

THE TOWNSHIP Planner



PUBLISHED BY THE PENNSYLVANIA STATE ASSOCIATION OF TOWNSHIP SUPERVISORS

SUMMER 2008

Not A Drop to Spare

Linking Land Use Planning to Water Budgeting Will Prevent Your Township's Well from Running Dry

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Benjamin Franklin once said, "When the well's dry, we know the worth of water." Given today's growing population and the demand we are putting on our water supply, the inventor's quote is closer to fact than metaphor.

Water — specifically groundwater — is an "invisible" resource that is out of the public consciousness. Consequently, township officials may forget the importance of managing this vital resource. Unfortunately, if municipalities overlook water resources management in their

overall comprehensive planning, the well could run dry — or close to it.

According to the Pennsylvania Municipalities Planning Code, "comprehensive plans shall include a plan for the reliable supply of water, considering current and future water resources availability, uses, and limitations, including provisions to adequately protect water supply sources."

That said, it's up to volunteer planners and other local officials to manage their townships' water resources by linking growth patterns to the protection of natural features that sustain their water supply, all of which can be done through comprehensive plans and related ordinances. Municipalities may also control how efficiently water is used through supporting subdivision and land development and stormwater ordinances. Therefore, with a comprehensive plan that incorporates concrete water resources management strategies, your township's water supply can keep pace with and accommodate new growth.



The best way to inventory your township's water resources is through a water budget, which, much like a financial budget, determines how much of the resource is available versus how much is being consumed.

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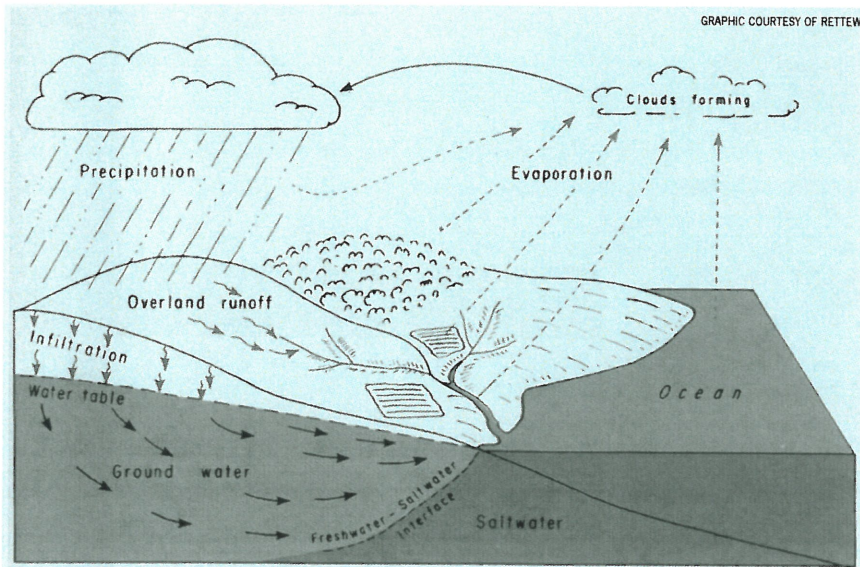
Understanding the basics

Linking land use planning to water resources management first requires a fundamental understanding of a watershed's hydrologic cycle and how land use activities influence your township's water resources. Other factors influencing water availability include the watershed's soils and geology.

In Pennsylvania, groundwater is the primary source for domestic, municipal,

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A watershed is a geographical area within which rain water seeps and runs into common surface or subsurface water bodies, such as streams, rivers, lakes, or aquifers. An accounting of the hydrologic cycle within that watershed is a water budget.

agricultural, and industrial operations. Pennsylvania averages 42 inches of precipitation a year. However, only about 25 percent of this infiltrates and “recharges” the groundwater, which is stored in underground aquifers.

The way water flows in a particular watershed also directly impacts its availability. For example, in high-growth areas, aquifers can be depleted as new developments, which may include large buildings, parking lots, driveways, and access roads, decrease the amount of impervious (*porous*) surfaces and thereby reduce the amount of water that can replenish the aquifer.

Contemporary urban, suburban, and rural land uses have also altered the historically stable hydrologic cycle and water quality by disrupting natural watershed processes, polluting runoff and groundwater, depleting water supplies, and exacerbating flooding, habitat loss, streambank erosion, and sedimentation.

Together, all of these things translate to less available water to sustain today’s communities.

Developing a water budget

The best way to inventory your township’s water resources is through a water budget which, much like a financial budget, deter-

mines how much of the resource is available versus how much is being consumed.

Once completed, a water budget allows planners and municipal officials to assess their options for meeting current or projected water demand and achieving balance in the watershed. These options involve integrating the various components that impact water resources: land use, wastewater facility planning, stormwater management, source water and wellhead protection, watershed restoration and preservation, and water supply planning.

Historically, these components have been disconnected, but in reality, they are linked and should be viewed holistically as a township moves through the planning process to effectively manage the demand for and availability of its water resources.

By adopting this philosophy, townships can develop an integrated water resources management plan that ties together the following:

Land use: Though grounded in land use, comprehensive planning takes into account existing infrastructure and other nonland use-related components, including the quality of the environment, economic development, transportation, and public facilities and services. Roads, sewer service, and

schools, for example, also play a significant role in the location and intensity of land use.

