both planning and permitting. A collection system serving 7,500 may need to spend an average of \$6,000 each year to comply with this rule.

Additional Information

For additional information about EPA's proposed sanitary sewer overflow regulation, contact Kevin Weiss at weiss.kevin@epa.gov or visit <http://www.epa.gov/owm/sso.htm> on the Internet.

CAPACITY, MANAGEMENT, OPERATION AND MAINTENANCE (CMOM)

122.42(f) Capacity, Management, Operation and Maintenance Programs for Municipal Sanitary Sewer Systems

- (1) **General Standards** - You, the permittee, must:
 - (i) properly manage, operate and maintain, at all times, all parts of collection system that you own or over which you have operational control;
 - (ii) provide adequately capacity to convey base flows and peak flows for all parts of the collection system you own or have operational control;
 - (iii) take all feasible steps to stop, and mitigate the impact of, sanitary sewer overflows in portions of the collection system you own or have operational control; and
 - (iv) provide notification to parties with a reasonable potential for exposure to pollutants associated with the overflow event.
 - (v) develop a written summary of your CMOM program and make it, and the audit under section (5), available to any member of the public upon request.
- (2) **Management Program** - You must develop a capacity, management, operation and maintenance (CMOM) program to comply with paragraph (1). If you believe that any element of this section is not appropriate or applicable for your CMOM program, your program does not need to address it, but your written summary must explain why that element is not applicable. The Director will consider the quality of the CMOM program, its implementation and effectiveness in any relevant enforcement action, including but not limited to any enforcement action for violation of the prohibition of any municipal sanitary sewer system discharges described at 40 CFR 122.42(g). The program must:
 - (i) **Goals:** Identify with specificity the major goals of your CMOM program, consistent with the general standards identified above.
 - (ii) **Organization:** Identify:
 - (A) administrative and maintenance positions responsible from implementing measures in your CMOM program, including lines of authority by organization chart or similar document; and
 - (B) the chain of communication for reporting SSOs under 122.42(e) from

receipt of a complaint or other information to the person responsible for reporting to the NPDES authority

- (iii) **Legal Authority:** Include legal authority, through sewer use ordinances, service agreements or other legally binding documents, to:
 - (A) Control infiltration and connections from inflow sources;
 - (B) Require that sewers and connections be properly designed and constructed;
 - (C) Ensure proper installation, testing, and inspection of new and rehabilitated sewers (such as new or rehabilitated collector sewers and new or rehabilitated service laterals);
 - (D) Address flows from satellite municipal collection systems; and
 - (E) Implement the general and specific prohibitions of the national pretreatment program that you are subject to under 40 CFR 403.5.
- (iv) **Measures and Activities.** Your CMOM program must address the elements listed below that are appropriate and applicable to your system and identify the person or position in your organization responsible for each element.
 - (A) Maintenance of facilities
 - (B) Maintenance of a map of the collection system
 - (C) Management of information and use of timely , relevant information to establish and prioritize appropriate CMOM activities (such as the immediate elimination of dry weather overflows or overflows into sensitive waters such as public drinking water supplies and their source waters, swimming beaches and waters where swimming occurs, shellfish beds, designated Outstanding National Resource Waters, National Marine Sanctuaries, waters withing federal, state, or local parks, and water containing threatened or endangered species or their habitat), and identify and illustrate trends in overflows.
 - (D) Routine preventive operation and maintenance activities
 - (E) Assessment of the current capacity of the collection system and treatment facilities which you own or over which you have operational control

- (F) Identification and prioritization of structural deficiencies and identifying and implementing short-term and long term rehabilitation actions to address each deficiency
 - (G) Appropriate training on a regular basis
 - (H) Equipment and replacement parts inventories including identification of critical replacement parts.
- (v) **Design and Performance Provisions:** You must establish:
- (A) requirements and standards for the installation of new sewers, pumps and other appurtenances; and rehabilitation and repair projects.
 - (B) procedures and specifications for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects.
- (vi) **Monitoring, Measurement and Program Modifications.** You must monitor the implementation and, where appropriate measure the effectiveness of each element of your CMOM program. You must update program elements as appropriate based on monitoring or performance evaluations. You must modify the summary of your CMOM program as appropriate to keep it updated and accurate.
- (3) **Overflow Response Plan:** You must develop and implement an overflow response plan that identifies measures to protect public health and the environment by, including but not limited to, mechanisms to:
- (i) ensure that you are made aware of all overflows (to the greatest extent possible);
 - (ii) ensure that overflows are appropriately responded to, including ensuring that reports of overflows are immediately dispatched to appropriate personnel for investigation and appropriate response;
 - (iii) ensure appropriate reporting pursuant to 40 CFR 122.42(e).
 - (iv) ensure appropriate notification to the public, health agencies, and other impacted entities (e.g. water suppliers) pursuant to 40 CFR 122.42(h). The CMOM should identify the public health and other officials who will receive immediate notification
 - (v) ensure that appropriate personnel are aware of and follow the plan and appropriately trained; and

- (vi) provide emergency operations.
- (4) **System Evaluation and Capacity assurance plan:** You must prepare and implement a plan for system evaluation and capacity assurance if peak flow conditions are contributing to an SSO discharge unless you have either (1) already taken steps to correct the hydraulic deficiency or (2) the discharge meets the criteria of 122.42(g)(2). At a minimum the plan must include:
 - (i) **Evaluation:** Steps to evaluate those portions of the collection system which you own or over which you have operational control which are experiencing or contributing to an SSO discharge caused by hydraulic deficiency or to noncompliance at a treatment plant. The evaluation must provide estimates of peak flows (including flows from SSOs that escape from the system) associated with conditions similar to those causing overflow events, provide estimates of the capacity of key system components, identify hydraulic deficiencies, including components of the system with limiting capacity and identify the major sources that contribute to the peak flows associated with overflow events.
 - (ii) **Capacity Enhancement Measures:** Establish short and long term actions to address each hydraulic deficiency including prioritization, alternative analysis, and a schedule.
 - (iii) **Plan updates:** The plan must be updated to describe any significant change in proposed actions and/or implementation schedule. The plan must also be updated to reflect available information on the performance of measures that have been implemented.
- (5) **CMOM Program Audits** - As part of the NPDES permit application, you must conduct an audit, appropriate to the size of the system and the number of overflows, and submit a report of such audit, evaluating your CMOM and its compliance with this subsection, including its deficiencies and steps to respond to them.
- (6) **Communications:** The permittee should communicate on a regular basis with various interested parties on the implementation and performance of its CMOM program. The communication system should allow interested parties to provide input to the permittee as the CMOM program is developed and implemented.

Summary of Major Industry Technical References for Sanitary Sewers - April 2001

Measure	Technical References
Identify and track discharges	<u>Sewer System Infrastructure Analysis and Rehabilitation Handbook</u> , EPA, 1991
Overflow emergency response plans	<u>Preparing Sewer Overflow Response Plans: A Guidebook for Local Governments</u> ; American Public Works Assoc, Tele: 816-472-6100
Public notification	<u>Combined Sewer Overflows - Guidance for Nine Minimum Controls</u> , EPA, May 1995, EPA 832-B-95-003
General management, operation and maintenance	<p><u>Wastewater Collection Systems Management</u>, Manual of Practice No 7, Water Environment Federation, 5th edition, 1999.</p> <p><u>Operation and Maintenance of Wastewater Collection Systems, a field study training program</u>, 4th edition, California State University, Sacramento, 1993.</p> <p><u>Control of Infiltration and Inflow in Private Building Sewer Connections - Monograph</u>, Water Environment Federation, 1999.</p> <p><u>Manual of Practices- Wastewater Collection Systems</u>, NASSCO, 1995</p> <p><u>Detection, Control and Correction of Hydrogen Sulfide Corrosion in Existing Wastewater Systems</u>, EPA-832-R-92-001, Sept, 1992</p>
Capacity evaluations, actions to ensure adequate capacity and rehabilitation	<p><u>Sewer System Infrastructure Analysis and Rehabilitation Handbook</u>, EPA, 1991</p> <p><u>Existing Sewer Evaluation & Rehabilitation</u>, WEF manual of practice FD-6, ASCE Manual and report on engineering practice no. 62, 1994</p> <p><u>Sewerage Rehabilitation Manual</u>, 3rd ed., Water Research Centre, 1994.</p> <p><u>Inspector Handbook for Sewer Collection System Maintenance and Rehabilitation</u>, NASSCO, 1993</p> <p><u>Manhole Inspection and Rehabilitation</u>, ASCE Manuals and Report on Engineering Practice No. 92, 1997</p> <p><u>Specification Guidelines for Wastewater Collection Systems Maintenance and Rehabilitation</u>, 9th ed., NASSCO, 1996</p> <p><u>Monograph: Control of Infiltration/Inflow (I/I) In Private Sewer Service Connections</u>, WEF, 1999</p> <p><u>Demonstration of Service Lateral Testing and Rehabilitation Techniques</u>, EPA, 1985</p> <p><u>Handbook for Sewer System Evaluation and Rehabilitation</u>, EPA, 1975, EPA/430/9-75/021</p>
Sewer use ordinance - Testing of new sewers	<p><u>Demonstration of Service Lateral Testing and Rehabilitation Techniques</u>, EPA, 1985</p> <p><u>Gravity Sanitary Sewer Design and Construction</u>, ASCE manual and report on engineering practice no. 60 and WPCF Manual of Practice No. FD-5, 1982.</p>

Performance indicators	<p><u>Collection Systems: Methods for Evaluating and Improving Performance</u>, California State University, Sacramento, 1998.</p> <p><u>Optimization of Collection System Maintenance Frequencies and System Performance</u>, ASCE, 1999.</p> <p><u>Benchmarking Wastewater Operations-Collection, Treatment, and Biosolids Management</u>, WERF, Project 96-CTS-5, 1997</p> <p><u>Benchmark '95: Wastewater Collection Agencies: An Analysis of Survey Data</u> Charlotte-Mecklenberg Utility Department, 1995</p> <p>Stalnaker, R. and M. Rigby, "Evaluating the Effectiveness of Wastewater Collection System Maintenance." <u>Water Engineering Management</u>, January 1997</p>
General design issues	<p><u>Construction Grants 1985</u>, EPA, 1984, EPA/430/9-84/004</p> <p><u>Recommended Standards for Wastewater Facilities</u>, 1990, A report of the wastewater committee of the Great Lakes-Upper Mississippi River Board of State Public Health and Environmental Managers.</p> <p><u>Technical Report 16 - Guides for the Design of Wastewater Treatment Works</u>, 1998, New England Interstate Water Pollution Control Commission.</p> <p><u>Pumping Station Design</u>, 2nd ed, Sanks, 1998</p> <p><u>Design of Wastewater and Stormwater Pumping Stations - MOP FD-4</u>. WEF, 1993.</p> <p><u>Wastewater Engineering: Collection and Pumping of Wastewater</u>. Metcalf & Eddy, Inc., McGraw-Hill, 1981.</p> <p><u>Design and Construction of Sanitary & Storm Sewers - MOP 9</u>. Water Pollution Control Federation , 1969.</p> <p><u>Design Manual for Odor and Corrosion Control in Sanitary Sewerage Systems and Treatment Plants</u>, EPA/625/1-85/018, October 1985</p>

To locate these documents, please contact the following:

