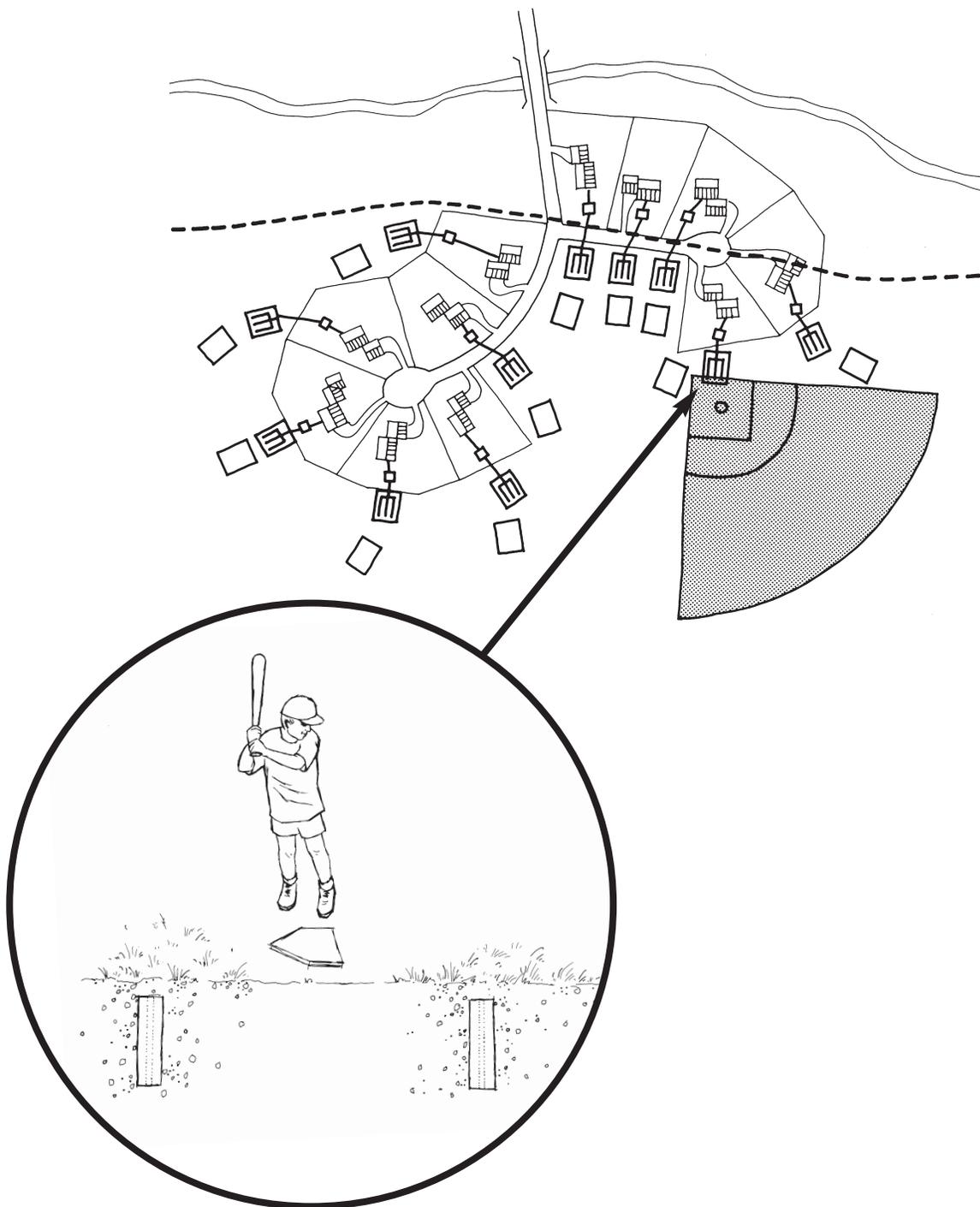


Individual Off-Lot Sewage Systems





BOARD OF COUNTY COMMISSIONERS

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Individual Off-Lot Sewage Systems

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Introduction

The purpose of this Planning Bulletin is to show how variations in locating individual sewage systems can be used as one method to help achieve local and County environmental protection and open space preservation goals. The term “individual off-lot sewage system”, as used in this Planning Bulletin, refers to the placement of the primary and/or replacement effluent absorption area outside the boundaries of the building lot served by the system. This concept applies primarily to new residential land development projects in rural and suburban areas that are not served by a public sewer system. This concept can also be applied when it has become necessary to replace a home’s malfunctioning septic system.

More and more municipalities and developers are seeking alternative residential subdivision designs which protect the important environmental, scenic, and historic resources. The primary method used to achieve these goals is reducing building lot sizes and grouping them together where they will have the least impact on the resources. The result is larger green spaces and open vistas for all the homeowners in the development to share and enjoy. This Bulletin shows how sewage and water facilities can affect the minimum building lot size, and how individual off-lot sewage systems can help conserve the resources of a particular site. Conserving resources at one development site can also create opportunities to create open space networks if and when surrounding sites are developed.

Approving the use of individual off-lot sewage systems is a decision that is made at the local municipal level. There are no State or County Health Department regulations that require the system to be located on the same property as the house it serves. When used in an alternative subdivision design, individual off-lot sewage facilities can offer economic advantages to the developer and future homeowners compared to the construction of a new community sewage system. Community sewage systems do place greater responsibilities upon municipalities to assure that they are properly operated and maintained. However, as demonstrated in this Bulletin, proactive involvement by municipalities in a sewage facilities management program is also needed to assure the long term viability of all individual sewage systems.

Scope

This Bulletin is designed to offer to local municipal officials, site designers, developers and others information to help:

- Determine the appropriateness of off-lot sewage systems in their community and new land developments;
- Evaluate the possible benefits of allowing off-lot systems;
- Understand variations in siting the components of individual systems;
- Maintain the identity of off-lot system components;
- Implement necessary important management strategies.

Relationship to the County Comprehensive Policy Plan Element, *Landscapes*

An individual sewage system is typically situated within the confines of the building lot of the dwelling it serves. In fact, for many years the Chester County Planning

Commission (CCPC) promulgated a policy for new land developments which stated that all residential building lots, except those with access to public or community sewage and water facilities, should be self-sufficient. In other words, a building lot should be large enough to contain the necessary sewage treatment and disposal facilities and potable water supply within its boundaries. With the adoption in 1996 of the Chester County Comprehensive Policy Plan Element known as *Landscapes*, CCPC became aware that this policy of “building lot self-sufficiency” may be working against the achievement of some of the Plan’s Goals.

Landscapes promotes the concept of livable landscapes and creates a framework for resource protection and growth management within the County through a partnership with local municipalities. The Policy Plan depicts four distinct landscapes - Natural, Rural, Suburban, Urban, plus Rural and Suburban Centers. The numerous goals and policies contained in *Landscapes* are all designed to help achieve an overall vision of landscape patterns in the County. The Policy Plan asserts that Natural and Rural Landscapes, because of their important open space, environmental, scenic, historic, and agricultural resources, are least appropriate for new intensive land development.

