

Welcome to Tinicum Township Bucks County, PA

A Guide for Stewardship of Our Natural Resources



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The natural beauty of Tincum Township is evident to all who come here.

Fresh air, clear flowing streams, a forest in solitude, or the bucolic vista of a working farm: the wealth of these natural resources sustains our spirit and our Tincum way of life. These resources are, as the Pennsylvania Constitution states, "the common property of all the people, including generations to come."

The preservation of our sustaining natural resources can be wholly compatible with the modern lifestyle, and this guide offers practical suggestions about how this can be done. The entire booklet, with hotlinks, is available on our Township website. Also, the staff and volunteers at the Township Building are available to answer further questions.

In the end, it is the character and commitment of our residents—our most valuable resource of all—that will carry forward the stewardship of this special place, for generations to come.

Tincum Township Board of Supervisors

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Columbine, official township flower voted by residents in 2005

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Feel Free to visit the Township Office for further information

- List of Native Plants for Homeowners ♦ Invasive Plants List
- Guide to Bucks County, Pennsylvania ♦ Household Hazardous Waste and Old Computer Recycling Program ♦ Water Conservation in Your Home
- Tincum Township Open Space Committee’s Conservation Easements
- And more.....



Protecting Tincum's Water Resources

Water is one of Tincum's most precious resources as are the natural scenic landscapes that capture, hold, filter and deliver this lifeblood to our residents. It is essential for life, and although it is a renewable resource, water is a finite resource. In Tincum, we are completely dependent on ground water wells for our water supply. Public health, safety and welfare can be protected when no degradation of quality or diminishment of quantity of water occurs. It is important to understand how each of us can help protect our water resources.

As residents of Tincum, we all value the natural beauty and character that our creeks add to the area. Something that may surprise you is that two of Tincum's major streams, the Tincum and Tohickon Creeks, hold special recognition on county, state and federal levels. A *1999 Natural Inventory* study by Bucks County identified the Tincum and Tohickon Creeks along with the Braided Channel Islands of the Delaware as *Priority 1* sites based on their exceptionally high quality of natural features. The County's study showed that Tincum Township possesses 3 of the 19 top priority natural sites in the whole county. A recent update of this study reexamined our rich biodiversity in the context of "sustainable landscapes" and ranked Tincum as having the greatest number of *Conservation Landscapes* in the entire County, numbering 5 of a total of 13.

On the state level, Pennsylvania conferred *Special Protection Waters* status to most of the streams of Tincum based on their high water quality. Tincum Creek, including its tributaries, Rapp and Beaver Creeks, is rated as *Exceptional Value (EV)*, the highest or top tier classification/level of protection. The Tohickon and Smithtown Creeks are classified as *High Quality (HQ)*, the next highest rating. In addition, the Delaware River, along with the Tincum and Tohickon Creeks and their tributaries are recognized on the Federal list of *Wild and Scenic River Systems*. Tincum also has federal recognition for its inclusion in a region designated by the U.S. Forest Service as the *Highlands*, where it boasts three of a total of 9 *Critical Treasures* in Bucks County — Tincum Creek, Rapp Creek, and Tohickon Creek Watersheds. With this wide recognition, it is apparent that our watersheds are not only valuable to township residents but to all of the people who pass through and enjoy their beauty.

Protecting Our Water Supply

It is important to understand that these ecologically significant waterways share the same groundwater that fills our wells, which are the sole source of our water supply in Tincum. The ability to obtain ground water for our water supply is a function of geology. Unfortunately, the soils and underlying bedrock in most of the township have limited capacities to hold and replenish groundwater, especially in northern areas of the township underlain by more dense and impermeable rocks. Because we share a limited water supply, dependent entirely on groundwater, we must be mindful that withdrawals constitute a subtraction from the groundwater reservoir. Any misuse on one person's property could affect one's neighbor, as well as our base stream flows.

The major water supply issue in Tincum is reliability during droughts, and proper management of water use is crucial requiring judicious use of water. Irresponsible use of a well by over pumping, especially during a drought, or pumping in excess of the local aquifer's ability to regenerate its supply, may cause the well water supply to fail temporarily. This is particularly a problem in summer and autumn when demands on water are the highest, but supplies are the lowest.

Our watersheds are relatively small and sensitive to increases in storm water runoff from development. This makes it imperative that we protect the quality and quantity of our current water source. Several watershed management initiatives have been implemented, including a progressive water-resources protection ordinance, an aggressive and highly successful land preservation program, and ground water management planning which will significantly reduce the impacts of development on stream conditions.

Tinicum's Water Development Ordinance 123

Tinicum and its adjoining townships of Bridgeton and Nockamixon have been monitoring and studying the groundwater for over twenty years. The data gathered has assisted in understanding the numerous challenges we face in protecting our groundwater. This has served as the basis of our Township's Water Development Ordinance, which was designed to ensure that water resources meet the needs of current and future residents. Our Groundwater Ordinance is currently under revision to be included as part of Tinicum's Zoning Ordinance. Subdivisions or land development must undergo a Quality Analysis and if needed, a Biological and Hydrogeological Analysis. Details on these tests and other information regarding wells and water use can be found at the township office or website.

Recognizing the sensitive nature of our water resources and the need to protect them from degradation, Tinicum has enacted regulations in the form of *Overlay Zoning Districts* to prohibit development of environmentally constrained lands: floodplains, steep slopes, wetlands and wetland margins, streams, riparian buffer areas and hydric soils. These *overlay districts* create additional provisions to protect hillsides, scenic, critical groundwater recharge areas, headwater and other natural and cultural resources as part of land use applications.

Environmental Impact Assessments (EIA) are required for any application for preliminary and final subdivision and/or land development plans for specified zoning districts and any *overlay district* that pertain to these districts. The *EIA* is a written assessment that describes, analyzes and documents beneficial and adverse effects of a proposed project on environmental, historic and cultural resources in accordance with provisions of the various ordinances and plans adopted in the township.