Office of Water Resource Center (202) 260-7786

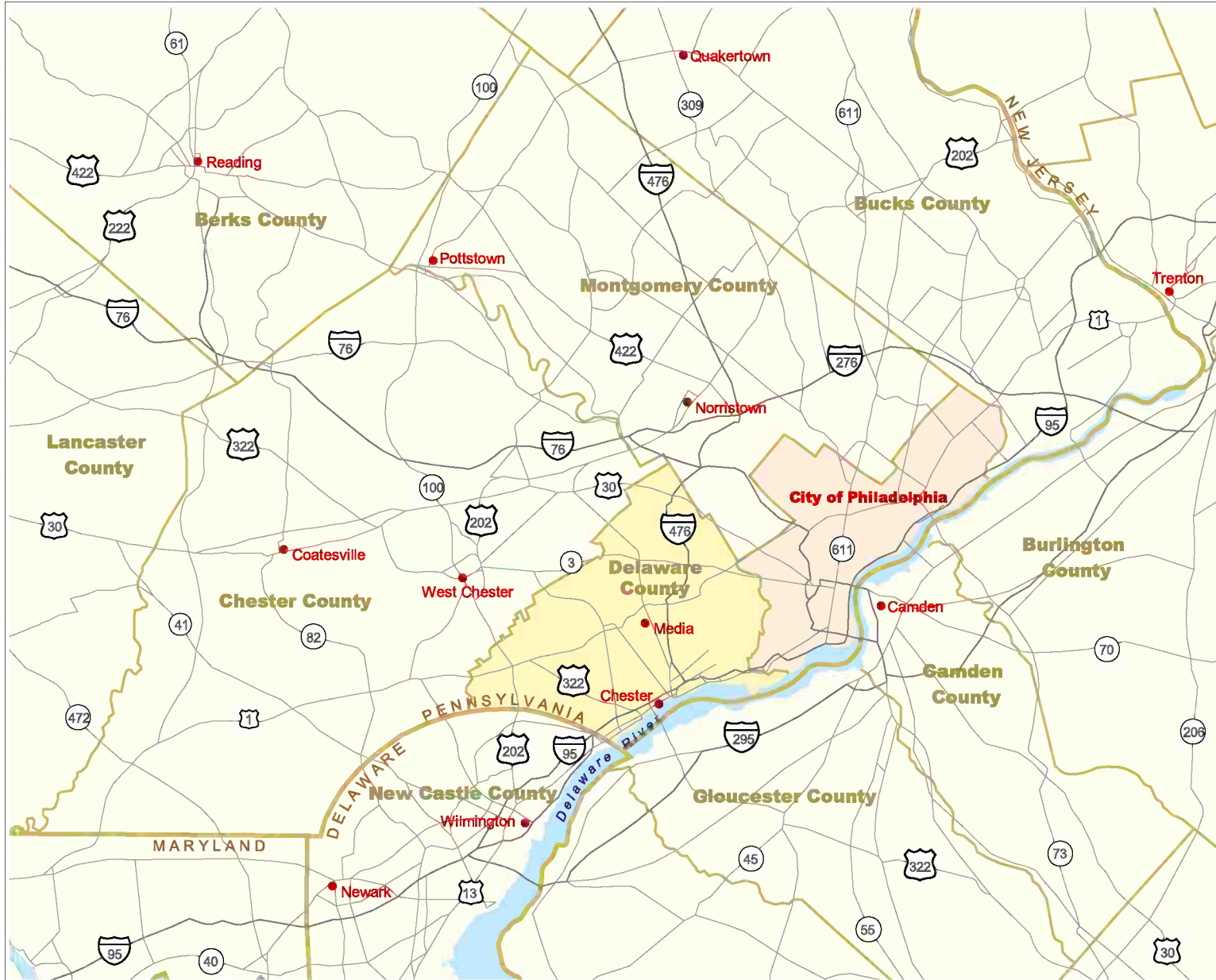
National Small Flows Clearinghouse (800) 624-8301

Water Environment Federation www.wef.org
(Formerly: Water Pollution Control Federation)

CA State University, Sacramento (916) 278-6142

American Society of Civil Engineers <http://www.asce.org/>

FIGURE 1-1
Regional Setting



LEGEND

- Roads
- County Boundary
- State Boundary



Scale in Miles
2 0 2 4 6 8

Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

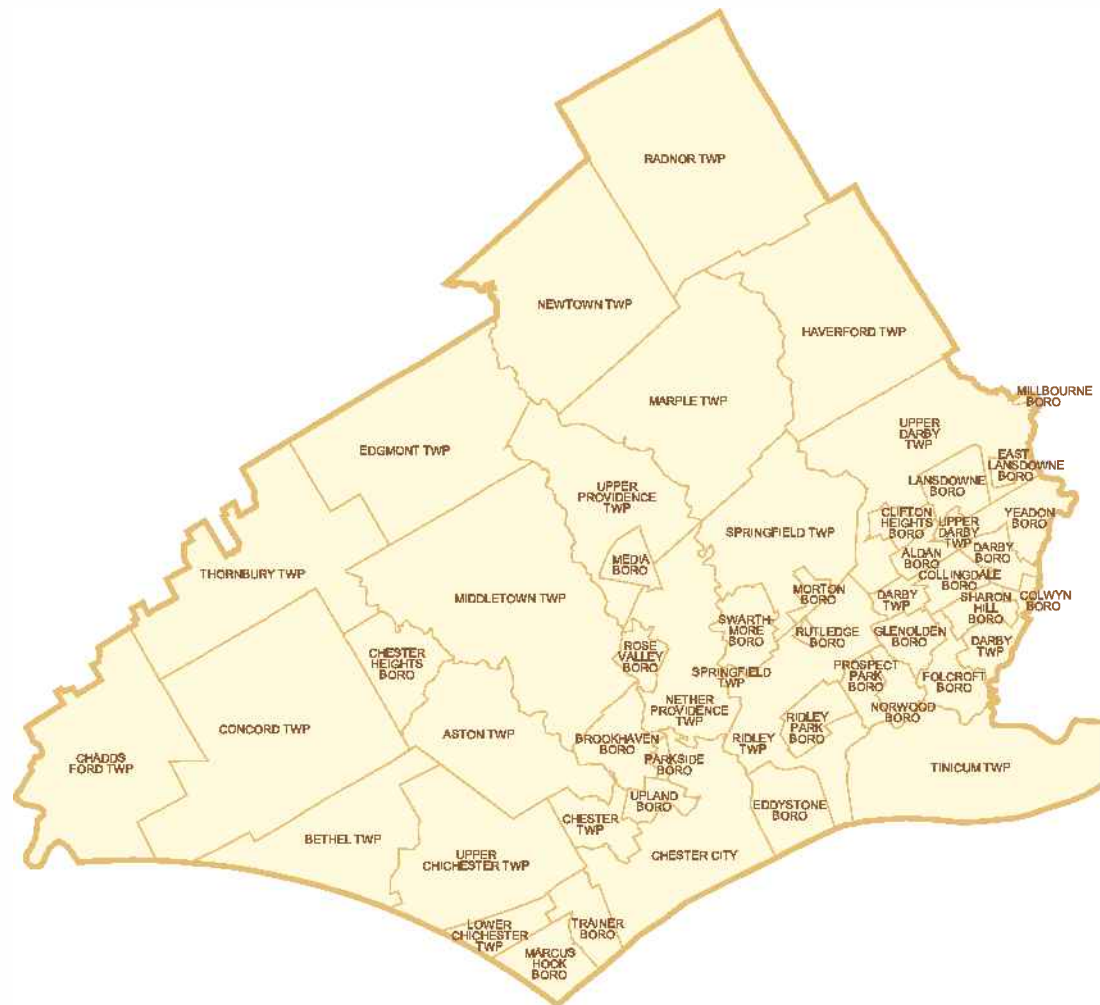
Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

FIGURE 1-2
Delaware County Municipalities



LEGEND

 Delaware County Municipalities



Scale in Miles






Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 1-3
Major Watersheds of Delaware County



LEGEND

-  Hydrography
-  Major Subwatersheds
-  Delaware County Municipalities



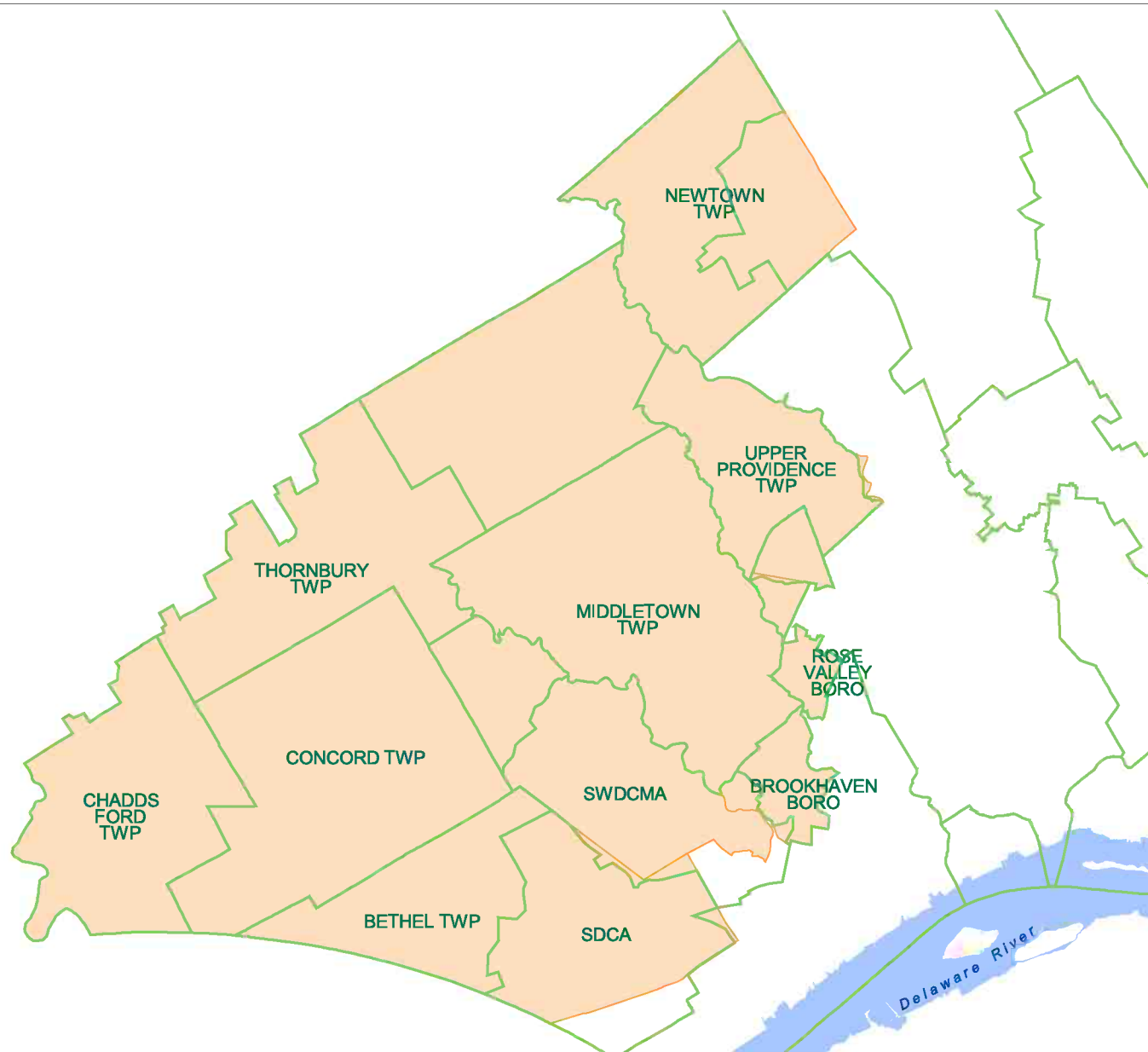
Scale in Miles



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

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 - Delaware County Planning Department (DCPD)

FIGURE 1-4
Municipal/Public Sewer Organizations



LEGEND

- Sewer Authority Boundary
- Western Project Area, Municipal Boundaries



Scale in Miles



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Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 1-5
Planning Area Boundaries



LEGEND

- Eastern Planning Area
- Western Planning Area
- Delaware County



Scale in Miles



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

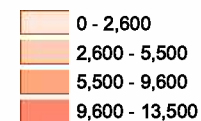
Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 2-1
Population Density by Municipality, 2000

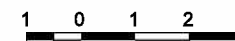


LEGEND

POPULATION DENSITY
 (persons per square mile)



Scale in Miles



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Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)
 - Delaware Valley Regional Planning Commission (DVRPC)