Many of the policies contained in *Landscapes* address open space issues. One policy concerning open space in the Suburban Landscape is: Develop a permanent open space system linking existing areas and adding new ones (Policy 1.2.5). A policy concerning open space in the Rural Landscape is: Encourage cluster development on non-prime agricultural soils which maintains open space and retains the overall rural character (Policy 1.3.2). Directly related is this policy for Natural Landscapes: Create an open space network of natural resources for the many environmental benefits it provides. (Policy 1.4.1) These particular policies, along with many others contained in *Landscapes*, have created a need to encourage alternative forms of residential subdivision designs. These alternative designs embrace the conservation of critical environmental resources and retain significant areas of open space.

New CCPC Policies

With the adoption of *Landscapes*, CCPC realized that there was a need to change its “building lot self-sufficiency” policy. This policy was perceived as supporting a pattern of low density residential development that is inconsistent with objectives adopted for the Rural and Suburban Landscapes. The following are important additional reasons why CCPC considered a new policy:

- Building lot sizes used in village, cluster and other alternative residential developments considered to be appropriate in the Rural Landscape may not be conducive to the use of individual on-lot sewage systems.
- Extending public water and sewage facilities into rural and certain suburban areas may not be desirable or feasible.
- New community sewage systems pose additional economic and management issues that frequently become barriers to their use.
- Lacking viable sewage system alternatives, many municipalities will approve, and developers will build, conventional large-lot subdivisions that do not preserve appreciable areas of open space.

Therefore, in October of 1997 the CCPC revised its policy as follows:

“It is the policy of the Chester County Planning Commission that using open space areas for individual sewage systems may be appropriate for certain subdivision designs to enhance natural resources and achieve open space preservation objectives.”

The intent of this new CCPC policy is to support municipalities that are striving to preserve significant areas of open space in the Natural, Rural and Suburban Landscapes through the use of alternative designs for new residential land developments. These alternative designs can preserve from 50 to 80 percent of the original tract as community and/or public open space while accommodating a reasonable number of residential building lots. Additionally, the concept of individual off-lot sewage facilities has the potential to better match land use needs with specific site characteristics. For example, the soils most suitable for sewage effluent disposal can be utilized for subsurface absorption areas. This leaves other appropriate areas for the construction of houses and roads.

Implementing the concept of individual off-lot sewage facilities requires more direct municipal involvement in sewage facilities planning. Additional municipal involvement in the form of a sewage system management program is another key element in providing for the health, safety and welfare of residents. Since regular maintenance is essential to keep individual systems functioning properly, CCPC adopted a second related policy in October of 1997:

“It is the policy of the Chester County Planning Commission to request all municipalities to adopt an ordinance requiring regular management, inspection and pump-out of all individual sewage systems, established in a legally enforceable manner.”

Some options for a municipal sewage facilities management program are described in more detail starting on page 12 of this Planning Bulletin. Additional resource materials on sewage management programs are listed in the Bibliography.

Primer on Individual Sewage Systems

This Planning Bulletin primarily focuses on planning concepts and conceptual designs of typical individual sewage systems that are permitted for use in the Commonwealth of Pennsylvania. The technical details of designing and engineering individual sewage systems can be found in other publications available from CCPC, the Chester County Health Department and the PA Department of Environmental Protection. However, an understanding of the basic components of a typical individual sewage system and the State regulations concerning their placement is germane to the design of alternative residential communities.

Definition and Use of Individual Sewage Systems

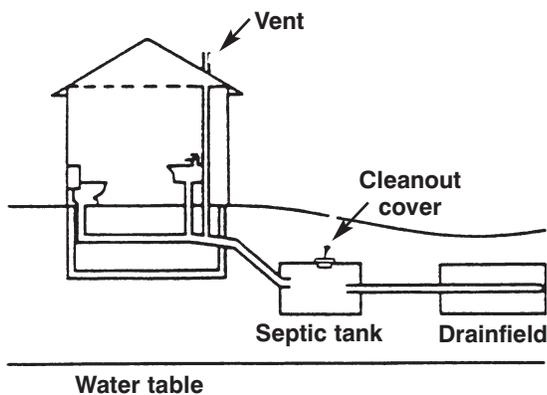
Title 25, Section 73.1 of the Pennsylvania Code defines an individual sewage system as: “A system of piping, tanks or other facilities serving a single lot and collecting and disposing of sewage in whole or in part into the soil or into waters of the Commonwealth or by means of conveyance to another site for final disposal.” While a number of variations exist, many people know the typical individual sewage treatment and disposal systems as “septic systems”. Current state regulations also

permit the use of small flow treatment facilities, spray irrigation systems and others as individual residential systems

The 1990 Census indicates that there were 139,597 housing units in the County. Of this total, 85,633 units (61.3%) were reported as being served by a public sewage system. The remaining 53,964 units were served by septic systems and cesspools (37.6%) or other means (1.1%). Individual sewage systems are prevalent throughout the suburban and rural areas of the County. The Chester County Health Department has been responsible for permitting individual sewage systems since 1968, and reports that approximately 1,800 system permits were issued during 1997. This number represents between eight and nine percent of all permits issued in Pennsylvania.

Individual sewage systems can provide economic and environmental advantages over certain types of community and public sewage systems. When constructed as part of a new home, individual systems usually represent a relatively small portion of the total capital investment. All individual systems require some maintenance, and for many systems this expense may be less than \$100 per year. With proper use and regular maintenance, an individual sewage system will last as long as the house itself. Individual systems are environmentally benign and protect public health because they are designed to treat domestic wastewater when properly operated and maintained. Typical individual sewage systems also return most of the water used in a home back to the local groundwater system.

Figure 1: Typical Individual Sewage System



Source: Chester County Planning Commission

Isolation Distances and Lot Sizes

As shown in [Figure 1](#), a typical septic system consists of two basic components: a treatment tank, and an absorption area that is used for the disposal of treated effluent. The absorption area is the place where the treated liquid effluent is released from a network of pipes and allowed to migrate down through the soil layers. Different methods are used to disperse treated effluent into the absorption area including seepage beds, standard trenches and elevated sand mounds. These areas are also known as drainfields or leaching fields. For the purposes of this Bulletin, the term “absorption area” will be used to include all of these terms.

In Pennsylvania, the location of these two basic system components is determined, in part, by the minimum horizontal isolation distances specified in 25 PA Code Chapter 73 Section 13 (as revised and amended). The Commonwealth, through the Environmental Quality Board, has determined that these are the minimum distances needed to safely separate the components of an individual sewage system from other physical features. These regulations and standards are enforced by the PA Department of Environmental Protection (PADEP) and the Chester County Health Department (CCHD). Where conditions warrant, PADEP or CCHD can require greater isolation distances. The concept of isolation distances or set-backs is shown in [Figure 2](#).