State laws do not require testing of private domestic water supplies, and regulatory agencies do not regularly monitor the quality of private wells. However, the Bucks County Department of Health began certifying new private wells in 2005 to prevent residents from drinking contaminated water. An excellent guide for homeowners with private wells is available from Penn State Cooperative Extension (<http://extension.psu.edu/publications/agrs-111/view>).

WATERSHED ASSOCIATIONS

The following independent watershed associations work within the township to protect and enhance water resources:

- Delaware Riverkeeper Network
- Friends of the Delaware Canal
- Tinicum Creek Watershed Association
- Tohickon Creek Watershed Association
- Smithtown Creek Watershed Association

These organizations perform vital services, including advising municipalities on ordinances to strengthen water protection, tree planting and riparian corridor improvements, community outreach and education, water testing, implementing Best Management Practices (BMPs), and obtaining grants for studies and improvement projects. You as a citizen of Tinicum can play a vital role in safeguarding water resources through your support and participation in these organizations.

Using Water Efficiently: What You Can Do

The EPA estimates that most of a family's water use occurs inside the home where roughly two thirds of water usage is from toilets, washing machines, and showers.

- Use low flow toilets (< 1.6 gal/flush). Mandated in 1994, they use less than 4 times the water of older models. This can suddenly be important if you have a lot of guests on a weekend fest. Never use your toilet as a wastebasket.
- Repair leaks. A leaky toilet can waste 200 gal/day. To detect leaks in the toilet, add food coloring to the tank water. The toilet is leaking if colored water appears in the bowl (see toilettology.com).
- Showers - newer showerheads with flow restrictors use 2 to 2.5 gal/min so that a 10-minute shower uses 25 gallons and lots of electricity to heat the water. Replace older shower high flow heads or retrofit with a flow restrictor. Take short showers instead of tub baths and turn off the water while soaping or shampooing. If you must use a tub, close the drain before turning on the water and fill the tub only half full. Bathe small children together.
- Turn off the water run while shaving or brushing your teeth.
- Install low-flow faucet aerators.
- Keep drinking water in the refrigerator instead of letting faucet flow. If it takes longer than a minute to get warm water from your faucet, consider installing an instant heat water heater.
- Wash fruits and vegetables in a basin. Use a vegetable brush.
- Modern dishwashers are generally more efficient in terms of water and energy use compared to hand washing. Scrape, rather than rinse dishes before loading in dishwasher.
- Add food wastes to your compost pile instead of using the garbage disposal. Garbage disposals are not recommended in Tinicum, where waste water systems are on-lot with septic tanks.
- Washing machines – Consider purchasing a high efficiency washing machine, which can save over 50% in laundry water and energy use. High efficiency front loading machines use from 35% to 50% the water of top loading machines as well as saving an equivalent amount of energy per load. Wash only full loads of laundry or use the appropriate water level and load selection on the washing machine.

TIPS FOR OUTDOOR USES- during the growing season most of a home's total water use can be for outdoor purposes.

- Detect and repair all leaks in irrigation systems.
- Use properly treated wastewater for irrigation where available.
- Water the lawn or garden during the coolest part of the day (early morning is best). Do not water on windy days.
- Water trees and shrubs, which have deep root systems, longer and less frequently than shallow-rooted plants that require smaller amounts of water more often. Check with the local extension service for advice on watering needs in your area (<http://extension.psu.edu/bucks>).
- Watering lawns and gardens in the late summer, particularly after a dry spell, is discouraged.
- Set sprinklers to water the lawn or garden only—not the road or sidewalks.
- Use soaker hoses or trickle irrigation systems for trees and shrubs.
- Install moisture sensors on sprinkler systems.

- Use mulch around shrubs and garden plants to reduce evaporation from the soil surface and cut down on weed growth.
- Remove thatch and aerate turf to encourage movement of water to the root zone.
- Raise your lawn mower cutting height—longer grass blades help shade each other, reduce evaporation, and inhibit weed growth.
- Minimize or eliminate fertilizing, which promotes new growth needing additional watering.
- Observe water restrictions during drought events. Use the water from the air conditioning condenser, dehumidifier, bath, or sink on plants or the garden. Don't use water that contains bleach, automatic-dishwashing detergent or fabric softener.
- Sweep driveways, sidewalks and steps rather than hosing off.
- Wash the car with water from a bucket, or consider using a commercial car wash that recycles water.
- When using a hose, control the flow with an automatic shut-off nozzle.
- Avoid purchasing recreational water toys which require a constant stream of water.
- Do not install or use ornamental water features unless they recycle the water. Do not operate during a drought.
- If you have a swimming pool, refills or significant top offs should utilize the services of a water tanker truck to fill the pool. Consider purchasing a new water-saving swimming pool filter. Also, use a pool cover to reduce evaporation when pool is not being used.

For more tips on conserving water, inside and outside, visit the *Water, Use it Wisely* website: www.wateruseitwisely.com. Also, take the *Family Water Audit* to learn more about saving water (www.wateruseitwisely.com)

Water Moves in Many Ways

The interrelationship between our water resources, water supply, storm water management, and wastewater treatment and disposal is discussed in the following sections. Recharge of our ground water reservoir is dependent on soil infiltration capacity, land cover, topographic characteristics, and management of storm water runoff and methods of wastewater disposal.

STORM WATER

Storm water is water that washes off the land and impervious surfaces such as rooftops, parking lots, driveways, and roads after rain or snowmelt. Land development and building construction can severely alter the natural surfaces of our landscape. New development replaces trees and other vegetation with hardened or impervious surfaces, such as roofs and pavement (and even lawns with very short grass can behave this way). Further exacerbating the situation, construction equipment often compacts soils, making them less able to absorb rainwater. As a result, developed areas create a significant increase in runoff. The majority of precipitation moves across the land surface as runoff. The increased surface runoff results in an increase in storm water volume and velocity as well as an increased potential for rapid flooding and erosion, decreased groundwater recharge, and diminished stream flow during dry spells. Furthermore, this runoff carries sediments, excess nutrients, oil, debris and other pollutants directly into our streams without the benefits of filtration by soil or plants. Also, water flowing over impervious surfaces can be heated to high temperatures before running directly into our waterways, increasing their temperature. The result of unchecked storm water runoff is degraded water quality and threatened fish and wildlife habitats.