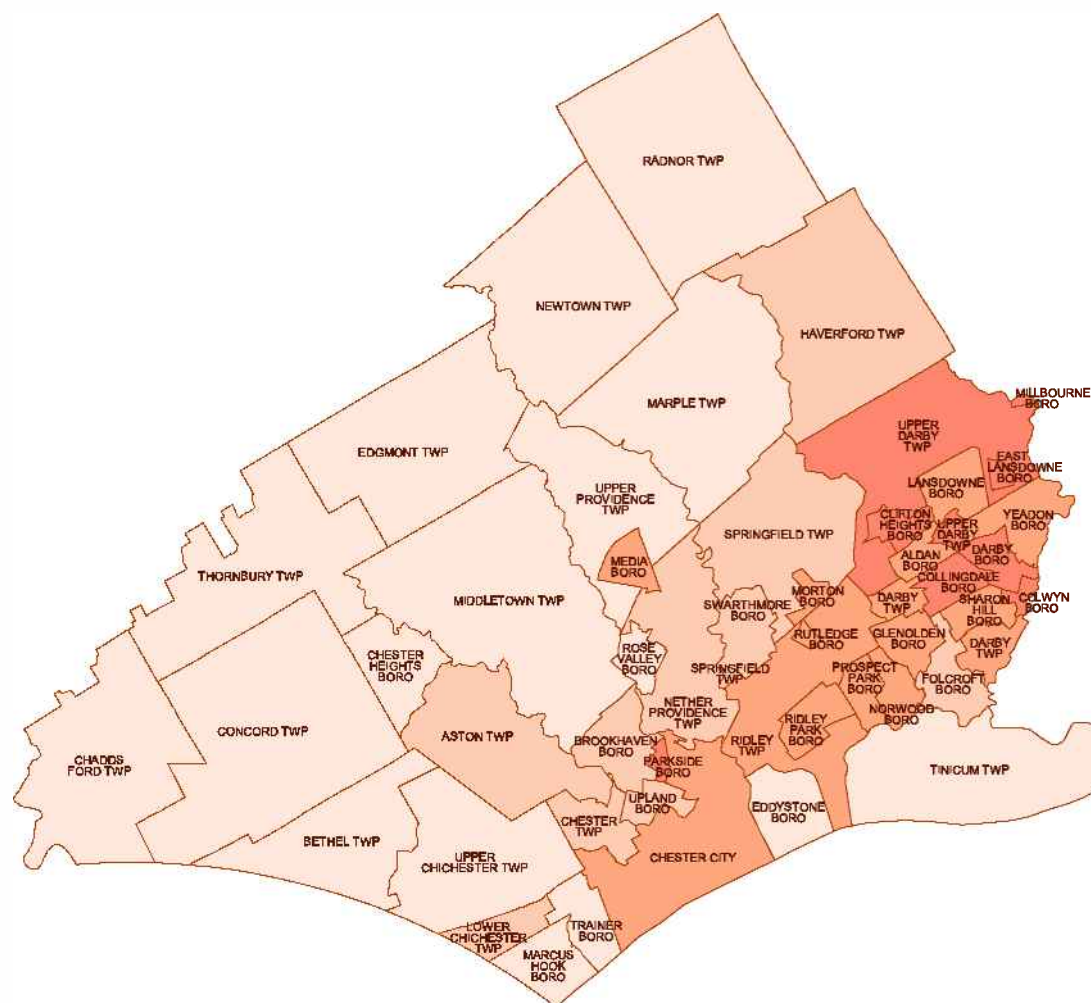
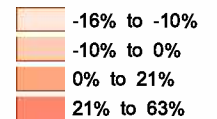


FIGURE 2-2
Projected Population Change, 2000-2025



LEGEND

POPULATION CHANGE



Scale in Miles



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)
 - Delaware Valley Regional Planning Commission (DVRPC)

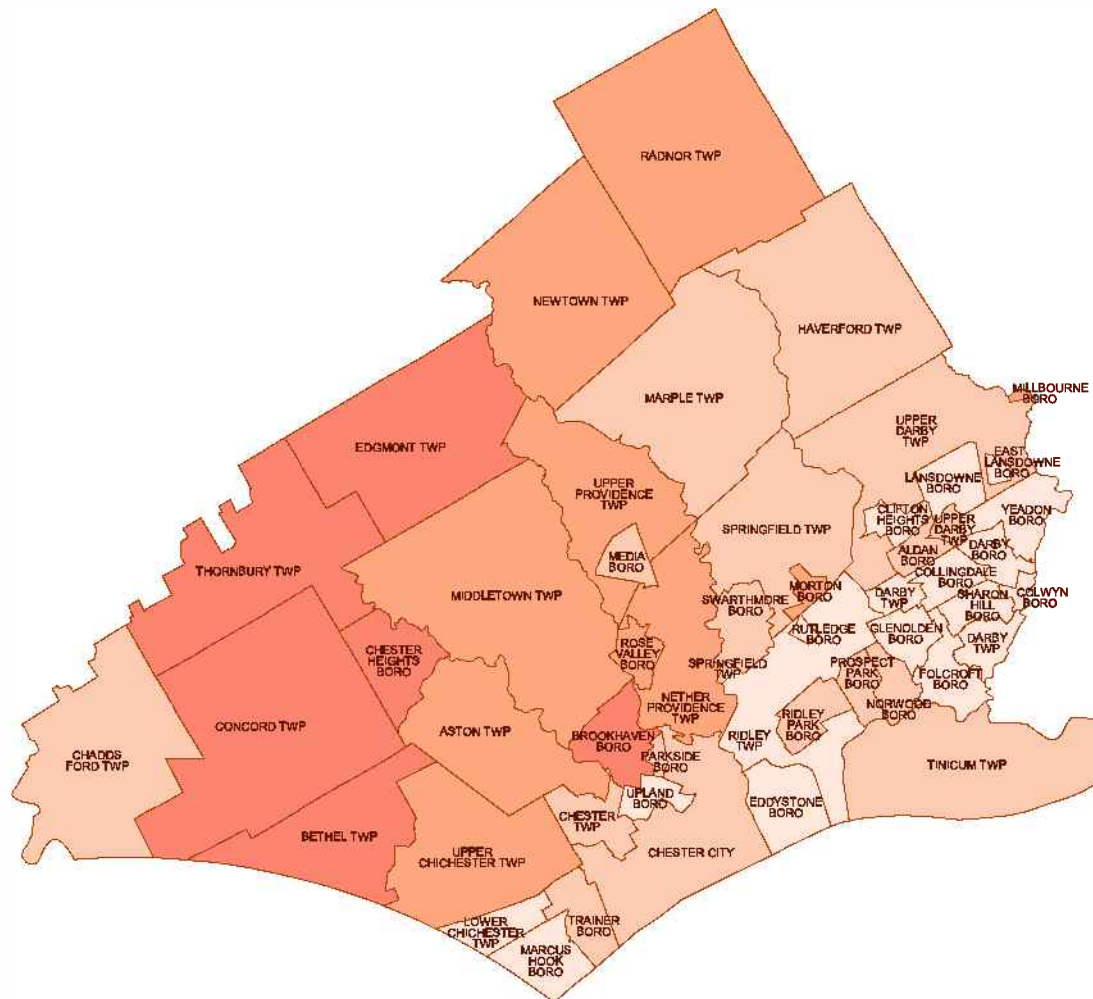
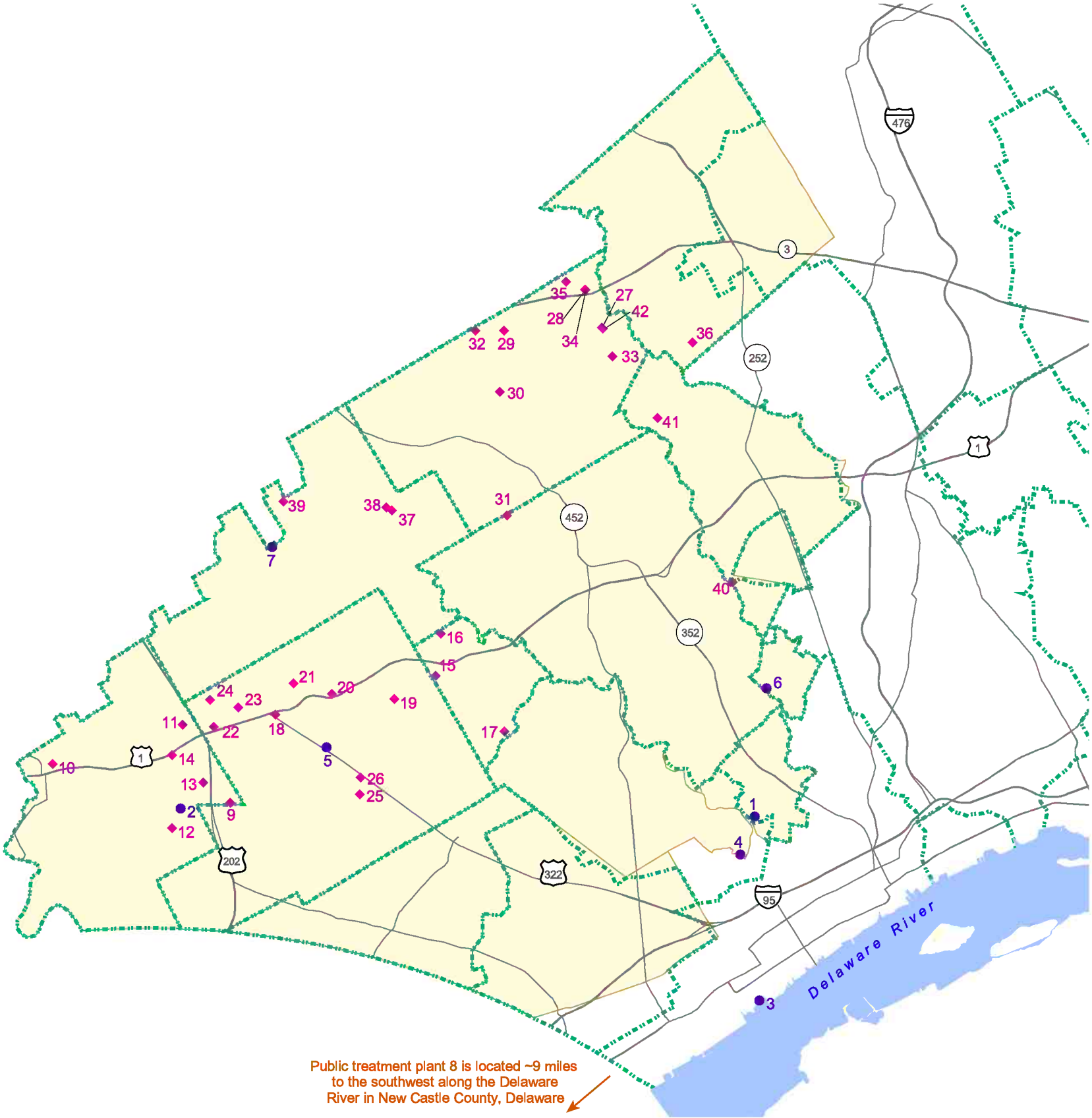


FIGURE 3-1
Treatment Facilities, Western Planning Area



Treatment Facility Key

- 1 BROOKHAVEN WWTP
- 2 RIDINGS WWTP
- 3 DELCORA WRTP
- 4 BALDWIN RUN POLLUTION CONTROL PLANT
- 5 CENTRAL STP
- 6 ROSE VALLEY STP
- 7 THORNBURY TOWNSHIP TP
- 8 WILMINGTON WATER POLLUTION CONTROL FACILITY
- 9 SPRINGHILL FARMS WWTP
- 10 BRANDYWINE RIVER HOTEL WWTP
- 11 KNIGHTS BRIDGE WWTP
- 12 RAVENS CREST WWTP
- 13 BRANDYWINE SUMMIT WWTP
- 14 PANTOS WWTP
- 15 COVENTRY CROSSING TP
- 16 DARLINGTON WOODS TP
- 17 VALLEYBROOK TP
- 18 CONCORDVILLE INN SP
- 19 FOX VALLEY SP
- 20 BRINTON MANOR SP
- 21 CONCORD INDUSTRIAL PARK SP
- 22 STATE FARM STP
- 23 SOUTHCO STP
- 24 CONCORD COUNTRY CLUB SP
- 25 GARNET VALLEY SCHOOL DISTRICT SP
- 26 CONCORD BEVERAGE SP
- 27 RUNNYMEADE FARM STP #2
- 28 EDGMONT SQUARE CENTER TP #2
- 29 EDGMONT COUNTRY CLUB TP
- 30 WHITE HORSE VILLAGE TP
- 31 SLEIGHTON FARM SCHOOL STP
- 32 US ARMY RESERVE CENTER TP
- 33 RUNNYMEADE FARM STP #1
- 34 EDGMONT SQUARE CENTER TP #1
- 35 EAGLEVIEW TP
- 36 SPRINGTOWN POINTE ESTATES TP
- 37 GODDARD SCHOOL TP
- 38 GLEN MILLS SCHOOL TP
- 39 CHEYNEY UNIVERSITY TP
- 40 MEDIA STP
- 41 TOFT WOODS TP
- 42 RUNNYMEADE FARM STP #3