The minimum horizontal distance specified between the *treatment tank* and other physical features are (partial listing):

- occupied dwellings, swimming pools and driveways — 10 feet

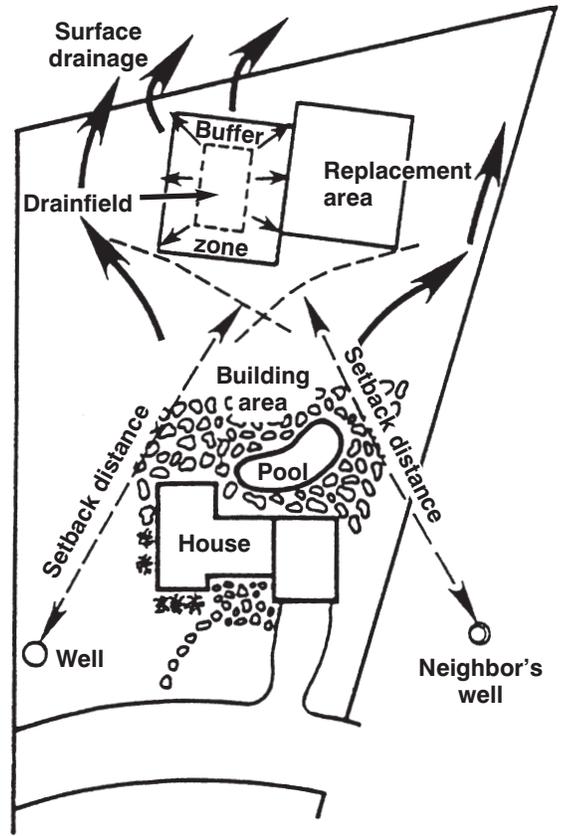
- property line, easement or right-of-way — 10 feet
- water supply line under pressure — 10 feet
- streams, lakes or other surface waters — 25 feet
- individual water supply well — 50 feet.

Minimum horizontal isolation distances between the *absorption area* and other physical features are:

- occupied buildings and driveways — 10 feet
- property line, easement or right-of-way — 10 feet
- water supply line under pressure — 10 feet
- surface drainageways — 10 feet
- rock outcrop or identified shallow pinnacle — 10 feet
- natural or manmade slope greater than 25% — 10 feet
- another active on-lot disposal system — 5 feet
- streams, lakes and other surface waters — 50 feet
- individual water supply well — 100 feet
- mine subsidence areas, mine bore holes or sink holes — 100 feet

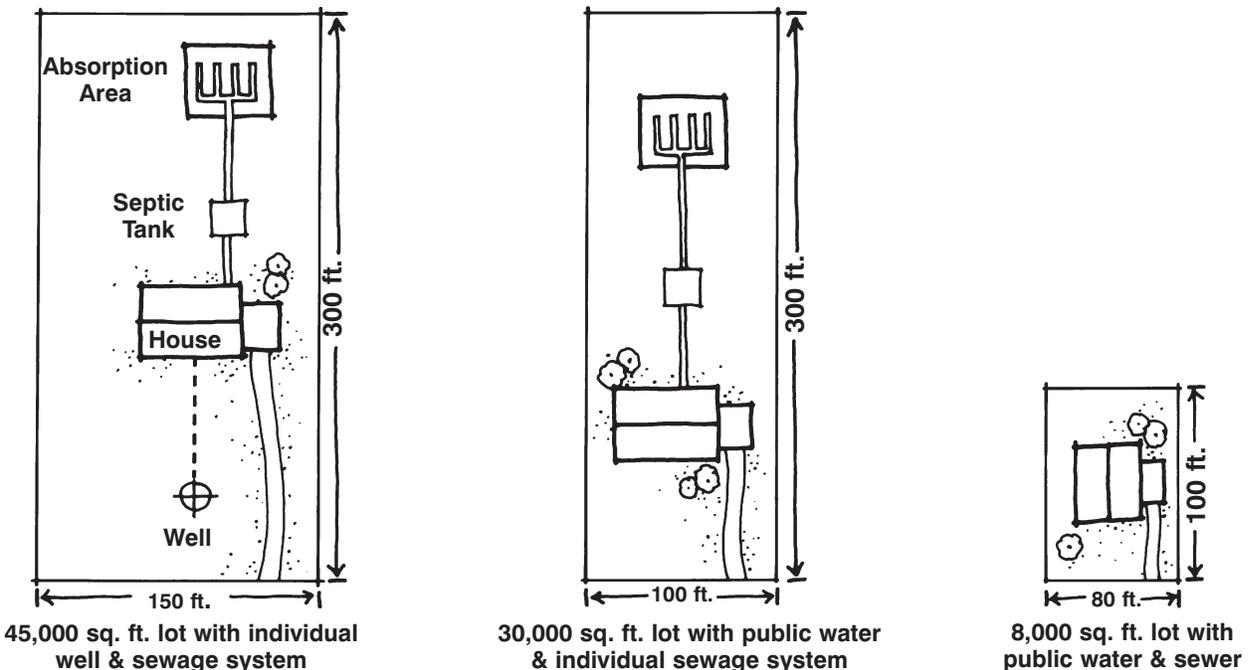
Figure 3 shows how lot size can be influenced according to the type of sewage disposal and water supply facilities available. Horizontal isolation distance regulations for individual sewage systems will affect the minimum size of a building lot. It takes almost 40,000 square feet of land with well-drained soils (one acre of land equals 43,560 square feet) to accommodate a building lot that is served by its own

Figure 2: Conceptual Horizontal Isolation Distances



Source: Chester County Planning Commission

Figure 3: Lot Sizes Vary According to Type of Sewage Disposal and Water Supply Facilities Available



Source: Chester County Planning Commission

sewage disposal and water supply systems. This area will usually provide enough space to place a septic system a safe distance from a potable water supply well and other site features, depending upon the footprint of the house and local minimum setback requirements. Less land (approximately 30,000 square feet) can be used for a building lot if it is served by either a public water or sewer system. Even less land (8,000 square feet, more or less) can be used for a building lot that is served by both public water and sewer systems.

Reasons for Off-Lot Sewage Systems

The practice of locating the primary individual sewage system components “off-the-lot” may be applied in two different scenarios. The first scenario involves a homeowner who is faced with the problem of having to replace a failed absorption area. Not only can this situation present a public health hazard, but many times there are only a few, expensive solutions. The second scenario involves new residential land developments not located near an existing public sewer system. Depending on local plans and policies, as well as specific characteristics of the site, individual off-lot sewage systems may present an alternative to a community sewage system. Both of these scenarios are discussed in greater detail.

Replacing a Malfunctioning On-Lot System with an Off-Lot System

There have been cases in Chester County where individual sewage disposal systems had to be placed on lots other than the one containing the house the system is serving. In most cases this occurred with houses constructed many years ago. Often, these homes were situated near a stream or wetland where the soils do not drain very well or have a seasonal high water table. Other cases involved subdivisions containing building lots that were approved prior to modern soil testing requirements (before 1968). Even though some of these approved lots contained one or more acres, there was no assurance that they contained soils suitable for the placement of a standard septic system within the boundaries of the lot. Eventually, some of the septic systems and cesspools installed on these lots had problems or failed. Other cases involved subdivision plans that were approved, but for various reasons, some lots sat vacant for a number of years. Then, when the lot was purchased and the owner attempted to build a house, they were denied a standard sewage system permit because the lot could not pass modern soil percolation tests.

In these instances, finding a solution to the problem of sewage treatment and disposal can be difficult and expensive. If the system malfunction is the result of absorption area failure, one of the first remedial steps usually taken is to re-locate the absorption area. If no area with suitable soils is found on the lot, one possible solution involves conducting soil tests on adjacent lots. This may be a solution if a suitable site for an absorption area is located on a neighbor’s lot and the neighbor is receptive to having someone else’s sewage disposal system on their property. When the absorption area of an individual sewage system is located on a neighbor’s property, access easements must be created. These easements are used to legally provide access to the system for maintenance and repair purposes. However, easements do place some limits on the use of the eased land, which is a reason why some neighbors are reluctant to agree to such an arrangement.