In addition to federal and state storm water management guidelines, Tinicum Township enacted Storm Water Ordinance 150 in 2002, which it periodically revises to emphasize evolving water quality management methods that address the potential negative impacts of storm water runoff and encourage sustainable practices that utilize non-structural, low impact development techniques reducing and disconnecting impervious cover. The guiding tenet of this ordinance is that the rate of runoff from a storm event that results from a new development should be no greater than before. Best storm water management practices (BMPs) are used in development proposals involving a significant land-use change, especially changes related to impervious land cover like roads, buildings, roofs, streets, driveways, parking areas, walkways, decks, patios, compacted soils, and stone terraces; all are examples of changes that lessen the ability for precipitation to infiltrate the soil and/or remove plants that effectively retard runoff. The second chapter of The Pennsylvania Storm Water Best Management Practices Manual provides an overview of the impact of land-use changes and local conditions on storm water runoff (<http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-8305>).

Capturing and Using Storm Water

Storm water is typically seen as a nuisance, something that damages and destroys a property, but it is important to realize that storm water is a valuable resource that is essential to maintaining our groundwater and stream levels, not a waste for disposal. Although storm water runoff control is required by the standards and criteria in our Storm Water Management Ordinance, the ordinance only regulates new development or redevelopment. Existing runoff problems are only corrected if the township or individual property owners attempt to remediate drainage problems on their own initiative. Some of the existing problems, especially when it involves retrofitting aging infrastructure, require extensive planning and re-engineering, a significant cost to the township or a property owner. Funding for improvements may be available through grants from federal, state or private agencies. Some sources of funding for municipal storm water retrofit projects include the state's Pennsylvania Department of Environmental Protection (PaDEP), the Department of Conservation and Natural Resources (DCNR), the Environmental Protection Agency (EPA), or PennVEST, and Pennsylvania's Infrastructure Investment Authority.

Waste Not, Want Not: What You Can Do

Individual initiative can make a tremendous difference in safeguarding our water resources. In Tinicum, with substantial stretches of woodlands and fields, sensible land conservation and the protection of existing riparian buffers are perhaps the most cost effective approaches to water resource protection. Other options include practices minimizing impervious cover and use of low impact development (LID) approaches as discussed below:

1. **Preserve Natural Areas through Land Conservation:** Consider placing a conservation easement on your property that preserves it in perpetuity. When open land is lost to development, the hydrology of the natural landscape changes. Densely vegetated land is replaced by land uses with a high proportion of impervious surfaces and the associated water quality and quantity is impacted. Conserving land has become an increasingly significant priority for Tinicum (see map of protected properties) where roughly 38% of our land is protected from further development. For more information about putting a conservation easement on your property, contact the Township Office.
2. **Protect or Enhance Riparian Buffers** A riparian buffer is a stream-side area of trees or other vegetation which can intercept surface runoff, subsurface flow and deeper groundwater flows for the purpose of removing or buffering the effects of nutrients, pesticides or other chemicals from upland use, which could otherwise directly enter waterways. Streamside forests in particular are critical to the health of our township because they protect water quality and provide critical wildlife habitat. They shade stream banks, filter pollutants such as fertilizers and sediment from

runoff, reduce stream bank erosion, keep water temperature more constant, and shelter and enhance aquatic habitats. In recent years the damage and loss of stream banks has become a more visible problem due to major storms.

Practice Proper Management Techniques on Riparian Lands

- place conservation easements, especially on floodplains and wetlands
- don't dump materials into streams or onto floodplains, including yard debris, trash, etc.
- don't mow or cut vegetation to the water's edge
- avoid cultivating or grazing on the water's edge
- allow a forested buffer to grow along the river/stream
- use native plants in landscaping (see later sections of this booklet)
- limit impervious surfaces
- move livestock away from streams and fencing waterways
- use roofed manure storage
- minimize use of pesticides, herbicides, and fertilizers
- minimize groundwater use and avoid landscaping that requires irrigation systems
- participate in water quality monitoring programs
- minimize use of hazardous products

3. Minimize Impervious Cover

The connection between increasing amounts of impervious cover within a watershed and water quality degradation is significant. Limiting impervious cover helps to reduce water quality degradation as well as storm water volume and velocity.

Things You Can Do to Limit Impervious Surfaces

- **Keep the natural landscape and minimize or avoid any soil disturbance**- undisturbed soils more efficiently allow infiltrate precipitation and permit stabilization benefits of vegetation. This is especially important for environmentally sensitive areas like wetlands, woodlands, meadows, and riparian corridors, which are excellent natural storm water buffers and serve to attract some of the native wildlife. If there is an area of your yard that is marshy or wooded, consider leaving it alone instead of mowing, maintaining, or clearing it.
- **Plant trees and deep rooted shrubs**- deep roots encourage higher water retention by aerating the soil allowing more space to hold water. Larger plants also hold a lot of water. Roughly half of the rain that falls as precipitation is taken up by evapotranspiration through trees.
- **Limit paved surfaces** for driveways, parking space and building footprints. Where hardscapes are necessary, use porous pavements such as porous asphalt, concrete or pavers. Alternatives such as porous pavement are more affordable and functional in frequently flooded areas.
- **Consolidate improvements** on a site to allow for relatively greater amounts of contiguous undisturbed natural land.
- **Keep in mind that heavy machines can compact the soil** and inhibit infiltration.
- **Limit lawn maintenance** – While not an impervious surface, a manicured lawn is far less retentive of water runoff than a more natural cover condition, such as a wildflower meadow, hedgerow or forest. Consider mowing less frequently or breaking up large areas of grass with wildflowers or trees.
- **Minimize Impervious Cover** The connection between increasing amounts of impervious cover within a watershed and water quality degradation is significant. Limiting impervious cover helps to reduce water quality degradation as well as storm water volume and velocity.