LEGEND

- Public Treatment Plant
- ◆ Private Treatment Plant
- Roads
- Streams
- - - Authority Boundary
- Project Area
- Delaware County Boundary



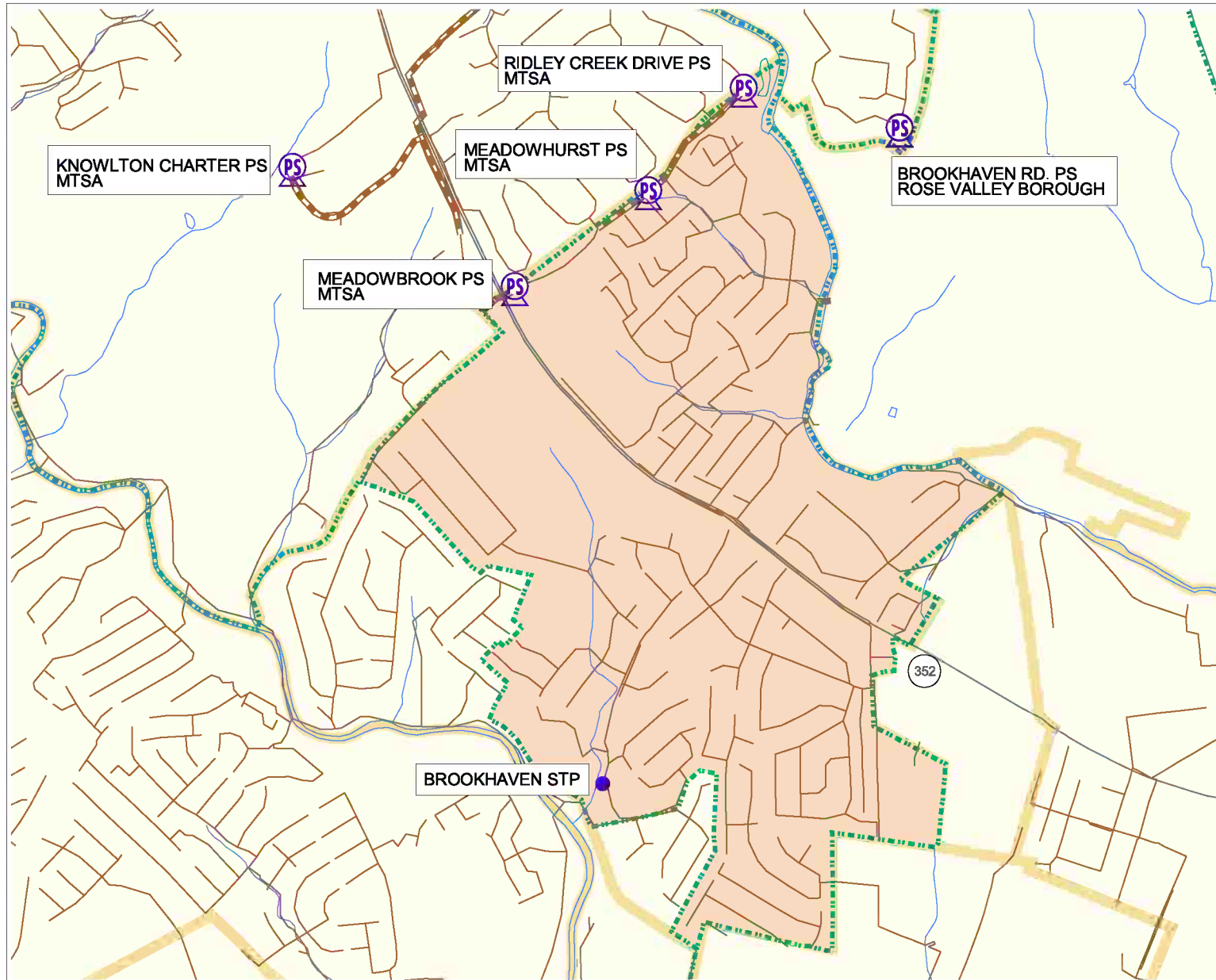
Scale in Miles



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

FIGURE 3-2
Brookhaven Borough

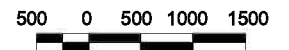


LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Brookhaven Borough
- Municipal Boundary



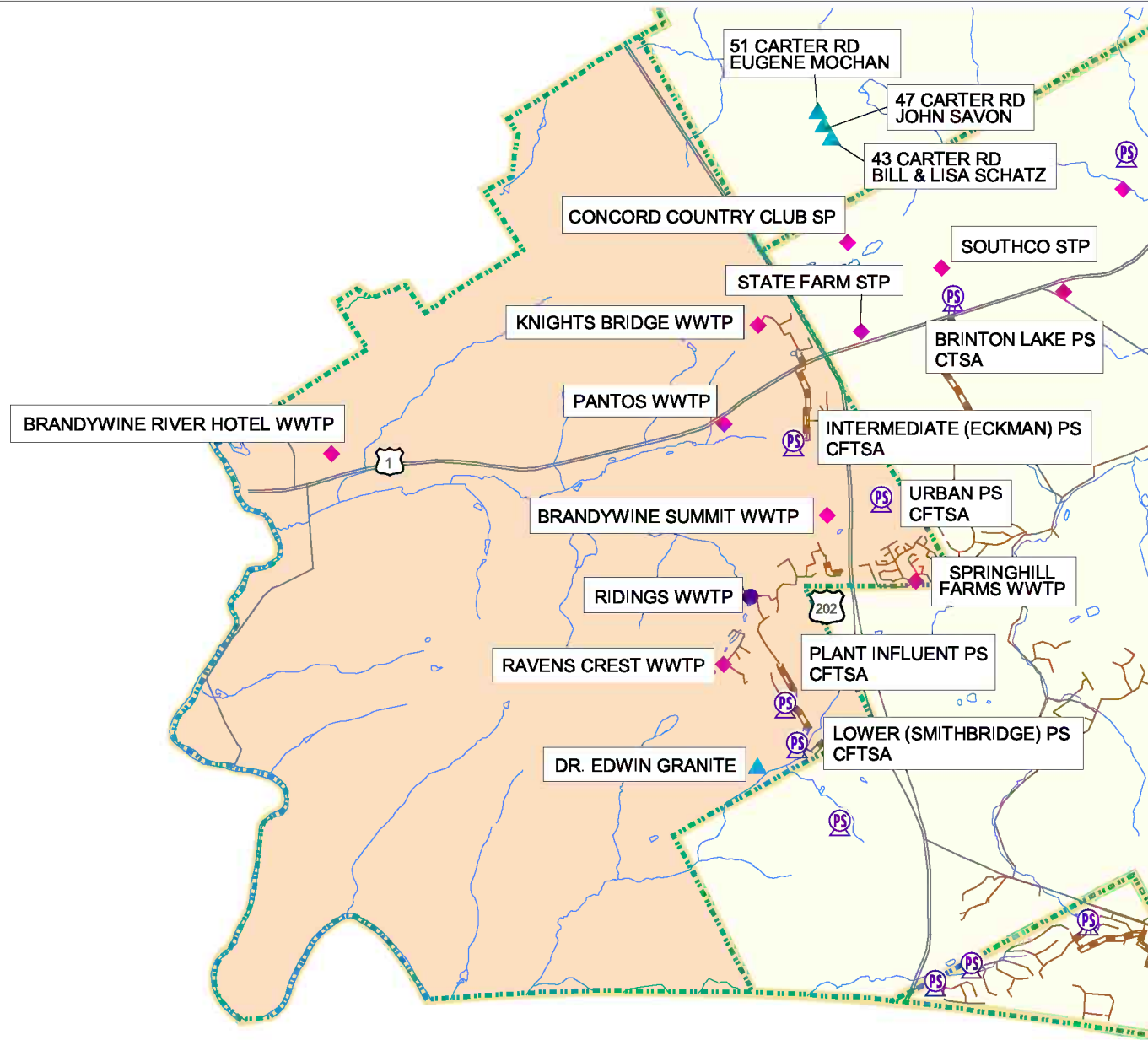
Scale in Feet



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Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 3-3
Chadds Ford Township



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Chadds Ford Township
- Municipal Boundary



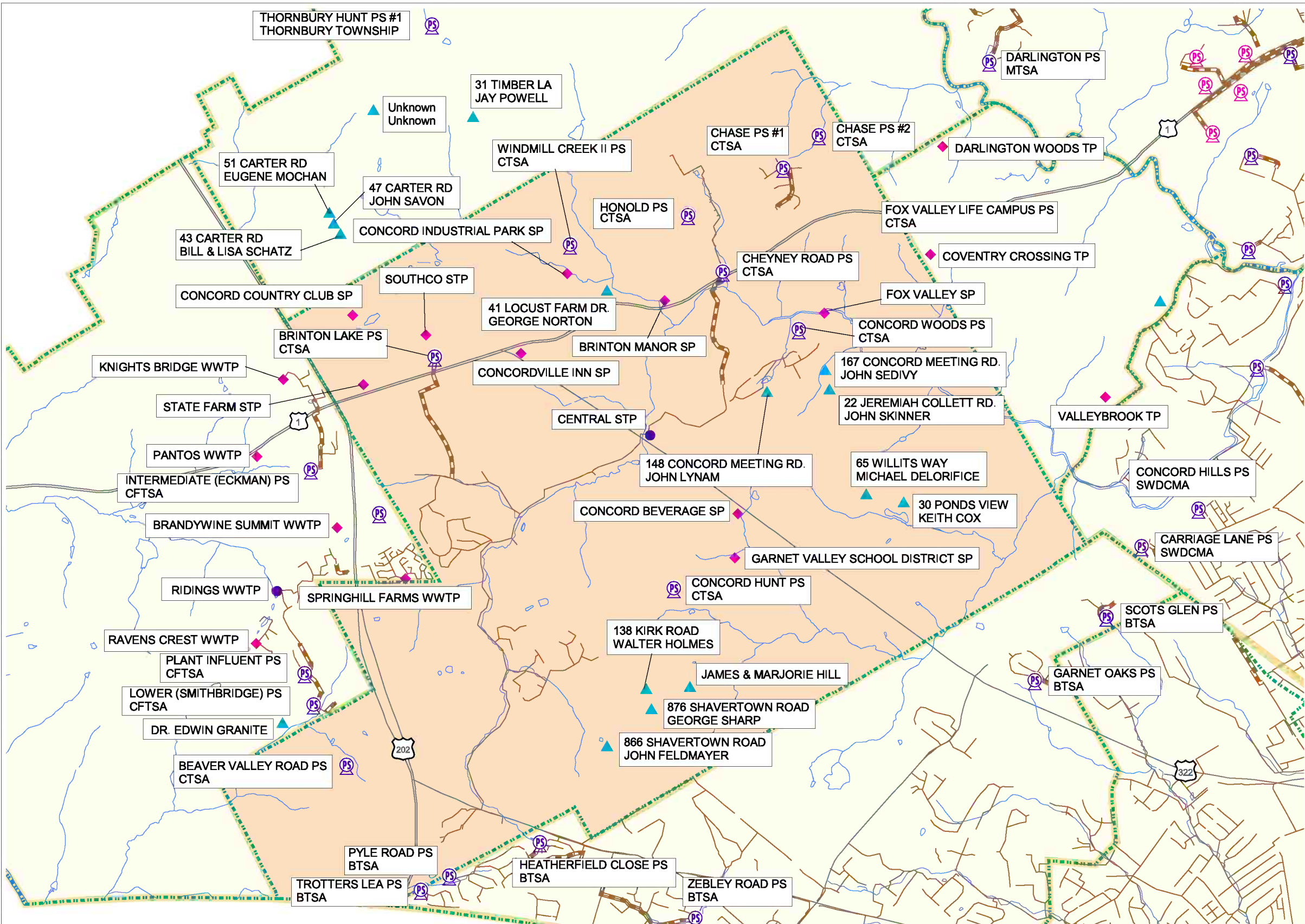
Scale in Feet

1000 0 1000 2000 3000

Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

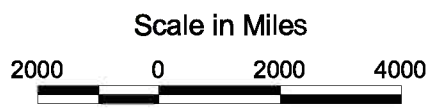
Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 3-4
Concord Township Sewer Authority