Another possible solution in these situations is the installation of a sewage treatment unit that discharges treated effluent to a nearby stream. Known as Small Flow Treatment Facilities, these systems are expensive to design, install and operate. CCPC does not support the use of these systems because they represent new discharges to the Waters of the Commonwealth, and can impact the receiving stream by adding pollutants as nitrates and phosphates. These systems require a special permit issued by PADEP and only used as a last resort.

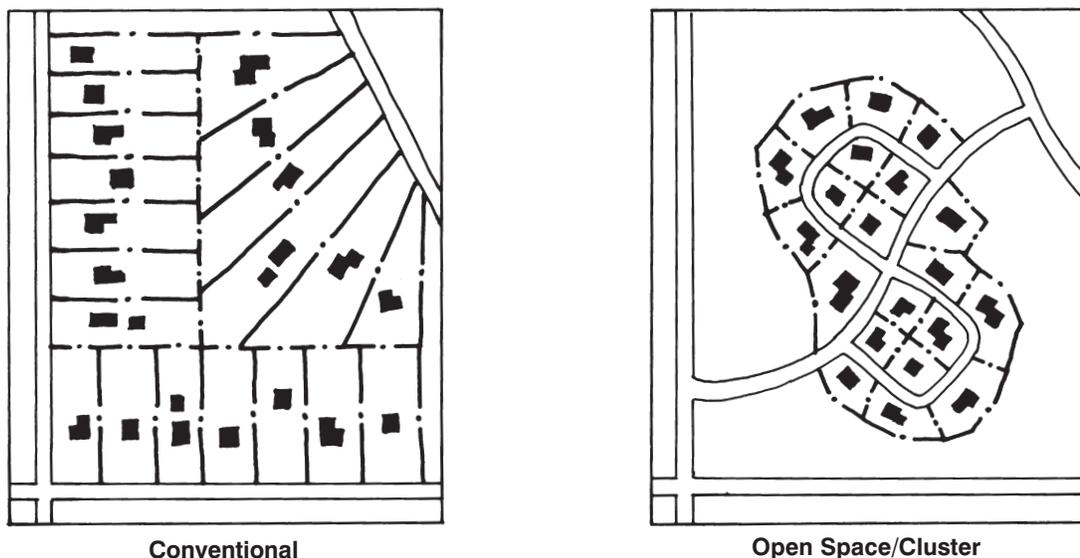
Reducing Building Lot Sizes in the Rural and Suburban Landscapes

The proliferation of residential subdivisions containing one and two acre residential building lots throughout Chester County is a land use pattern that has produced both positive and negative results. This growth has brought economic development and prosperity, new jobs and new places to shop and be entertained. At the same time this development pattern has contributed to traffic congestion and greater air pollution, higher housing costs, the loss of prime farmland and woodlands, and has stressed precious water resources. This is sprawling pattern of land development addressed in the County Policy Plan, *Landscapes*. CCPC is now working with the municipalities in the County to help manage new growth by directing and concentrating development in the most appropriate areas. Many municipalities are working on improvements to their plans and ordinances to help direct new growth from rural areas to suburban centers and urban areas where adequate infrastructure exists.

However, some new growth will continue to occur in the rural and suburban fringe areas. These are the areas where CCPC is encouraging local municipalities to promote alternative or neo-traditional residential subdivision designs as alternatives to conventional one- and two-acre lot subdivisions. These design options may include cluster, village, open space, or conservation subdivision designs. In some areas they are also known as land preservation districts.

The purpose of these designs is to allow the developer to build the maximum number of homes currently permitted by the municipality's zoning ordinance, while at the

Figure 4: Conventional Subdivision versus Open Space/Cluster Layout



Source: Chester County Planning Commission

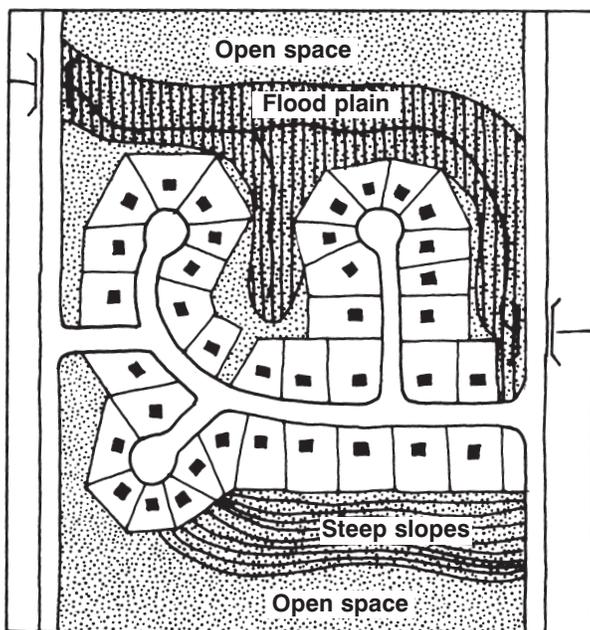
same time conserving large portions of original tract. The conserved lands generally include the most important open space, environmental, scenic, historic and agricultural resources on the tract. These spaces can also become part of an interconnected network of local and regional greenways.

Figure 4 illustrates the difference in lot sizes and layout in a conventional subdivision as opposed to an open space or cluster layout design. The new CCPC policy regarding individual sewage systems was initiated because the lots within these types of developments can be significantly smaller than the trend of the past 25 years. The use of smaller lots in an alternative layout makes it difficult to meet the minimum horizontal isolation distances for a typical individual sewage system required by state regulations, particularly when an individual well will be used on the same lot. A safe distance between the water supply well and septic system absorption area must still be provided.

Alternative Residential Subdivision Designs

Local zoning and subdivision ordinances can be created to encourage, and even require, the conservation of critical environmental features in a residential land development. This Planning Bulletin examines a few residential subdivision arrangements to highlight the concept of flexibility in design by using individual off-lot sewage systems. For more examples of alternative subdivision designs the reader is directed to the Bibliography which lists other publications available from CCPC and other organizations.

Figure 5: Example of a Residential Cluster Development



Source: Chester County Planning Commission

Combining the concept of alternative subdivision design with the concept of “off-lot” individual sewage systems has the potential to better match site development requirements with specific site characteristics. For example, soil profiles and percolation tests must be performed as part of the planning and permitting requirements for all new individual septic systems and for community on-lot disposal systems. Analysis of this information then indicates areas within the development tract containing the soils best suited for sewage effluent disposal. Those areas can then be set aside as community open space or utility use areas. The building lots and roadways can then be located in other appropriate areas of the tract.