4. Use Low Impact Development (LID): This is an ecologically friendly approach to new construction and redevelopment of existing properties that uses natural systems as a model for the design of man-made environments. Rather than collecting and carrying storm water offsite—through pipes, curbs, and gutters—LID uses native vegetation and landscaping to capture, treat, and promote

the infiltration of storm water into more permeable surfaces. A LID-designed or retrofitted site helps protect sensitive areas, such as streams and wetlands, by preserving natural water flow patterns and reducing the volume of storm water runoff.

Five Ways to Integrate LID into your Home and Yard

- **Downspout diversion.** The simplest LID strategy you can adopt is to direct runoff from impervious areas, such as your rooftop and driveway, onto landscaped and vegetated areas or existing ponds or marshy wet areas. This is an easy way to reduce the volume of water that goes directly into drainage ditches and into waterways. By simply directing your downspouts onto tree or shrub beds or your lawn instead of your driveway, rainwater can be absorbed into the ground, where it is cleaned before reaching our streams.
- **Rain barrels.** You can easily conserve water and reduce runoff by collecting rainwater from rooftops in rain barrels for later use. Rain barrels come in many shapes, sizes, colors, and styles, ranging from simple plastic barrels to elaborate oak-stave barrels. You can even make your own rain barrel from a food-grade plastic barrel, often for as little as \$25.
- **Rain gardens.** Rain gardens are specially designed gardens that are strategically placed in low-lying areas, where they capture storm water runoff from paved surfaces and downspouts and promote its infiltration into the ground. Any pollutants — such as fertilizers, pesticide residues, or even oil, grease, and heavy metals from roadways — can be trapped by the rich organic soil and root systems in the garden, permitting clean water to seep slowly through the soil and subsoil until it merges with groundwater. You will want to construct your rain garden with specialized soil and a mix of attractive native plants that require less maintenance than traditional landscaping. For more information visit www.raingardens.org.
- **Permeable pavements.** Pavement blocks, porous concrete, and porous asphalt let water infiltrate into the ground. When repairing your sidewalk, driveway, or patio, consider replacing existing asphalt and concrete with attractive pavers or even “grasscrete,” concrete pavers with spaces where grasses and other vegetation can grow and allow water to be absorbed into the ground.
- **Vegetated (“green”) rooftops.** If you are adventurous, a vegetated roof is a time-tested system that can yield multiple benefits. Europeans used vegetated roofs for centuries before the concepts of LID were formalized to reduce the impact of storm water. Green roofs use a combination of specialized planting media and vegetation — typically sedum, a hardy succulent plant — that helps filter pollutants, reduce runoff, and reduce energy demands for heating and cooling the building. Though initially more expensive to install than a traditional roof, it is cost-effective in the long run, outlasting traditional asphalt shingles and dramatically reducing heating and cooling costs. Currently, there is proposed legislation in Pennsylvania to provide tax credit for the construction of green roofs.

Construction principals and basic designs for other more ambitious projects are explained in the DEP link presented earlier.

The Importance of Wetlands and Floodplains

Pennsylvania is the most flood prone state in the nation. Both riparian buffers and wetlands slow and store flood waters, gradually releasing it as the water table lowers. Their role as natural flood control devices is critical for our area where they assist in recharging underlying groundwater. In addition to their aquifer recharge value, wetlands act as holding and cleansing areas for storm water. Tinicum’s network of ponds, wetlands, and wet meadows represent a variety of habitats for plants and animals.

Nearly 70 percent of Pennsylvania's threatened or endangered species of wildlife use wetland habitat at some point in their lives, and all game species use wetlands. Many species of waterfowl, aquatic animals and mammals depend on riparian corridors for food, cover and nesting places.

It is important to understand that all of the water systems that we treat as separate entities are actually connected. Ground water, stream flow, storm water and wetlands all share the same water. Protecting a wetland is the same as protecting our drinking water although we may not be drinking directly from the wetland itself. Tinicum has a Wetland Ordinance to protect the natural areas that serve to clean and retain our water. The purpose of the ordinance is to maintain the quality and hydrology of surface waters and wetlands as well as the quality and level of the ground water table and water recharge areas. It is intended to reduce storm water runoff and sedimentation, thereby protecting public health and safety, and wildlife habitats and the loss of property from the hazards of flood water.

Floodplains are typically flat areas of land bordering streams or rivers that are periodically inundated by floodwaters. Severe rainstorms can cause the entire natural floodplain to flood. It is desirable to limit development on floodplains because of the damage flooding can cause. Floodplains are important as aquifer recharge areas, natural storm water filters, and for wildlife habitat. Floodplains act as a natural buffer between streams and developed areas and provide access points to waterways for recreation. Floodplain boundaries have recently been revised by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program. Left unmanaged, continued development on a floodplain – more impervious surfaces, more obstructions, greater volumes – could continuously increase the size of the floodplain and the severity of flooding. Similarly, increased runoff caused by development within the watershed can also increase the size of the floodplain. The township office has the current mapping of these floodplain areas.

Landscaping for Storm Water Management

Landscaping provides another alternative for offsetting the impacts of many impermeable surfaces. You can create permeable areas with landscaping through a variety of options including forming a natural detention pond, marsh basin, planting a rain garden, or extending a creek buffer area. These can benefit you and your neighbors by slowing runoff, reducing storm water damage, stabilizing soil, improving water quality, and providing habitat for native wildlife. Re-vegetating and re-foresting disturbed or land-use areas using native species is a very helpful and is an excellent, long range, storm water management practice. Native and indigenous plants usually require less maintenance and less intensive application of fertilizers, herbicides, and, and pesticides- minimizing the likelihood of these chemicals entering the groundwater. There are some exceptions where nonnative plants can be useful for water quality improvements such as cattails but in general only natives should be used. The Township maintains a list of native species that can be used in landscaping. Also, Morris Arboretum of University of Pennsylvania has prepared a “Delineation and Management for the Vegetation Communities of Tinicum Township.” More information on native plants follows in this booklet; and is also available at the township office including information on conserving grassland birds.