LEGEND

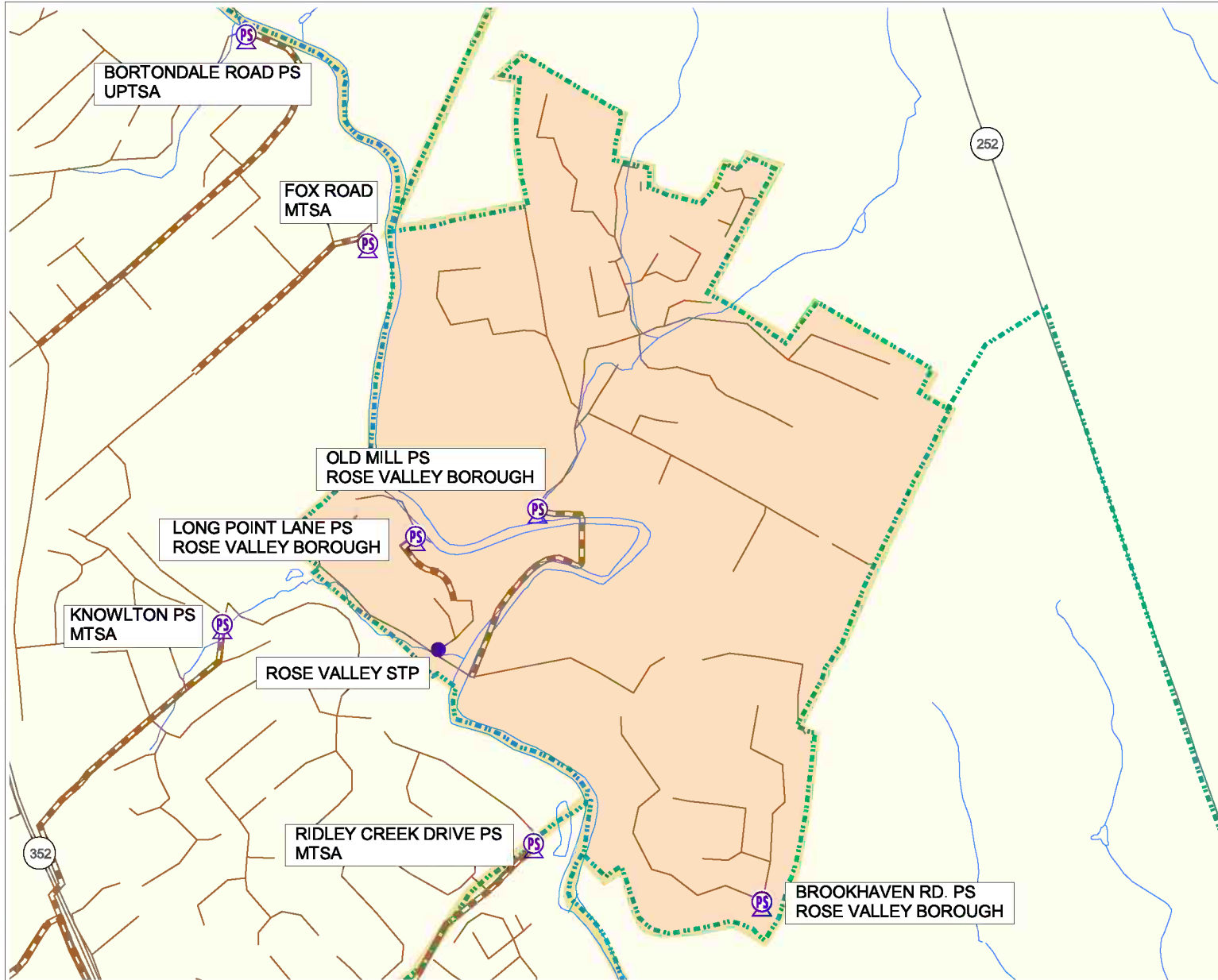
- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Concord Township
- Municipal Boundary



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

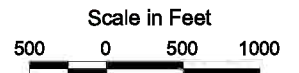
Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

FIGURE 3-5
Rose Valley Borough



LEGEND

- A Public Pump Station Location
- A Private Pump Station Location
- Public Treatment Plant
- ◆ Private Treatment Plant
- ▲ Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- - - Authority Boundary
- Rose Valley Borough
- Municipal Boundary

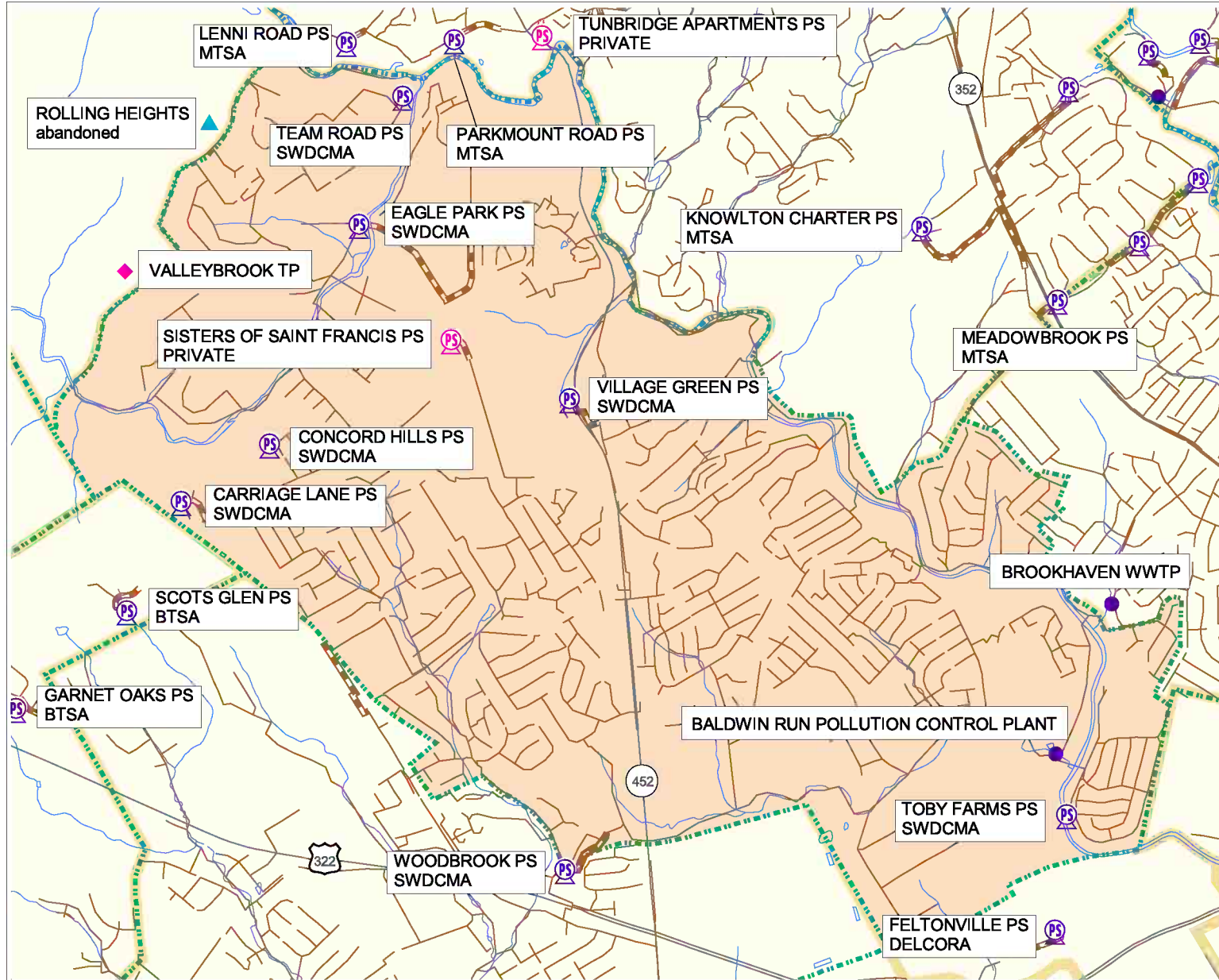


Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 3-6

Southwest Delaware County Municipal Authority



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- SWDCMA
- Municipal Boundary



Scale in Feet
1000 0 1000 2000

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Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

FIGURE 3-7
Thornbury Township



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Thornbury Township
- Municipal Boundary



Scale in Feet
1500 0 1500 3000

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Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

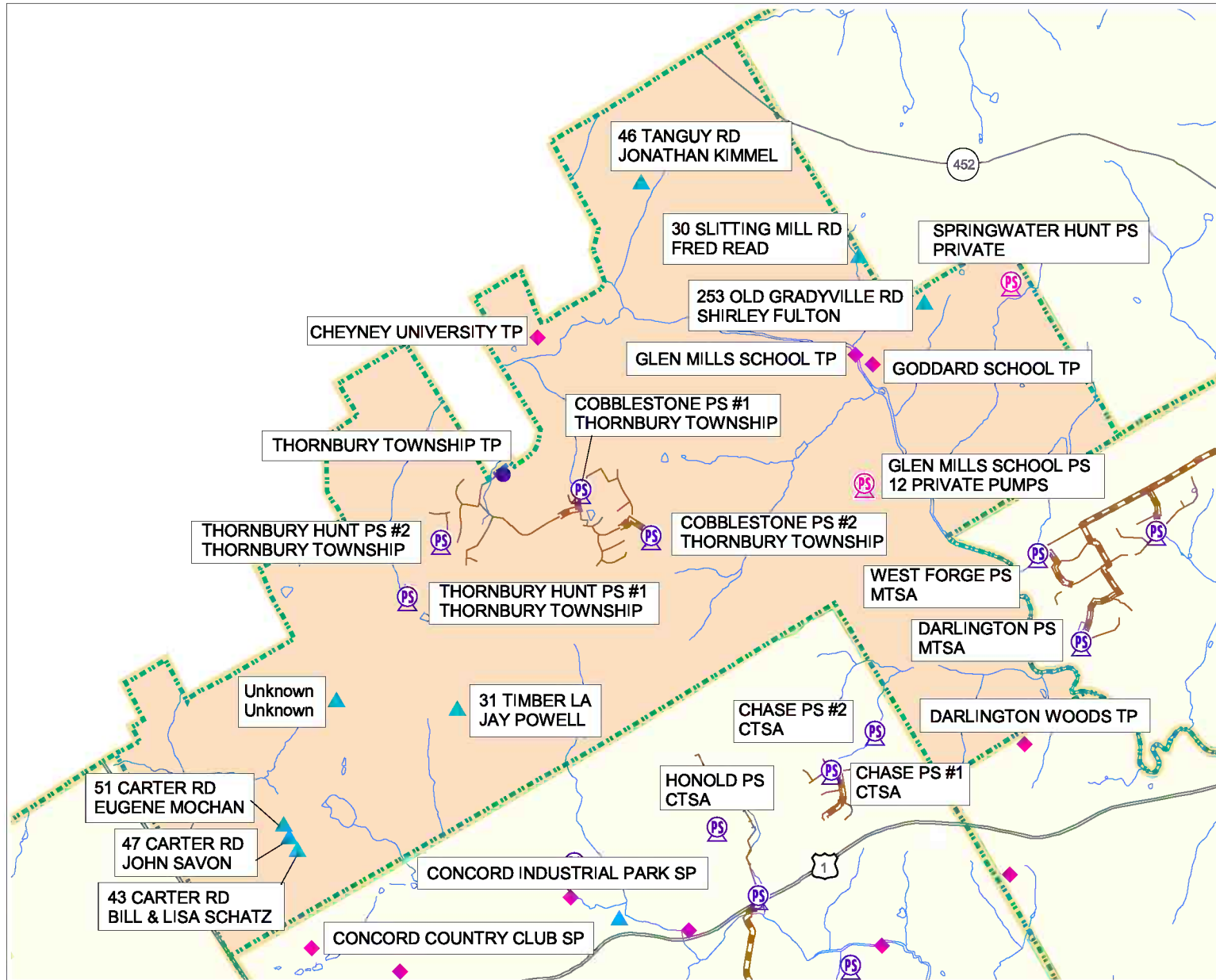
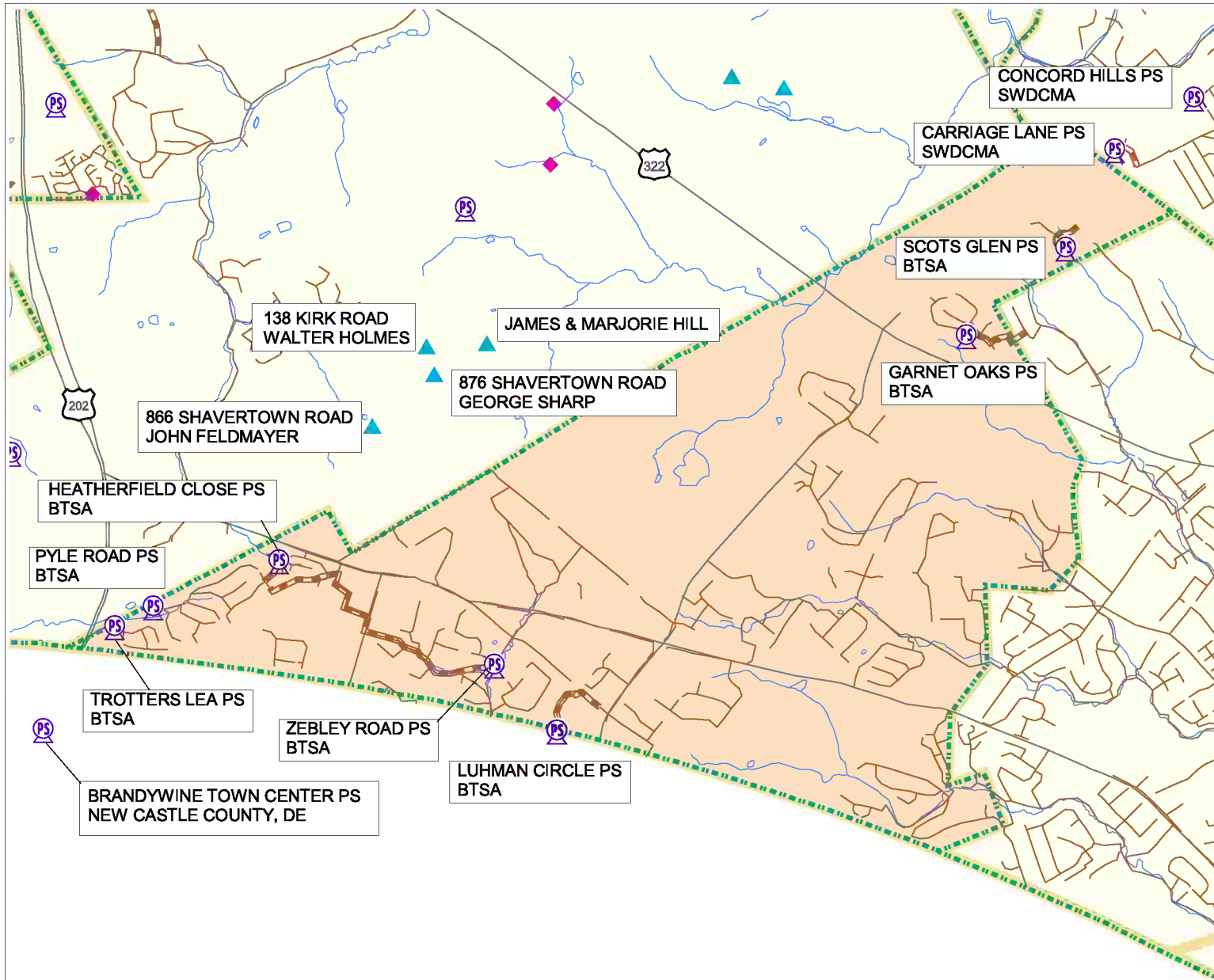