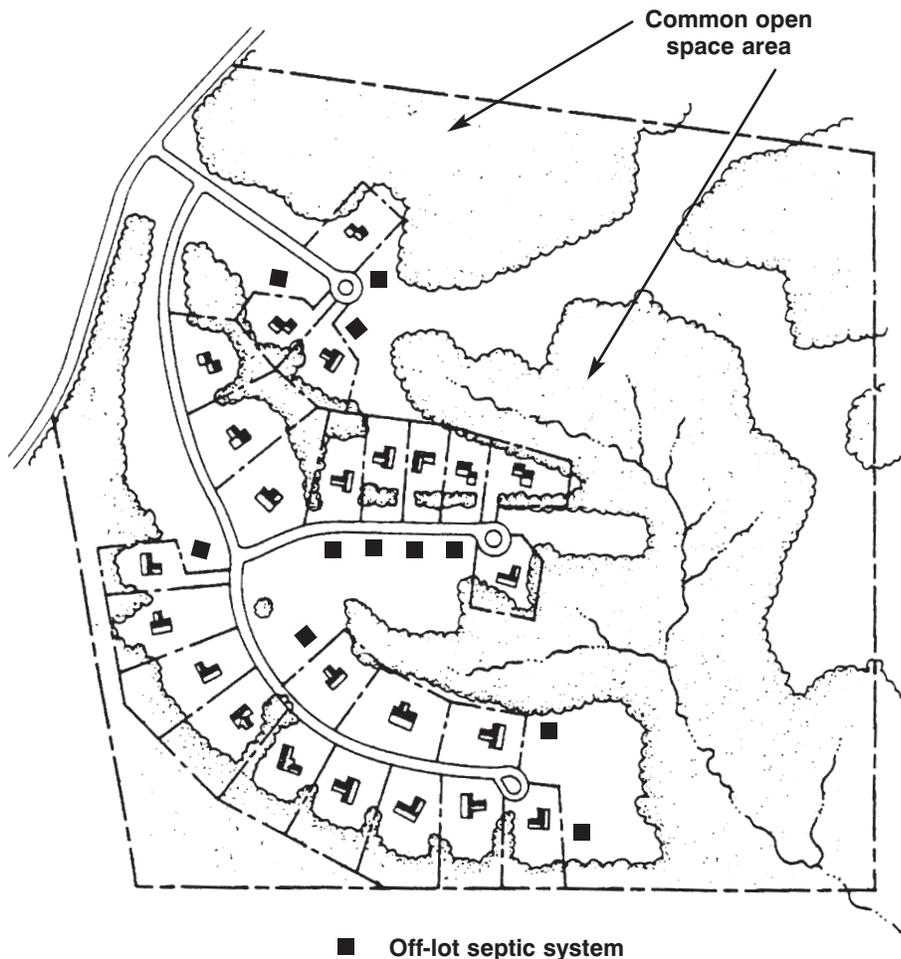
Some local zoning ordinances in Chester County permit, or even require, alternative subdivision designs in designated zoning districts. Provisions contained in some of these ordinances require that at least 50 percent of the original tract be preserved in open space and allow the same total density of residential units permitted in that zoning district. For example, assume the base zoning on a 37-acre tract of

land as shown in **Figure 5** is one dwelling unit per acre. The developer would be required to set aside at least 18.5 acres as open space and be permitted to build 37 homes on remaining 18.5 acres. Individual off-lot sewage systems may be appropriate for this type of subdivision design, especially if a range of lot sizes is desired. The smallest lots could be located next to the open space areas that contain suitable soils for a standard individual sewage system. The larger building lots could contain their own septic systems or perhaps utilize the open space areas if suitable conditions exist.

Local zoning ordinances may also include bonuses that allow an increased total number of dwelling units if a larger percentage of the tract is set aside for open space (density bonuses). **Figure 6** illustrates another example of an alternative subdivision design. In this example it may be possible and appropriate to utilize the common open space area for either individual off-lot septic systems or a community sewage system.

The previous illustrations are two possible alternative subdivision designs. Another way to visualize this concept is to think of the golf course communities that are popular in the mid-Atlantic region. These developments typically cluster houses on small lots between open spaces. In alternative subdivision designs the open land or green spaces used for the fairways, greens and rough would be conserved or used for other recreational activities.

Figure 6: Alternative Subdivision Design



Source: Natural Lands Trust

The most important objectives of such alternative subdivision designs are:

1. Maximizing the amount of land area that can be used for recreation as well as land that is left undisturbed and kept as open space in perpetuity;
2. Protecting the critical environmental resources on the site;
3. Linking protected open spaces with adjoining open spaces to create a network or greenway;
4. Minimizing the amount of land area that will be disturbed for roads and buildings.

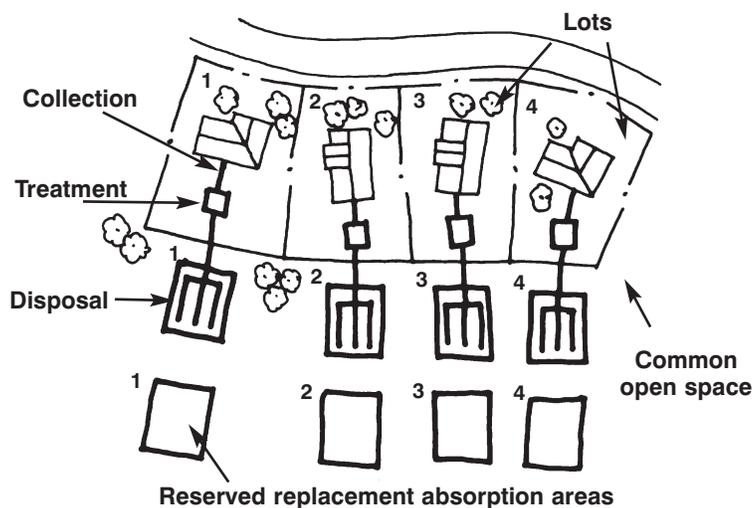
Variations in Locating Off-Lot Sewage System Components

The location of individual sewage systems can be varied according to the objectives and requirements of local ordinances and to the specific characteristics of the site. Potentially, some building lots in a subdivision can contain the entire sewage system while others may have off-lot sewage systems. One very important consideration in designing an alternative subdivision is the availability of a community or public water supply. As discussed previously, the minimum horizontal isolation distance between water supply wells and sewage system components is critical to protect public health and also help determine minimum lot sizes. The availability of a community or public water supply would present even more opportunities to create flexible alternative subdivision designs since there would be few concerns about providing proper isolation distances between wells and septic systems.

Another important consideration in the design of an alternative subdivision is the Chester County Health Department (CCHD) policy regarding areas on building lots or

in designated open spaces reserved for the replacement of failed absorption areas. CCHD requires that when a proposed building lot is less than one acre, or contains marginal soils, a replacement absorption area must be located and reserved for future use.

Figure 7: Building Lots Containing Treatment Tanks with Primary and Replacement Absorption Areas Off-Lot in Common Open Space



Possible arrangement of basic components

Alternative subdivision designs can allow flexibility in the arrangement and location of the basic septic system components. Locating the treatment tank within the bounds of even very small building lots generally does not present a problem because the tanks are relatively small in size and their locations are not dependent upon soil conditions. Local municipal policies and requirements can give the designer/developer a choice in the location

Source: Montgomery County Planning Commission

or arrangement of the absorption areas. For example, if the development will conserve a high percentage of open space and provide a community or public water supply, then the individual absorption areas may still be located within the bounds of the lot if the soil conditions are suitable. If the development will utilize individual wells and the lots do not contain suitable soils, then the absorption areas can be located “off-lot” in suitable places within the designated open space.