Consider the following before creating your landscape plan:

- **Project Goal and Objective-** Know the purpose that the feature will serve in the storm water landscape project: Storm water retention, water quality improvement, soil stabilizations, aesthetics, native landscape restoration, or a combination.
- Know the **Hydrology** of the site- Is the site often inundated with water? Knowing a plant's water tolerance and matching it with site hydrology (wet soil, poorly vs. well drained soil) will ensure healthier plantings.

- Determine other **Site Specific Factors**:
 - What type of soil is present? What native plants are most suitable for these soils?
 - Are deer, geese, or other animals a problem? What native plants are resistant to animal browsing and destruction?
 - Is the site below telephone wires or near buried cables? **Be sure to contact PA One Call System three days before digging (1-800-242-1776 www.paonecall.org)**.
 - As plantings grow and mature, will they block a desirable view? Select plantings that have the right profile for the property's aesthetics, both for you and your neighbor.

Latter sections of this booklet refer to native or indigenous plantings for Tincicum Township in more detail.

TINICUM TOWNSHIP ON-LOT WASTEWATER TREATMENT SYSTEMS

Preserving sustainable water resources is dependent on how wastewater is handled. Tincicum relies entirely on individual on-site wastewater systems (also called on-lot systems or septic systems) to treat sewage from homes. The key to sustaining water quantity is to rely on land-based treatment systems which recycle treated wastewater effluent water back to its source, as close to the point of "origin" as possible. This can be challenging in Tincicum because soils are generally poor and impermeable (shallow depth to bedrock, high water table, and other constraints), and land-based wastewater treatment options can be limited.

Properly functioning on-lot systems treat, distribute and disperse wastewater through a clean, economic and efficient process. Septic and sand mound wastewater disposal systems provide a ground water recharge benefit, provided no system failures occur that contaminate underlying aquifers or surface waters and there is no stream discharge of any wastewater effluent into surface waters.

However, even properly installed on-lot systems can malfunction if the homeowner does not properly operate or maintain the system. In addition to costly repairs, malfunctioning systems can contaminate surface and ground waters, cause various health problems and create unsightly messes and foul odors when raw sewage surfaces or backs up in the home. Regular maintenance and rehabilitation of failing systems are required to prevent these problems.

How a Septic System Functions

The most common septic system consists of a septic tank and a soil filter called the leaching bed (absorption area). A properly functioning septic system receives all household wastewater (including toilets, showers, sinks, dishwasher, washing machine), treats the water until it is safe, and returns it into your groundwater system. Your wastewater goes back into the environment by means of a drain field, also called an absorption field. Lack of maintenance can lead to environmental degradation, affect your quality of life, and high costs to fix or replace problems in your system.

Permitting of individual on-lot systems in Pennsylvania is the responsibility of a municipal Sewage Enforcement Officer (SEO); In Bucks County the SEO function is performed by the Bucks County Health Department.

On-lot septic systems include a treatment tank, which begins breaking down contaminants in the wastewater by separating liquids from the solids. The partially treated effluent leaves the tank by gravity or pump to an absorption or dispersal area (drain field) where it is further treated by the soil. The absorption area is designed such that the partially treated wastewater undergoes additional treatment as it passes through the stone, sand or soil on its way to the shallow groundwater under the site.

There are several different types of absorption areas in Tincicum. Older properties, with systems installed before current regulations were in place, have "in ground" trench type systems with a series of trenches dug into the ground that are filled with gravel with perforated pipes. Most newer, post late-1970's,

homes have elevated sand mounds consisting of sand placed on top of the original soil with gravel and a series of distribution pipes on top of the sand, then covered with soil. These types of absorption areas are needed due the fact that most soils in Tinicum have what are termed a limiting zone between 26 inches to 36 inches below the surface of the ground. These limiting zones are either evidence of a seasonal high water table or shallow bedrock. The purpose of adding this sand over the soil is to provide a 48-inch "zone of treatment" before the wastewater reaches the limiting zone of the soils.

Such distance has been shown to adequately remove pathogens ("disinfect") from the wastewater before it reaches the shallow groundwater. In a pressure dosed distribution system (see figure below), the treatment tank effluent flows into a second smaller tank called a dose tank where a pump or siphon periodically distributes the effluent to the sand mound. The dose tank is an underground concrete or fiberglass chamber placed between the treatment tank and the effluent delivery line. It receives effluent from the treatment tank. When a prescribed volume of effluent has accumulated in the dose tank, the effluent is transferred to the sand mound. This process, called pressure dosing, uniformly distributes the effluent over the surface of the sand mound through the laterals.

New technologies such as drip irrigation are expanding the wastewater management toolbox and allowing for greater flexibility even at problem sites. Check with the County Health Department or PADEP's "Alternate Systems Guidance" document for further information on several alternate type systems approved for use in Pennsylvania.

HOW TO CARE FOR YOUR SEPTIC SYSTEM

Your septic system is a vital component of your lifestyle. Maintaining and controlling what goes into your system will only benefit the quality of the effluent, your local environment, and the beauty of Tinicum. Septic system maintenance involves little effort and can significantly prolong the life of the system. Responsible maintenance can also save you a lot of money in the long run. Proper system operation and maintenance practices include conserving water, being careful that nothing harmful is disposed of through the system, and routinely inspecting and pumping the system. Good maintenance habits can be developed by educating everyone in your household. Know what is and what is not good for your septic system.

Use Water Wisely

Water conservation is very important for your septic system because continual saturation of the soil in the drain field can affect the quality of the soil and its ability to remove toxins, bacteria, viruses and other pollutants from the wastewater. Conserve water by taking stock of how it is being wasted and use low flow fixtures in the home, such as those bearing the USEPA "WaterSense" label (also, see water saving tips presented in earlier sections of this booklet). It is important to avoid overtaxing your system

by using a lot of water in a short time period or by allowing too much outside water to reach the drain field. Divert roof drains, footing drains, surface water and sump pumps away from the drain field.

Know What NOT to Flush

What you put into your septic system greatly affects its ability to do its job. As a general rule of thumb, do not dispose of anything in your septic system that can just as easily be put in the trash. Remember that your system is not designed to be a garbage disposal, and that solids build up in the septic tank and eventually need to be pumped out. To avoid disrupting or permanently damaging your septic system, do not use it to dispose of hazardous materials.