FIGURE 3-8
Bethel Township Sewer Authority



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Bethel Township
- Municipal Boundary



Scale in Feet

1000 0 1000 2000 3000

Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

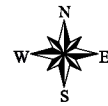
Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 3-9
Middletown Township Sewer Authority



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Middletown Township
- Municipal Boundary



Scale in Miles



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)
- Middletown Twp Sewer Authority (MTSA)

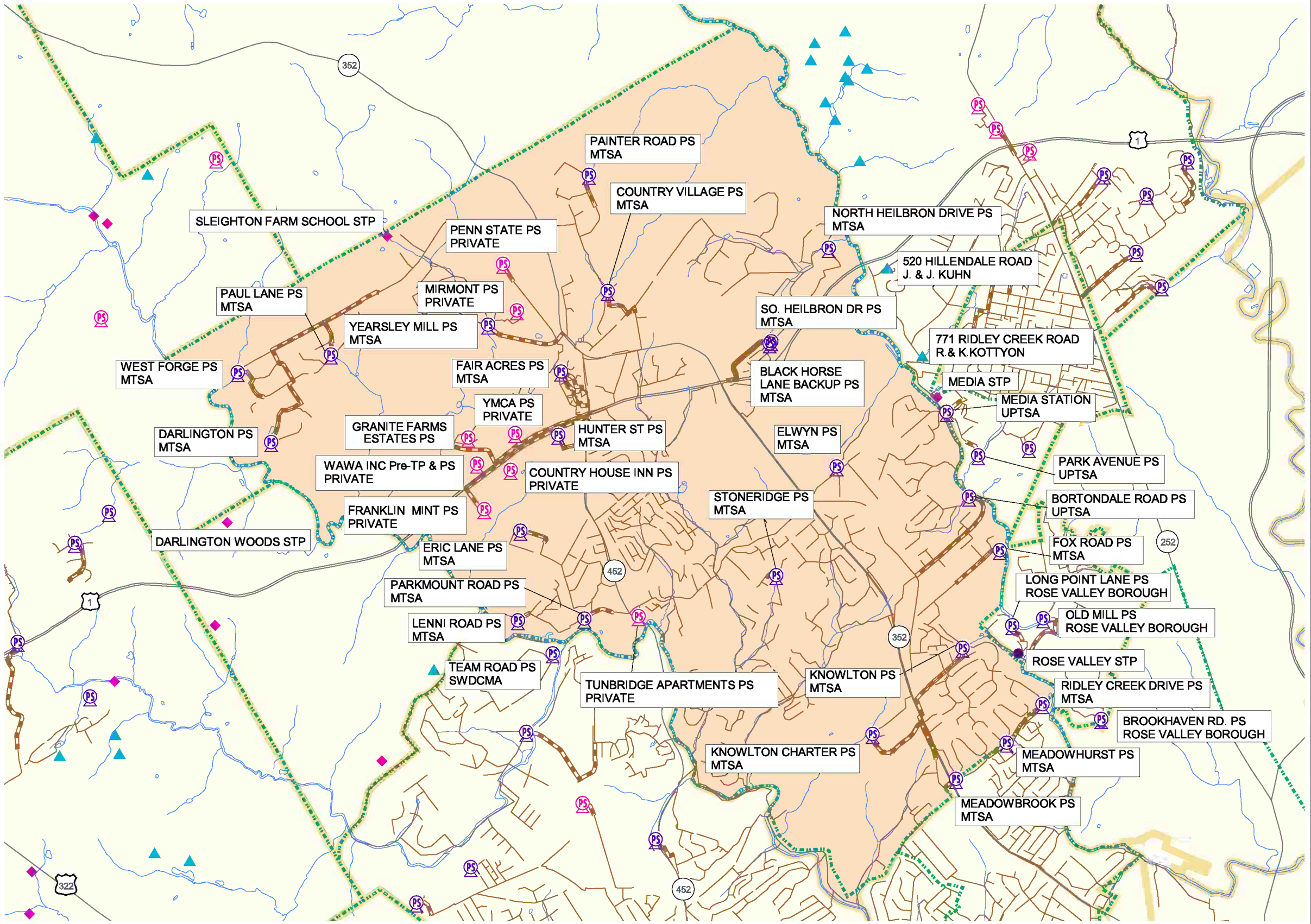


FIGURE 3-10 Newtown Township Municipal Sewer Authority



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Newtown Township
- Municipal Boundary



Scale in Feet
1500 0 1500 3000

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Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

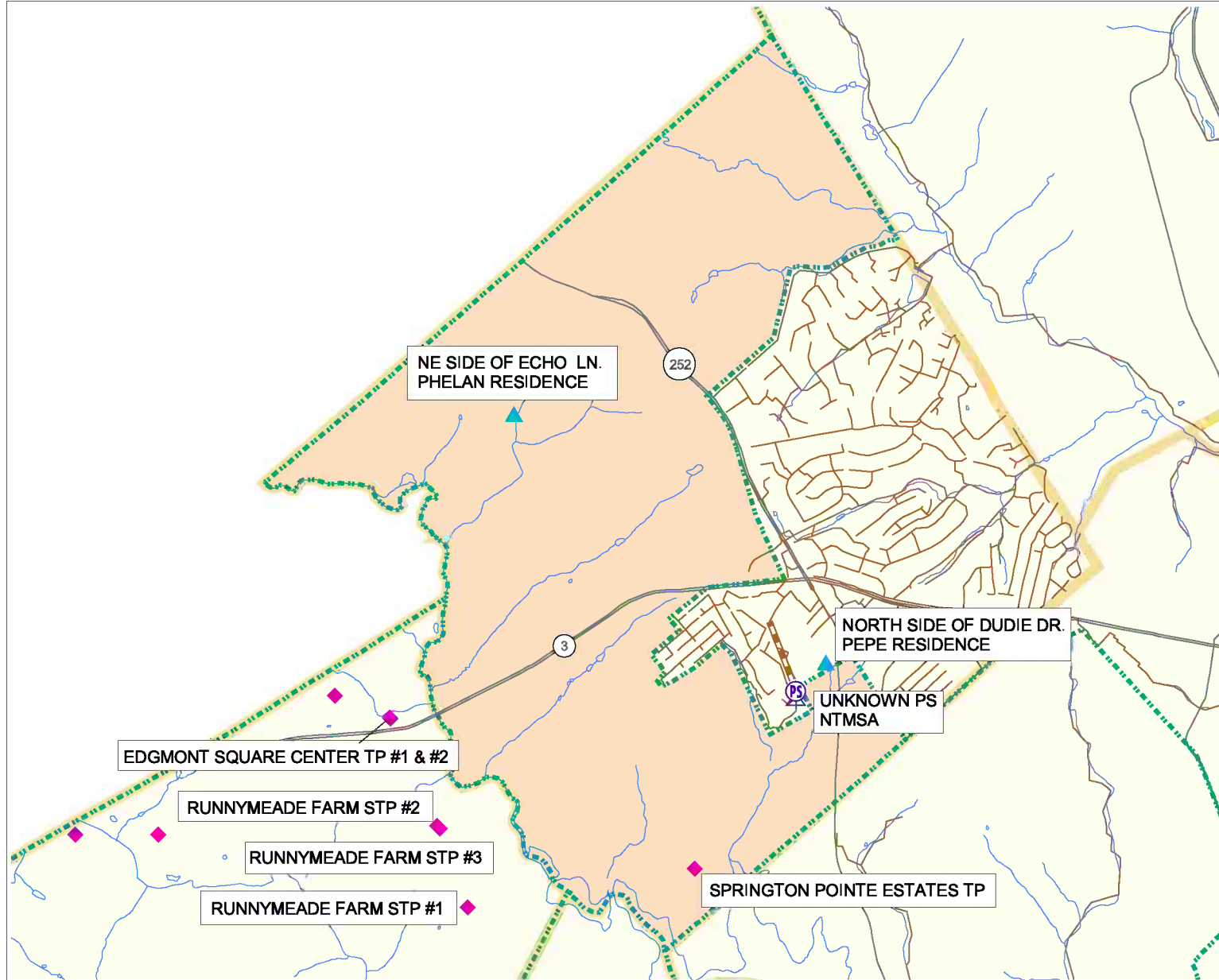
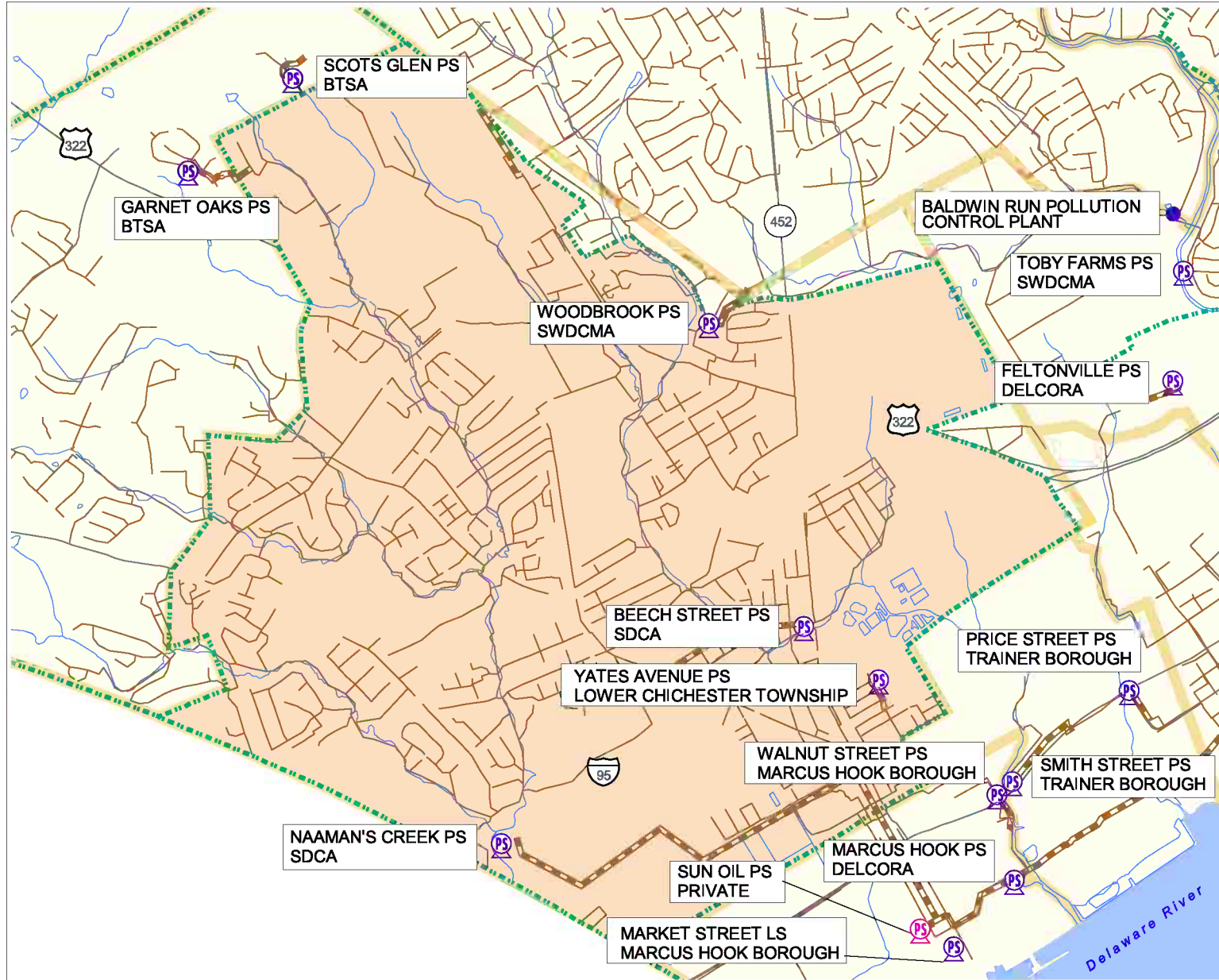