Additional arrangements of the septic system components are possible if CCHD determines that reserve or replacement absorption areas are necessary. If the lots are large enough and conditions are suitable, both the primary and replacement absorption areas may be located within the bounds of the lot. In some cases it may be possible to arrange that system so that the primary absorption area is located on the lot with replacement absorption areas reserved in the designated open space. Or, as illustrated in [Figure 7](#), both the primary and reserve absorption areas can be located off-lot in a common open space. It is possible for more than one arrangement of basic components to be utilized within a development.

Management of Open Space Areas Containing Off-Lot Systems

Areas of land set aside in new residential subdivisions for common use by the property owners can usually accommodate concurrent uses. However, designating the use of some common open space land for utility purposes such as stormwater management or sewage treatment and disposal may preclude some other uses. Recall that one of the goals in an alternative subdivision without access to public sewers is to make appropriate use of a site’s environmental features. This could mean using areas containing well drained soils for the disposal of treated sewage effluent and/or recharge of stormwater. If suitable soils are identified, then individual off-lot sewage systems could be located below the surface of a common open space area. The land above them still has the potential to be used for a number of recreational or open space functions. This concept of concurrent use of the open space areas may offer economic advantages to the developer and future homeowners.

Some development sites contain critical environmental resources such as woodlands, wildlife habitats, wetlands or flood plains. These areas should not be disturbed and should be set aside for passive recreation uses such as nature walks and bird watching. Typically, these areas would be available for enjoyment by property owners in the development and would be owned in common by a Home Owners Association (HOA) or be dedicated to the local municipality. Natural areas such as woodlands and wetlands will require little maintenance, if any, and therefore do not represent management problems or a financial burden to the HOA or municipality.

Some development sites may also contain areas for more active recreational pursuits such as playgrounds, field sports and equestrian activities. These areas may be owned by a HOA or a local municipality, and usually require some level of regular maintenance. Open meadows, seasonal grazing areas and other open spaces would be the most likely areas to contain individual off-lot sewage systems, particularly if these areas contain well-drained soils. Setting aside the best soil areas for individual sewage system use should help eliminate the need for sand mound systems. Therefore, the

designated sewage disposal areas can retain their original contours, and would not present additional groundskeeping challenges. However, heavy vehicle traffic should be restricted from areas containing subsurface sewage disposal absorption areas.

The primary open space area management task is to assure that nothing is placed in these areas that would affect the operation of, or access to, the individual subsurface sewage systems. Permanent paving, swimming pools, permanent structures or trees should not be placed on top of sewage effluent absorption areas. Both the HOA and the local municipality share the responsibility of assuring that no activities or structures will occur in open space areas designated for individual sewage disposal systems.

System Location Controls and Management Options

This Planning Bulletin specifically addresses sewage disposal systems owned by individual home owners. Individual ownership carries with it the responsibility to properly use the system, as well as to correct any system malfunctions or failures, regardless of where the system is located. With individual off-lot sewage systems there is a need to be able to easily identify the owner. There may also be a need to find a particular individual off-lot sewage system located in an open space area. The field recording methods and easements described below can be used to help maintain the identity of system owners and the location of their sewage system components.

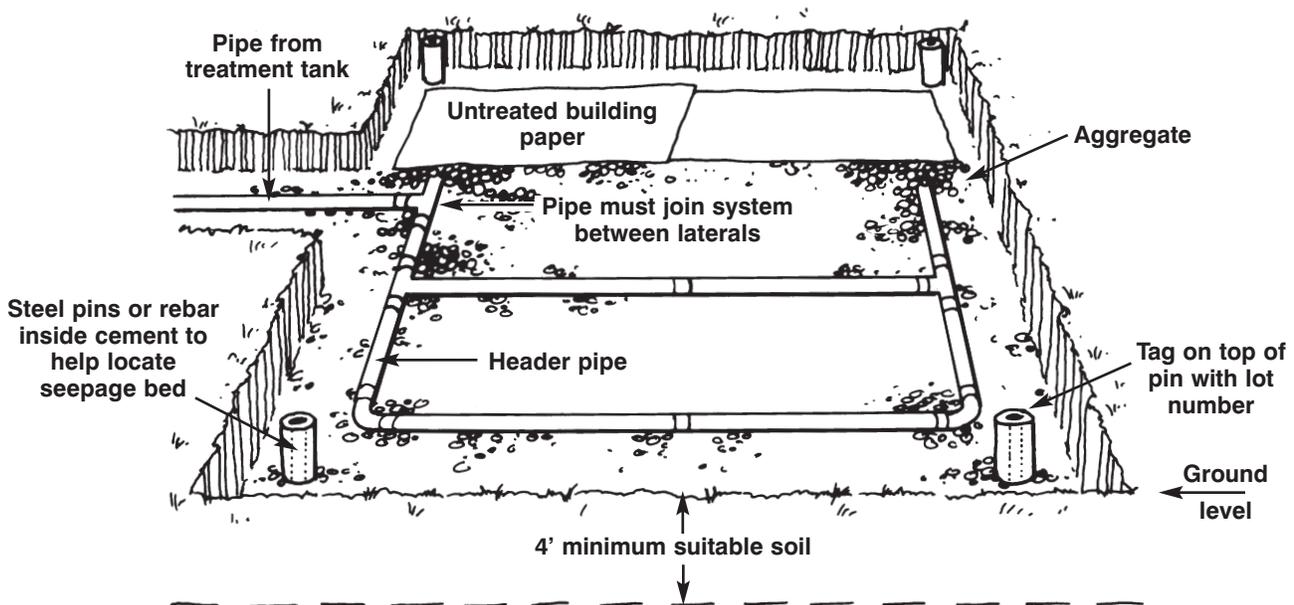
Field Recording Methods

There are five primary tools for recording the identity and location of off-lot systems, and they are applied during the soil testing, planning and construction stages of a potential land development project. State regulations for sewage facilities planning require that all locations on the project site where the soils have been evaluated must be listed and shown on the subdivision plan drawings. Thus, the subdivision plans are the first tool used to identify which building lot will use a particular absorption area.

Some of the locations on the project site where soil profiles have been examined and percolation tests conducted may meet state standards for absorption areas, and some may not. After the actual location of the acceptable absorption bed locations have been determined, those locations can be surveyed and then recorded on the property deed of each building lot. This is the second tool that could be very useful in the future if the absorption area needs to be located. The third tool is the permit issued by CCHD for each of the individual systems. The permanent permit file maintained by CCHD will also contain specific information on the design of the system, as well as the location of the major system components.

Most municipalities in the County have Building Codes containing requirements that must be met before construction begins and during the construction process. These codes are a separate set of ordinances and can require inspections at specified construction phases. For example, a municipality can require foundation inspections, electrical inspections, occupancy inspections, etc. These codes can also require that specific site information and drawings be submitted to the municipality before

Figure 8: Marking an In-Ground Seepage Bed in the Field



Source: Chester County Health Department and the Chester County Planning Commission

construction can begin. Information to be shown on a site plan used for these purposes includes the boundaries of the lot and the location of the house in relation to setback requirements. These plan drawings could also show the location of sewage system treatment tanks, as well as primary and replacement absorption areas. This type of local building code requirement is the fourth tool that can help document off-lot sewage system location and ownership. This method would provide useful information in a municipal sewage facilities management program.