Trillions of living bacteria constantly decompose and treat raw sewage in a septic system; the effectiveness of these bacteria can be impaired if harmful substances and chemicals are put into it, as well as a potential contamination of the groundwater.

Avoid Flushing Hazardous Chemicals including:

- Oils and greases
- Gasoline
- Antifreeze
- Varnishes, paints and solvents
- Harsh drain and toilet cleaners
- Bleach, disinfectant
- Pesticides, herbicides, and insecticides

Drain and toilet bowl cleaners should be used in moderation and only in accordance with the product labels. Overuse of these products can harm your system. It makes sense to try to keep all toxic and hazardous chemicals out of your septic tank when possible since they can pollute the ground water. To dispose of household hazardous waste, be sure to take advantage of the county's hazardous waste collection program, which is periodically held during the year at various sites throughout the county.

Remember, what goes into your toilet and drains may eventually end up back in your well drinking water. Instead of using caustic cleaners or bleach try green cleaners, mild detergents or baking soda. For clogged drains use mechanical devices (such as a zip-it tool) rather than harsh chemicals.

Also, **NEVER** flush bulky, hard to dispose items such as dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, cat litter, paper towels, plastics, food scraps, egg shells, bones or coffee grounds because they can clog the system. In the kitchen, grease and cooking oils contribute to the layer of scum in the tank and should not be put down the drain.

PUMP YOUR TANK REGULARLY

Pumping your septic tank is probably the single most important thing you can do to protect your system. If the buildup of solids in the tank becomes too high and solids move to the drain field, this could clog and strain the system to the point where a new drain field is needed. Since the cost to replace a malfunctioning on-lot system can often exceed \$30,000, it is in your best interest to maintain the system on your property. The Health Department recommends that you pump your septic tank a minimum of once every 3-5 years. How often your tank needs to be pumped depends on tank size, the number of people living in your home, and the habits of your particular household. Do not use a garbage disposal because it will add extra load to the septic tank and potentially lead to clogging the drain field. If you do use a garbage disposal be sure to pump your tank every year since it can increase the amount of solids in the tank by up to 50%. High water use technologies such as a hot tub or whirlpool also affect the pumping frequency.

Monitor Your System Health- Signs of Malfunctioning

Monitoring the health of your system is a good way to head off future problems. Having easy access to your septic system is the first step to proper maintenance. Installing access risers is a good idea if your tank is buried deep into the ground. Map out the location of your tank and drain field so you know where they are located. Watch for potential problems, such as soft or spongy ground over the drain field (especially after storms), new plant growth, odd smells or sewage odors in the house or yard, slowly draining sinks and toilets, gurgling sounds in the plumbing, and sewage backing up into the house. When the system is pumped make sure all baffles and tees are in place and in working order. This will prevent solids from entering your drain field. Finally, if your home has an alternate septic system, consider the benefits of having a maintenance contract in place.

Protect Your System

The drain field is an important part of your septic system. Keep it safe by:

- Not compacting the soil (Never park on or drive over any part of your septic system!)
- Avoid damaging the pipes
- Not excessively watering or saturating the area
- Don't plant anything but grass near your septic system and keep this area trimmed and cut
- Grass is the most appropriate cover for the drain field
- Avoid planting trees or shrubs on or near the drain field. Roots from shrubs and trees can enter and clog drain field pipes.
- Do not construct buildings or concrete over any part of the sewage system.

Myths about your Septic System

Measures to assist in creating bacteria growth within your tank are completely unnecessary and do not do it any faster than the sewage you generate within your house. Wastewater created within your house will provide all the necessary bacteria to help your system function properly. Another myth is that placing additives in your system can help renew your system's life span. Some of these additives even claim that they eliminate the need to pump out your tank. These products usually contain yeast, bacteria, or enzymes. However, there is little evidence showing that these additives are beneficial. First, there are some materials inside your tank, which cannot be broken down by any bacteria or enzymes such as bits of plastic, sand, and grit. Second, the habitat within your tank is a very specialized one that is only fit for certain types of bacteria that have adapted specially to live in that environment. Any external bacteria that are introduced to your septic tank are more likely to be eaten than they are to eat. Lastly, enzymes, unlike bacteria, are not living organisms, and cannot reproduce. Because of the very large volume of septic tanks, it would be very difficult to add enough enzymes to make a difference.

Tinicum Township's Act 537 Sewage Facilities Plan is periodically updated to continually ensure protecting the quality and quantity of the Township's water resources. It provides actions and alternatives to safeguard the use of disposal systems by:

- Requiring monitoring and maintenance of all new and replacement systems.
- Creating a database to manage the maintenance program, and
- Ensuring that selected sewage treatment alternatives are reviewed based on soil testing, system selection, operation and maintenance requirements, and required planned replacement areas for all alternate, experimental and community systems as well as systems located on marginal soils or marginal sites.

Additional information regarding on-lot wastewater systems is available from:

“On-site Sewage Disposal Facilities,” Bureau of Environmental Health, Bucks County Health Department (215-345-3318):
<http://www.buckscounty.org/government/healthservices/HealthDepartment/Environmental/OnSiteSewage>

“Maintaining Your Septic System: A Guide for Homeowners,” from the National Small Flows Clearinghouse: http://www.nesc.wvu.edu/pdf/ww/septic/pl_fall04.pdf

“What Is a Septic System? How do I Maintain One?”:
http://www.nesc.wvu.edu/subpages/septic_defined.cfm

“So Now You Own a Septic System – Part 1”:
http://www.nesc.wvu.edu/pdf/ww/septic/septic_tank1.pdf

“The Care & Feeding of your Septic System - Part 2”:
http://www.nesc.wvu.edu/pdf/ww/septic/septic_tank2.pdf



Tree Removal and Maintenance

When removing trees in Tincicum be aware that there is a Tree Harvesting Ordinance 112 that applies when cutting down 15 or more trees on any contiguous woodlot per year. It is also important to know that areas along certain streambeds or on slopes may also be protected so check with the Township office to see if your property falls within one of these areas.