FIGURE 3-11
Southern Delaware County Authority



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Southern Delaware County Authority
- Municipal Boundary

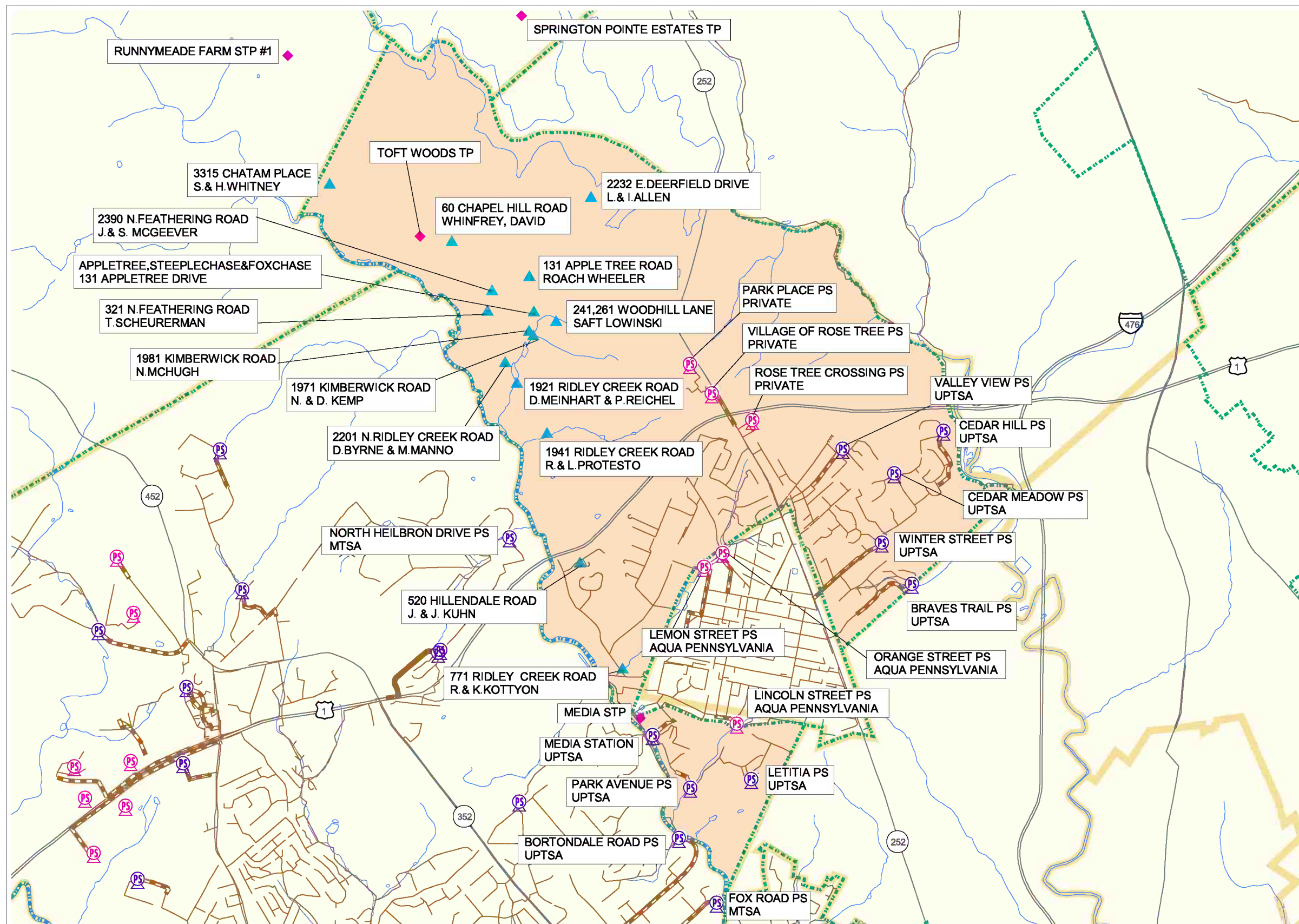


Scale in Feet
 1000 0 1000 2000













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Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 3-12



LEGEND

-  Public Pump Station Location
-  Private Pump Station Location
-  Public Treatment Plant
-  Private Treatment Plant
-  Small Flow Treatment Plant
-  Force Mains
-  Sewer Lines
-  Streams
-  Roads
-  Authority Boundary
-  Upper Providence Township
-  Municipal Boundary



Scale in Miles

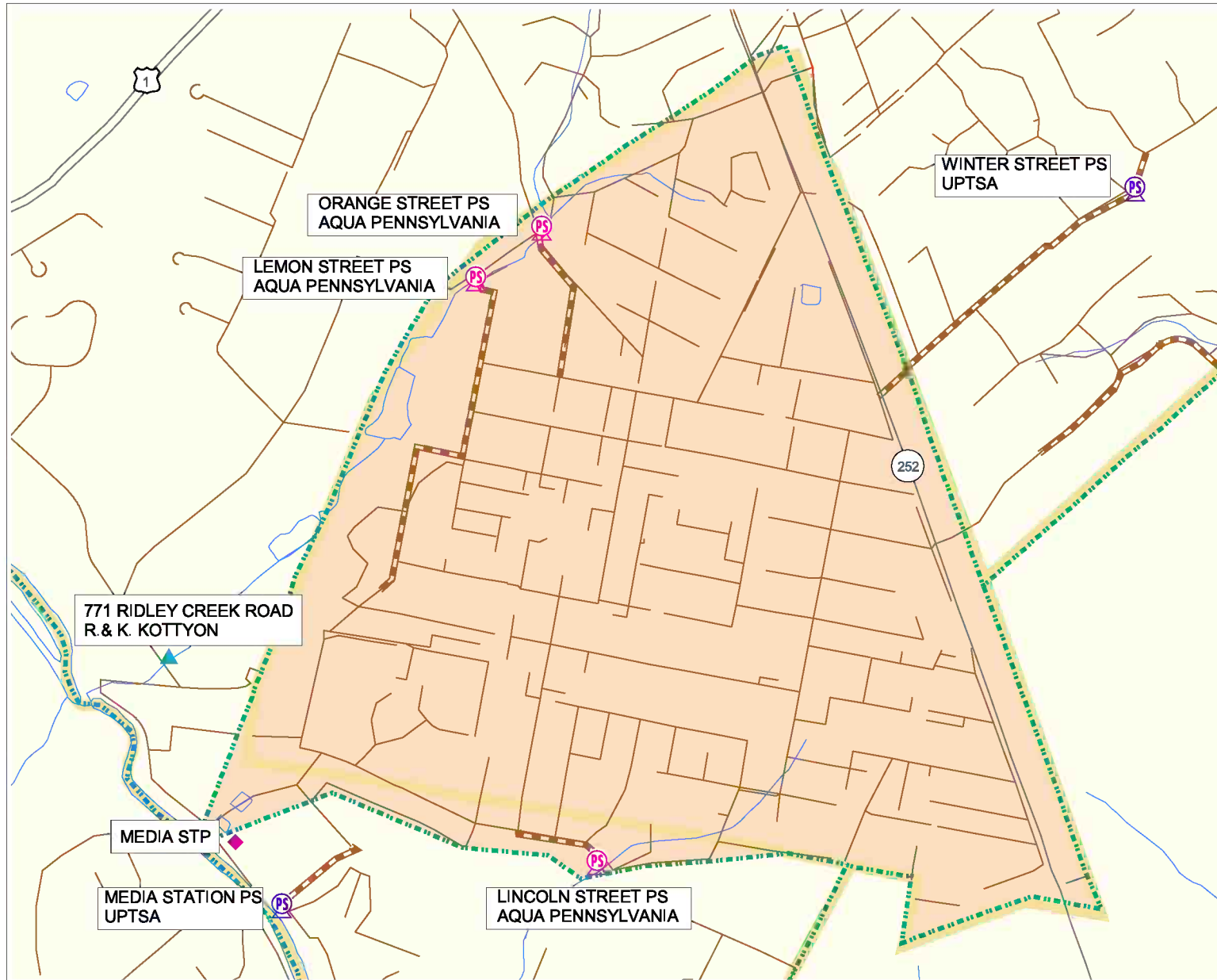


Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

Data Source:

- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

FIGURE 3-13
Media Borough



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Media Borough
- Municipal Boundary