There is a fifth method available to help locate an absorption area in the field and maintain the identity of an off-lot sewage system and its owner. During construction of the seepage bed in the absorption area, long iron pins or steel concrete reinforcement material (rebar) can be driven into the ground at the corners of the absorption area and left several inches below the ground surface. As shown in [Figure 8](#), these pins or bars can be made more secure by digging a small hole around them and filling it with concrete. Then, if needed in the future, a metal detector can be used to locate the metal pins or bars. Also, a plastic cap or metal tag marked with the number of the house lot can be attached to each pin to assist with identification.

Use of Easements

Easements are described generally as an interest in or right over the land of another. Many types of easements exist, and serve purposes such as land conservation, preservation of scenic views and access to solar energy. Easement rights may attach to and run in favor of the dominant estate and pass automatically with passage of title to that estate (an appurtenant easement). The parcel of land burdened by an easement is referred to as the subservient estate.

Appurtenant easements have been used to guarantee access to individual sewage systems when it was necessary to place the system off-lot as the result of a

malfunctioning system. In these cases the boundaries of the easement were created to include conveyance pipes leading to the treatment tank and/or absorption bed, the site containing the absorption area, and sufficient width for vehicular access.

The use of appurtenant easements may or may not be desirable or necessary for individual off-lot sewage systems in a common open space area. The use of easements will depend upon the subdivision layout and land use agreements or covenants. For example, if the designated open space area is owned by the HOA, and the HOA documents contain a covenant that specifically allows the use of designated areas for sewage disposal by all the property owners in the development, then individual easements may not be necessary. In most situations a conservation easement or a covenant will be placed on open spaces owned by an HOA to restrict further development. Easements for each individual off-lot sewage system may be desirable if the land is owned by an entity other than the HOA.

Figure 7 shown on page 10 represents an ideal situation in which the absorption areas are located in the HOA open space directly to the rear of the building lots. If the situation necessitates the use of easements, this type of arrangement minimizes the amount of land constrained by easements on the subservient estate (the open space). It also minimizes the amount of site disturbance in the open space area. Criss-crossing sewage conveyance lines to off-lot absorption beds should be avoided to prevent the necessity of placing multiple easements on the same piece of land.

Municipal Sewage Facilities Management Programs

The Pennsylvania legislature has delegated the responsibility of sewage systems to local municipalities. Section 71.71 of Title 25 of the PA Code states that “municipalities are required to assure the proper operation and maintenance of sewage facilities within their borders”. The Pennsylvania Department of Environmental Protection (PADEP), which administers the state-wide sewage facilities planning and permitting programs, has interpreted this statute to involve municipalities in sewage facilities of all kinds including public, private and individual systems.

Local sewage facilities management programs are not required by statute or regulation. However, should a municipality choose to become actively involved in a management program, that program should be officially adopted by the local governing body. The process for establishing a program should follow the sewage facilities planning process established under PA Act 537 as enumerated in 25 PA Code Chapter 71. Municipalities are now eligible for reimbursement of up to 85 percent of eligible costs for the administrative and personnel expenditures to implement a sewage management program (25 PA Code 71.73(d) and 72.44).

There is a range of options available to a municipality willing to take a proactive role in a sewage management program. The basic tenet of all municipal programs is to educate residents on water conservation and the proper use and maintenance of individual sewage systems. Without this information some system owners may unwittingly neglect or abuse the system, which can lead to system malfunction and failure. The lack of individual knowledge and responsibility may become, sooner or later, the municipality’s problem. The old adage, “An ounce of prevention is worth more than a pound of the cure,” certainly applies to individual sewage systems.

The goal of a sewage facilities management program is to insure that all individual sewage systems are maintained and inspected on a regular basis to prevent failure.

Experts recommend that all septic treatment tanks be pumped at least every three years to remove accumulated solids and scum. However, even the best education program will not insure that all individual system owners are keeping up with needed maintenance. Most ordinances adopted by municipalities in Chester County require homeowners to send the municipality proof of tank pump-out at specified intervals. CCPC firmly believes that these programs are beneficial to all those who are involved. CCPC strongly recommends a sewage management program for all municipalities in the County with individual sewage systems, especially those who may be considering allowing the use of “off-lot” systems. Specific information on options for management programs can be found in publications listed in the Bibliography

Other Considerations

Use of individual off-lot sewage systems to replace a malfunctioning system or in an alternative subdivision can give the site planners and engineers a great deal of flexibility. In an alternative subdivision the site design can be based on preservation of the unique physical characteristics of a site. However, there may be concerns about two other issues: dealing with system malfunctions and determining if there should be a limit to the number of individual off-lot systems in a particular subdivision. Both issues are important and are addressed below.

Dealing with System Malfunctions

Proper location, design, construction, operation and maintenance all play a role in preventing system malfunctions. Dealing with malfunctioning individual off-lot sewage systems should not be any different from dealing with malfunctioning on-lot systems. The homeowner is usually aware when their septic system is malfunctioning. Sewage backing up into the house is one obvious indication of a problem. Bright green areas of lush vegetation or wet areas on the lawn giving off a distinct odor are also indicators of an absorption bed malfunction. Fortunately, these problems do not always indicate a complete failure of the system. A local plumber or septic system contractor may be called in to help determine if the primary problem is a failed absorption area.

If there is a problem with an absorption bed, regardless of where it is located, residents should alert the local municipality and the CCHD. If ownership of the system is in question, subdivision plans and property deeds are the most direct methods to determine which home is connected to the malfunctioning system. As suggested previously, a metal detector can be used in the field to locate the steel pins at the corners of the absorption area if they were installed during the construction phase. The CCHD can also conduct dye tests to determine the system owner and the location of the absorption area.

As with any individual sewage system, once a homeowner becomes aware of a problem they should take immediate appropriate steps to correct the situation. In the event there is a problem or system malfunction, CCHD requires a permit for any system repair or replacement work. Individual home owners are responsible to the contractor for the cost of any repairs their system may need. If proper site testing and planning has been conducted during the pre-construction phase, there should be an



Primary and replacement absorption areas in an open space area. They have been staked, surveyed, and cordoned off so the area is not disturbed until the system is installed.

area containing suitable soils for a replacement absorption area nearby.

Regulating the Number of Off-Lot Sewage Systems

Many factors and circumstances need to be considered to determine if, and how many, individual off-lot sewage systems should be used. Market demand, size of the tract, soil conditions and important environmental assets will help determine if a conservation subdivision design is appropriate. Sketch plan reviews involving the local municipality, developer, CCHD, and CCPC would be most useful to help determine the most

appropriate subdivision design and sewage system arrangement. This initial step can save a developer a significant amount of time and money in the planning and permitting process.

For a large tract under consideration for development, there will be a break-even point on the cost of providing individual versus community sewage facilities. The installation cost (1997 dollars) for a complete standard individual sewage system ranges from \$6,000 to \$16,000, depending on soil type, system location and existing site conditions. As an example, assume the average cost of an individual sewage system in a 50 home subdivision is \$10,000 each. The total cost to provide sewage facilities for the development would then be \$500,000. Half-a-million dollars may or may not be enough money to build a community sewage system or, if appropriate, connect the development to a public sewage system in the area.