Trees contribute to our human environment and property values. You can save as much as 25% in annual energy costs by planting deciduous trees to shade your home and evergreen trees or bushes to block the wind. Beyond reducing noise and increasing privacy, residential trees and forest buffers can provide a nature sanctuary in your backyard, and a cool shaded refuge from the summer heat. Trees also hide houses and buildings from view from waterways, preserving the feeling of wilderness that makes Tincicum so special.

Before considering tree removal, consider the benefits they offer in temperature control, storm water reduction, wildlife shelter and the overall ambiance of your and your neighbors' property and the township.

What You Can Do

There are several simple and inexpensive ways that you can protect the beauty of Tincicum while maintaining scenic views from your property. Light pruning may be all that is needed to preserve your view while also maintaining a healthy forest. If you live adjacent to public parkland, check your property's deed before doing any pruning, as your options may be restricted by a conservation agreement. Tree topping — or removing the tops or large mature branches of trees — can damage a tree's trunk or roots, weaken its limbs, and increase the likelihood that it will fall in a storm, endangering people or property. It can also be expensive. Instead, selectively removing branches, or selective pruning, can help to frame views. When thinking about your view of the river or stream, you might also imagine what your property looks like from the water or neighboring yards. Trees that screen structures from view help protect your privacy, as well as the river's scenic qualities.

Three ways you can selectively prune for views:

- **Thinning** is the process of removing some of a tree's foliage without altering its basic form or compromising its long-term survival. It is recommended that less than one-quarter of the total leaf area be removed when thinning.
- **Windowing** involves pruning select boughs to frame a view. This method is particularly useful for close-in trees blocking a view from a window, for example.
- **Skirting** is the process of removing limbs near the bottom of a tree in order to open up a view, a method useful for mid-range trees. Not more than a third of a tree's limbs should be removed.

Choosing a Tree Service or Arborist

Tree pruning or removal should be conducted with the help of an arborist and in compliance with our ordinance. Choosing a certified arborist is an important decision when planning the pruning or thinning of trees on your property. Unfortunately, there are some unqualified individuals who offer tree trimming services in our area, showing up at the door with a chainsaw and pickup truck. Homeowners who accept their services may be left with poor quality work and greater long-term problems and expenses. Check with the township or township's website for a list of certified Bucks County arborists in our area.

Be sure to ask these questions before selecting a tree service company or arborist:

- Does the company have an occupational license? Are they familiar with local tree cutting ordinances? Make sure the individual helping you is a member of a professional association such as the National Arborist Association, the International Society of Arboriculture, or the American Society of Consulting Arborists.
- Are they a bona fide business in the community? Are they listed in the Yellow Pages under "tree service"?
- Are they fully insured for property damage, personal liability, and workers' compensation?



Weeds Gone Wild: *The Threat of Invasive Plants*

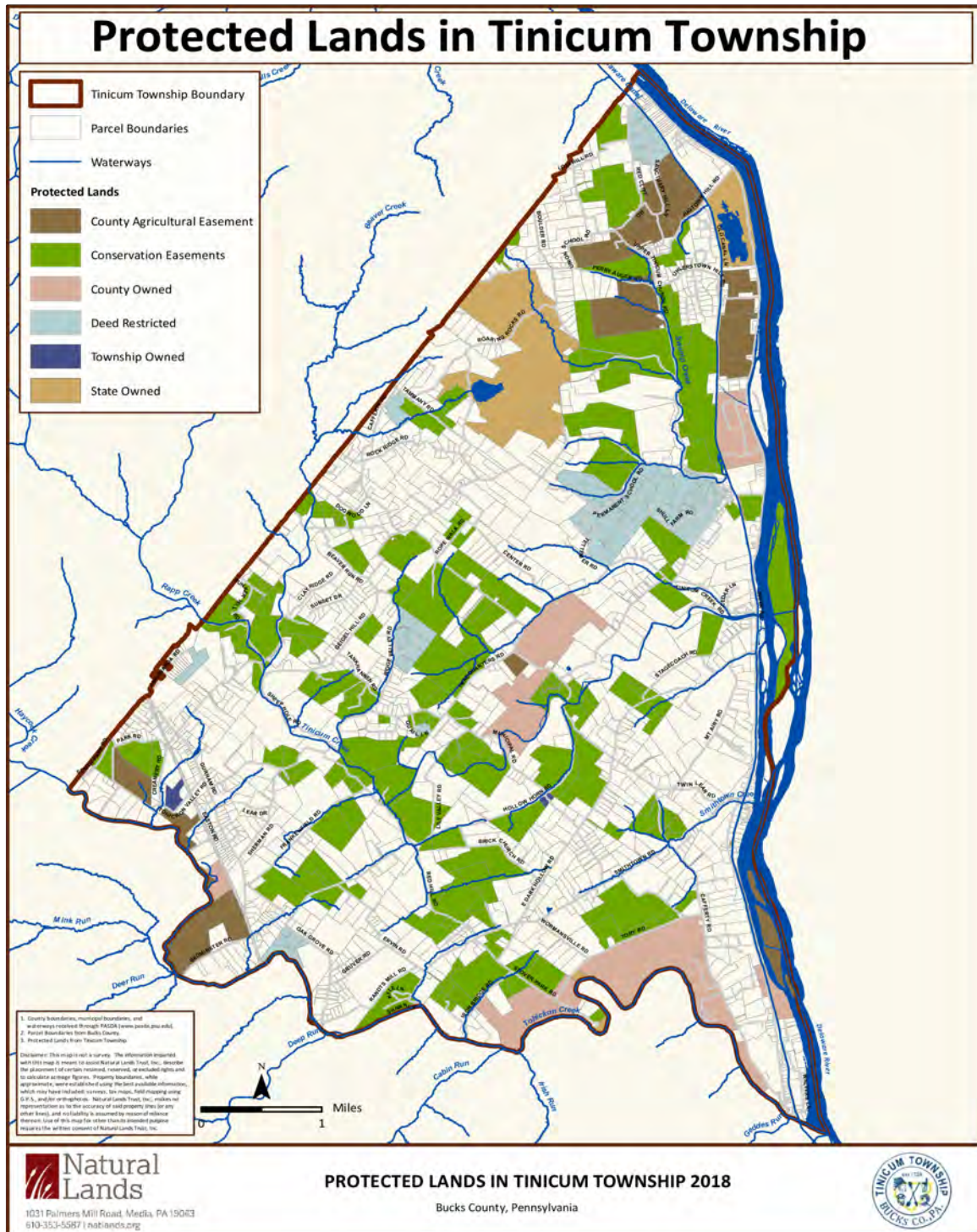
Weeds are more than just a nuisance. Noxious weeds are nonnative plants that have been introduced to our region in the past and have totally changed the landscape and natural ecosystem. Because of their aggressive growth and lack of natural enemies in North America, these species are highly destructive, competitive, and difficult to control. "Noxious" is a legal designation, determined by a weed's potential threat ecologically, socially or economically. In some areas, landowners are legally required to control noxious weeds on their land and to prevent seed formation and infestation of adjacent lands. The township has adopted Bamboo Ordinance 225 to address the safety issues that this plant presents when it is laden with snow and blocks our roadways.