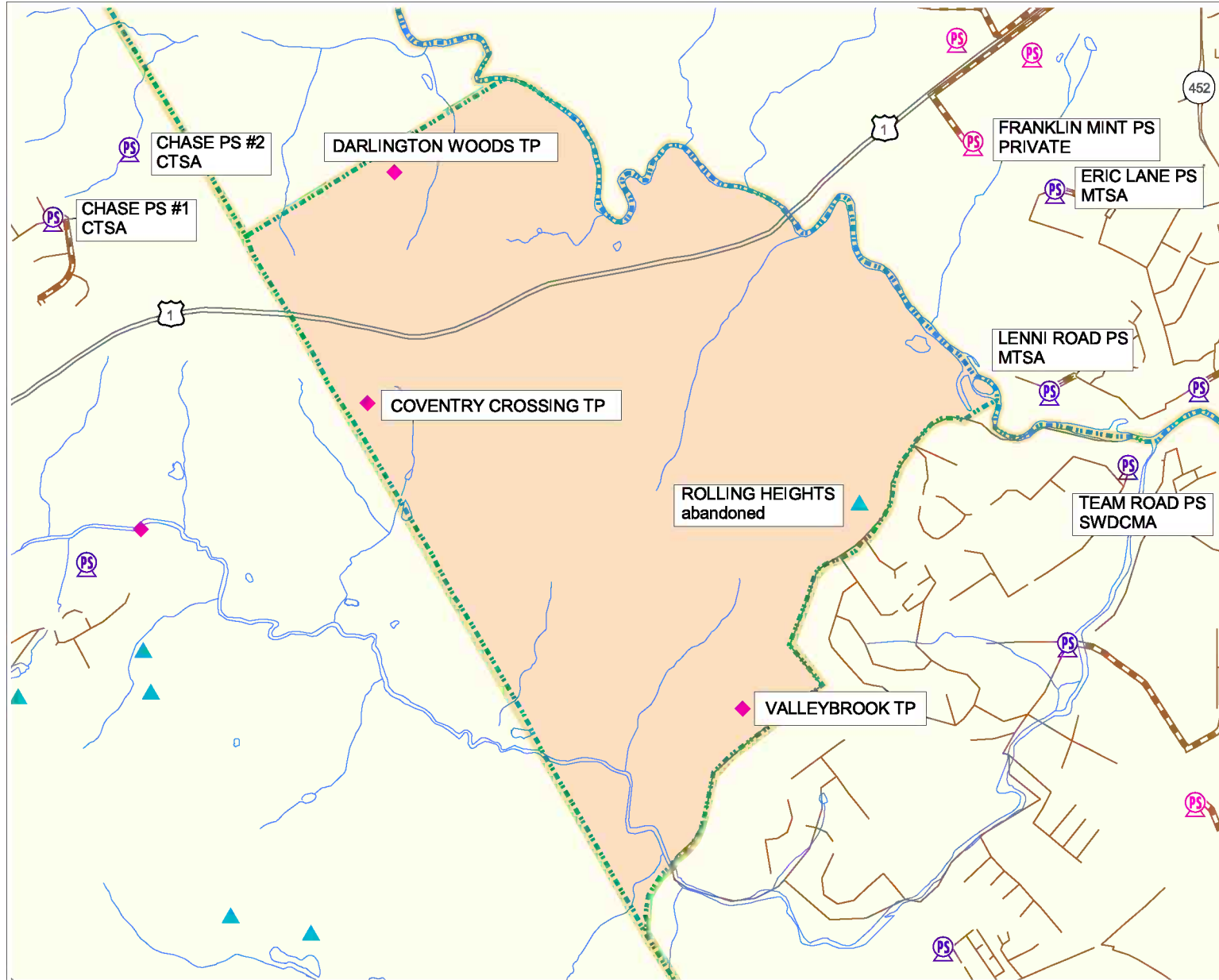
Scale in Feet



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Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 3-14
Chester Heights Borough



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Chester Heights Township
- Municipal Boundary



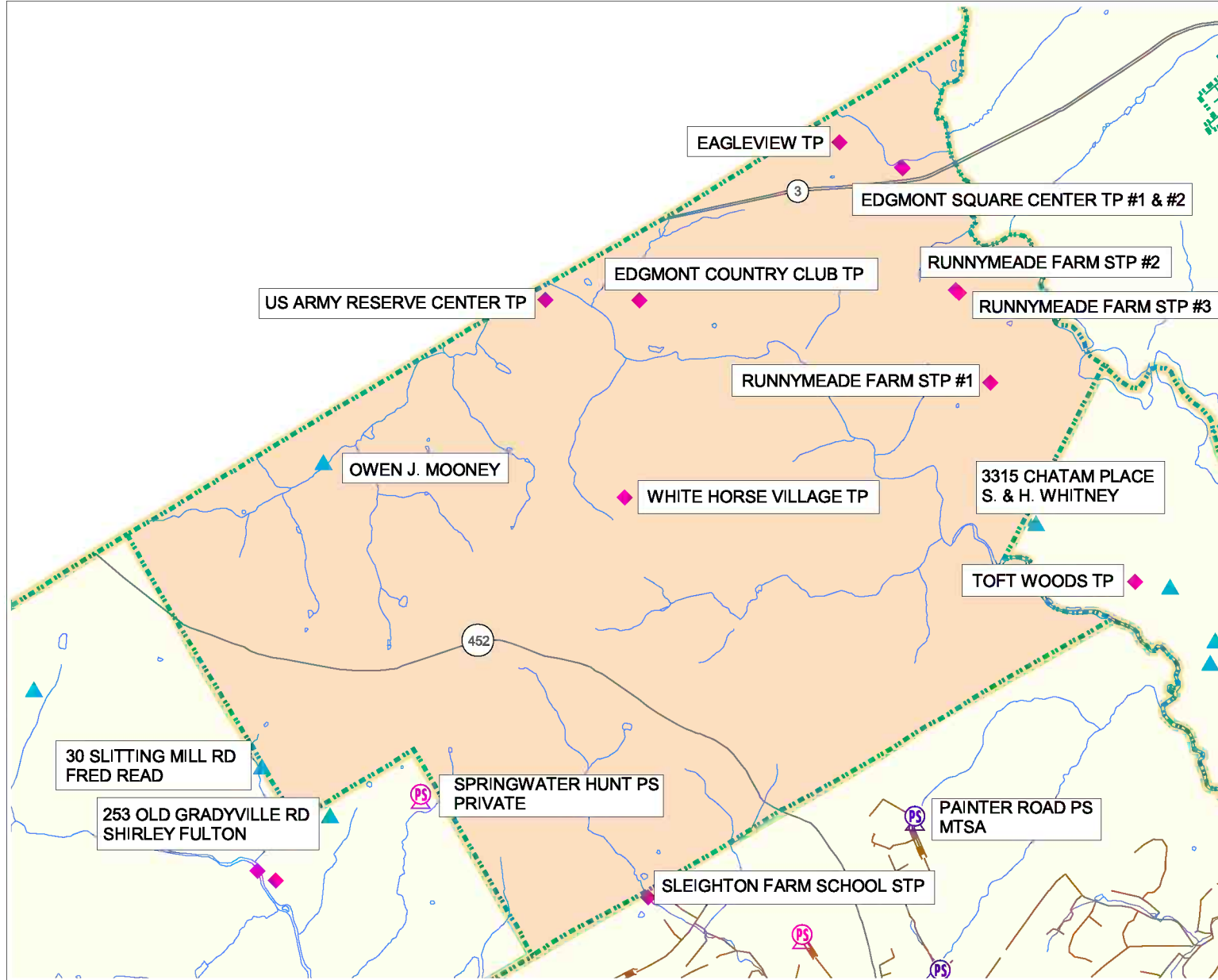
Scale in Feet



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

Data Source:
 - Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
 - Delaware County Planning Department (DCPD)

FIGURE 3-15
Edgmont Township



LEGEND

- Public Pump Station Location
- Private Pump Station Location
- Public Treatment Plant
- Private Treatment Plant
- Small Flow Treatment Plant
- Force Mains
- Sewer Lines
- Streams
- Roads
- Authority Boundary
- Edgmont Township
- Municipal Boundary



Scale in Feet

1500 0 1500 3000

Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

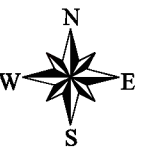
Data Source:
- Pennsylvania Spatial Data Access (PASDA) Web Site, <http://www.pasda.psu.edu>
- Delaware County Planning Department (DCPD)

FIGURE 4-1
Soil Limitations for On-Lot Disposal Systems



LEGEND

- Problem Areas (per 2000 SEO Survey)
- Roads
- Streams
- Moderate Limitations
- Severe Limitations
- Made Land
- Water
- Quarries
- Municipalities, Western Project Area



Scale in Miles



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

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- Delaware County Planning Department (DCPD)

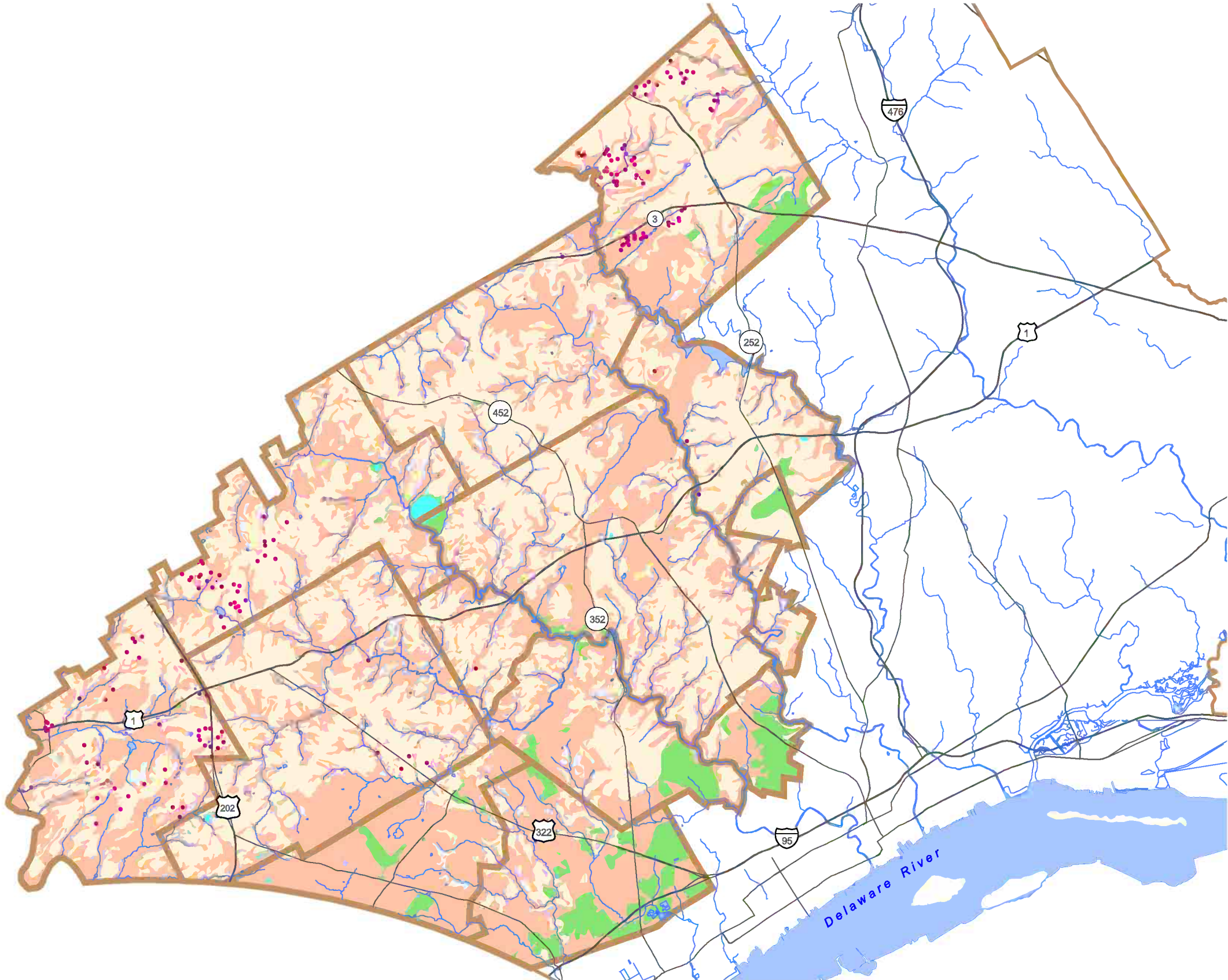


FIGURE 4-2
Physiographic Provinces and Geology



LEGEND

- Municipal Boundaries, Western Project Area
- Physiographic Province Boundary

Geology, Project Area

- Xa Anorthosite
- Tbm Bryn Mawr Formation
- fgh Felsic and intermediate gneiss
- fgp Felsic gneiss
- Xgw Glenarm Wissahickon formation
- Xgr Granitic gneiss and granite
- mgp Mafic gneiss - pyroxene
- mgh Mafic gneiss - hornblende
- Xpg Pegmatite
- Tpb Pensauken and Bridgeton Formations, undifferentiated
- Xu Ultramafic rocks
- Xw Wissahickon Formation



Scale in Miles



Disclaimer: This map is for analytical purposes only. The reliability of this map depends on the accuracy of the underlying data sources which have not been verified.

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 - Delaware County Planning Department (DCPD)