For municipalities that may be wary of alternative subdivision designs and the concept of individual off-lot sewage systems, a provision could be written into their subdivision and land development ordinance that would limit the number of off-lot sewage systems to 25 percent or perhaps 50 percent of the total building lots. This may have the beneficial effect of creating lots of various sizes in the subdivision. On the other hand, some municipalities may be bold enough to require a conservation subdivision design as a “by-right” plan in certain zoning districts. These municipalities may want to give the developer a reasonable amount of flexibility in using the common open space areas for sewage facilities, or perhaps approve them as a conditional use. However, as mentioned previously, these municipalities should also be prepared to take a more active role in the land development process through a sewage facilities management and building codes program.

Conclusions

Approving the use of individual off-lot sewage systems is a decision that is made at the local municipal level. Whether they are used to replace a malfunctioning system or in an alternative subdivision design, the use of off-lot systems may provide

environmental and economic benefits. Their use may also help achieve local open space preservation goals and the vision of the County Comprehensive Policy Plan Element, *Landscapes*.

Individual sewage systems will continue to be used in Chester County for the foreseeable future. These systems are preferred by many suburban and rural municipalities in the County because they return almost all of the water used to groundwater aquifers. This groundwater recharge helps to maintain the baseflow of local streams. Effluent discharged by a properly functioning system is cleansed in the soil, resulting in good quality groundwater. Using the best well-drained soils available helps assure the long-term viability of subsurface sewage disposal systems and will help to prevent malfunctioning systems. The recharge of groundwater also helps supply the water needed for local water supply wells.

When used in alternative subdivision designs, individual off-lot sewage systems can help conserve the environmental resources of a particular site. Off-lot systems can be placed in areas with the most suitable soils, with houses and roadways placed in other appropriate locations. Areas containing the most important environmental resources, such as wetlands, stream corridors and woodlands, would not need to be disturbed. Existing fields with good soils can be used concurrently for individual off-lot sewage systems and active and passive recreation uses. The design concepts and management tools described in this Bulletin are all shown together in sketch drawing shown in Figure 9.

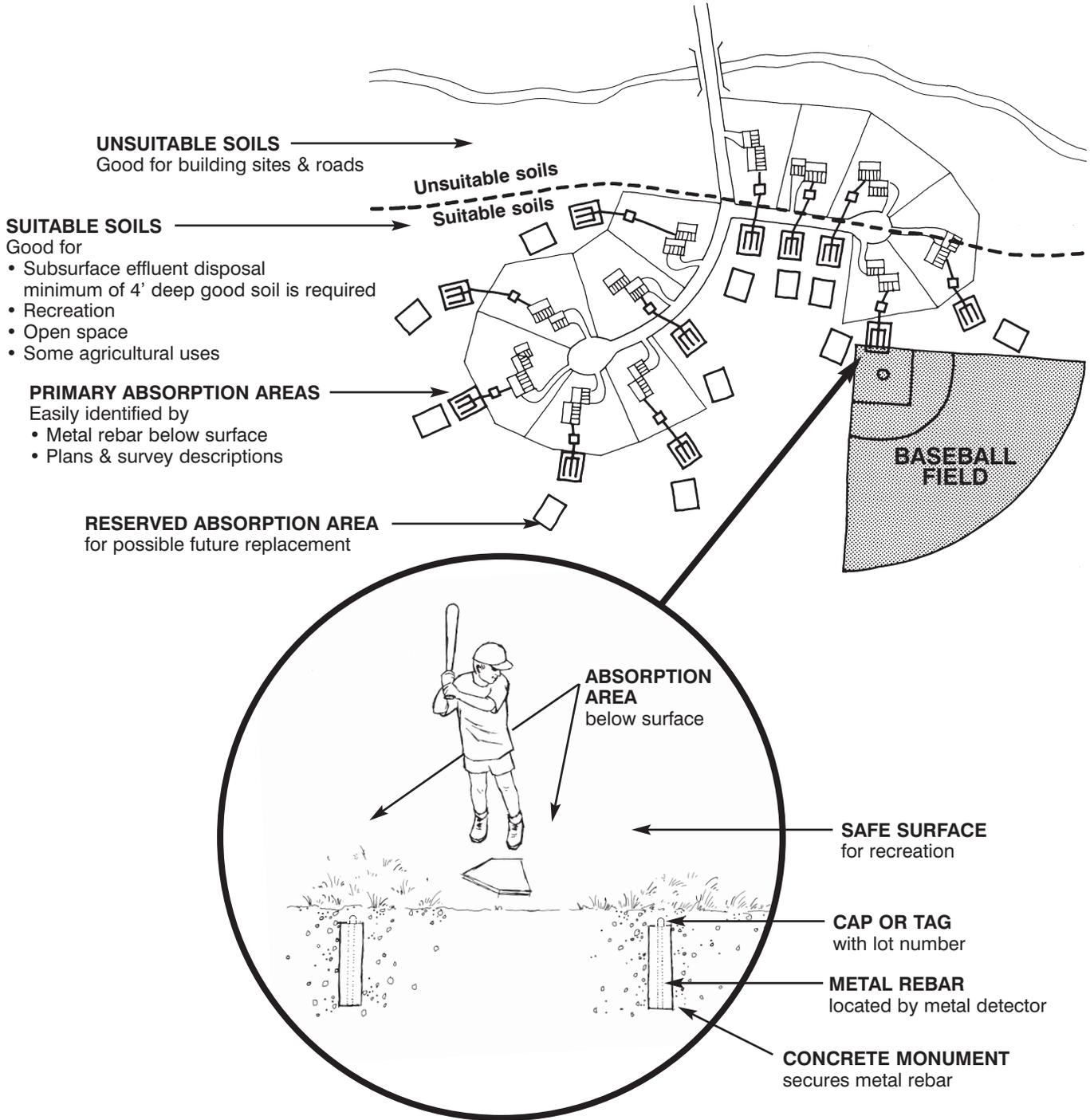
Another important aspect of alternative subdivision designs is that they can be used to create open space networks. The most critical Natural Landscapes in the County are stream corridors. Forested stream corridors and functional wetlands associated with them are essential in maintaining good water quality and diverse aquatic ecosystems. Greenways consisting of expanses of mature woodlands and other vegetated areas are also important as terrestrial wildlife habitats and travel corridors, and help maintain good water quality. The best way to link these critical areas is to form networks through enlightened municipal comprehensive planning, supported with incentives for alternative subdivision designs. Streams, woodlands and wetlands can be placed under conservation easements yet still be enjoyed by the property owners.

The use of an off-lot system to replace a malfunctioning on-lot system may also provide environmental benefits. In many cases where suitable soils cannot be found on the property, malfunctioning septic systems have been replaced by Small Flow Treatment Facilities. These mechanical treatment systems require special permits from the State because they typically discharge to a stream. Applying the concept of an off-site septic system may prevent the need for a new discharge to the Waters of the Commonwealth. Depending upon specific conditions, this concept may also prove to be a more cost effective alternative.

Municipalities in the County that are already engaged in an active sewage facilities management program will be the most prepared to handle the administrative responsibilities of off-lot systems. Other municipalities that see the potential benefits of the individual off-lot sewage system concept should not venture into this area without establishing their own facilities management program.

Figure 9: Individual Off-Lot Sewage Systems Used in an Alternative Residential Subdivision Design

OFF-LOT SEWAGE SYSTEMS CAN BE COST EFFECTIVE AND EASY TO LOCATE



Source: Chester County Planning Commission

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