Often, when a development is proposed in a township, residents and officials alike worry about the impact on these resources. However, when was the last time the public voiced concern about the effect this development will have on the community’s limited water supply?

One thing is certain: Natural resources, including water, should be identified and protected through the comprehensive planning process. All too often, though, the notion of water budgeting is overlooked or merely relegated to a comprehensive plan’s vision statement. Today, despite the fact that more than 25,000 homes have been built in Pennsylvania over the last 25 years, only 5 percent of municipalities have developed a water budget.

The failure to include a detailed water supply strategy in the comprehensive plan will likely create problems for your township down the road. First, officials have no idea if their groundwater resources are adequate to meet the community’s water demands and, second, they could be overextending their supply.

Wastewater facility planning: Typically, a township’s Act 537 Sewage Facilities Plan dictates its waste disposal method, whether it’s onlot septic systems or public sewer lines connected to a centralized treatment plant. Keep in mind, though, that whatever method is used, it will directly impact a region’s watershed and hydrologic cycle.

Therefore, onlot disposal systems must be well-maintained to ensure that they adequately treat the wastewater and do not contaminate the underlying aquifer. Many Pennsylvania municipalities are in the process of adopting sewage management programs and ordinances to monitor these systems.

On the other hand, centralized wastewater collection systems are potentially detrimental to the water supply because they do not return the water to the aquifer. Some municipalities have started addressing this issue by treating the effluent from the central system and discharging it back into the ground.

Stormwater management: Stormwater management has traditionally focused on controlling flooding and directing water off

an individual property as quickly as possible. Its cumulative effects, however, cause flash flooding, water quality problems, habitat loss, and soil erosion.

Today, however, some local stormwater and subdivision and land development ordinances are incorporating techniques that effectively cleanse, diffuse, and absorb water where it falls. For instance, Lower Makefield Township in Bucks County is encouraging home and business owners to use porous paving systems, rain gardens, and highly absorbent native landscaping to manage stormwater. The township has also instituted regulations that require developers to decrease stormwater runoff and preserve open space, which maximizes absorption into the water table.

Source water and wellhead protection:

Source water protection helps to prevent the pollution of your township's drinking water supplies. The underlying principle is that protecting source water is less expensive than trying to remediate it after it has been contaminated. Source water protection programs also promote sound land use planning.

For townships that rely on groundwater as their source of drinking water, a wellhead protection program can be instituted to prevent pollution and make wells less susceptible to contaminants.

Although wellhead protection programs are voluntary at the local level, a growing number of municipalities and water system operators in Pennsylvania are implementing these programs to maintain the quality of their drinking water sources and protect public health and safety. South Middleton Township in Cumberland County has adopted a wellhead protection program with a detailed ordinance that can serve as a model for other municipalities.

Watershed restoration and protection:

The approach townships take to address land use, as well as to identify features that influence water's movement, will ultimately determine the availability of water. While aquifer replenishment occurs wherever water seeps into the ground, some areas in a watershed contain features that allow an exceptional amount of recharge. These areas, known as "critical aquifer recharge areas," maximize the amount of groundwater available for wells, springs, and streams,

especially during dry periods.

Townships that aren't focused on protecting their water resources can potentially destroy their water supply by unknowingly covering a critical aquifer recharge area with large impermeable surfaces, such as paved parking lots and rooftops. Therefore, the most important step a township can take to protect its water supply is to map out these critical areas and use this as a guide to make informed, strategic decisions about growth.

Recently, a groundwater resource study in northern Lancaster County identified several critical aquifer recharge areas within a 50-square-mile basin. Officials also learned that they could maximize the potential of some of these areas through stormwater best management practices and stream restoration efforts.

Water supply planning: With water supply planning, townships take proactive steps to assess existing and projected water demand and identify potential resources by asking the following questions: What water resources do we have? How much will we need? What alternatives are available to meet that need?

Water supply planning addresses the cumulative effects of water withdrawals in a region and in areas that are experiencing rapid, unexpected growth, which puts a strain on existing water supplies. In Pennsylvania, some areas are already stressed or will be soon.

Water supply management requires townships to balance and coordinate their water allocations among users and uses to sustain supplies during a drought. Water supply management is on the minds of state officials, too. For instance, the state Department of Environmental Protection and the Regional Water Resources Committees, which will soon be releasing the State Water Plan, are focused on the importance of integrated water resources management plans. *(To learn more about the State Water Plan, log onto www.depweb.state.pa.us and enter the keyword, "Act 220.")*

In developing such a plan, existing and projected water demands are compared to the watershed's capacity to meet those needs. Based on the results, two alternatives — increasing supply and decreasing demand — are available. Options for increasing water supplies include increasing

groundwater withdrawals, expanding surface water storage, regionalizing systems, and importing water from outside the area. Options for decreasing demand include water conservation and recycling.

No easy answers

As townships continue to grow, their ability to maintain a sustainable water supply will be critical to ensuring that their communities endure.

And while there is no single solution to the water supply issue, local officials can begin by integrating all of their land use-related plans to preserve and protect their water resources. In fact, township planning commissions play an important role in this effort as municipalities become more proactive about water resources planning and management. ♦

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