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Local Land Conservation Organizations

One of the most effective ways to ensure that future generations will enjoy your land as it is today is by donating a conservation agreement. A conservation agreement is a legal tool in which the special qualities of a property are protected in perpetuity by a qualified conservation organization such as the Tincum Conservancy. (610-294-1077; <http://tincumconservancy.org>) or the Heritage Conservancy (215-345-7020; <http://heritageconservancy.org>).

As the holders of conservation agreements, these organizations take on the responsibility of ensuring that the property is forever managed according to the terms of the agreement. These land trust work cooperatively with local landowners to identify and protect the region's most important natural areas for the benefit of present and future generations through purchase, donation or voluntary land protection agreements. Agreements are individually tailored to permanently protect specific values such as water bodies, wildlife habitat, scenic views, open space, woodlands and farmland. The landowner usually receives tax benefits in return.



Noxious weeds are spreading at an alarming rate and seriously threatening meadows, woodlands, wetlands, and farmlands. Weeds displace native plants, reduce habitat for native animals, and threaten the diversity of wildlife. They spoil our landscape, alter soil fertility, dry up water supplies, poison animals, decrease agricultural production, clog streams and rivers, and reduce the recreational value of our area. Invasive species typically grow quickly and die during the hottest part of the summer and can create a fire danger.

Nonnative species, including invasive vines and shrubs such as oriental bittersweet, Japanese honeysuckle, mile-a-minute weed, and multiflora rose, have no natural controls here in Tinicum. As a result, they can spread unchecked, overrunning our yards and parklands and outcompeting native species, even deep in forests and otherwise undisturbed habitats. The plants that evolved in our area are adapted to specific soil, rainfall, and temperature conditions. Native species have natural defenses against many insects and diseases, but they often cannot compete with invasive species. In many cases, park and natural resource managers must take direct action to control invasive plants to protect and restore our natural habitats. *Bringing Nature Home* by Douglas Tallamy is an excellent guide on the importance of native planting providing information on why and what to plant (<http://www.bringingnaturehome.net>).

Some of our region's worst invasive plants are popular landscaping species, such as Japanese honeysuckle, wisteria, and English ivy. Yet many landowners continue to use these and other invasive species in their yards, largely because they are unaware of their adverse effects or of the good alternatives that exist. For many of these popular invasive landscaping plants, there are equally desirable noninvasive substitutes that offer comparable beauty and benefits. When you make landscaping decisions, it is important that you know which plants have the potential to become invasive (see Township brochure for a list of the worst invaders in our region). Using native or known noninvasive plants in your yard and garden helps to preserve the balance and beauty of our region. Simply selecting the right plants is an easy and important way that you can maintain and restore the natural ecosystems that clean our air and water, stabilize our soil, provide a buffer against floods, and offer food and shelter for wildlife.

Nine easy ways to combat invasive species: The most productive and cost effective approach to controlling weeds is learning how to recognize (see township brochure for pictures and information) and eliminate weeds before they become established:

1. Don't plant invasives. Verify that the plants you are buying for your yard or garden are **not** invasive. Replace invasive plants with noninvasive alternatives. Ask your local nursery for help in identifying invasive plants.
2. Don't release aquarium fish and plants, live bait, or other exotic animals into the wild.
3. Clean your shoes and clothing before and after you hike in a new area to remove hitchhiking weed seeds.
4. Don't pick the flowers of noxious weeds and take them home.
5. Keep vehicles out of weed patches and check for clinging weeds before leaving an area.
6. Check and clean your watercraft and trailer for clinging aquatic weeds before transporting it from one body of water to another.
7. Keep pets and pack animals out of weed patches. Feed pack animals processed food pellets before and during backcountry trips to avoid transporting seed in animal feces.

Nine easy ways to combat invasives *continued*

8. Don't "pack a pest" when traveling. Fruits, vegetables and other plants, insects, and animals can carry pests or become invasive themselves when transported to your home.
9. Volunteer at your local land conservancy, park, refuge, or other wildlife area to help remove invasive species. Help educate others about the threat.

Going Native: *Landscaping with Native Plants*

Plants native to Tinicum are species that evolved here and are adapted to its climate and soils, meaning that they occur in the wild and were not brought in from an outside area. Hundreds of species of trees, shrubs, and wildflowers are native to our region, offering a stunning diversity of colors, textures, and blooming and fruiting seasons. It is possible to use only native plants in your landscaping and still add as much variety as that provided by many nonnative or "ornamental" landscaping plant choices.

Always favor using native plants when planning your landscaping. Native plants have a number of advantages over nonnative plants. Because they are better adapted to regional conditions, they are typically hardier and require less care. They tend to be more drought resistant, require less fertilizer, and ward off pests and diseases well, reducing the need for pesticides and other chemicals. Using native plants in your landscaping will generally reduce your yard work, as well as cut down on the need for chemicals that harm water quality and wildlife. Native plants provide the food, shelter, and nesting habitat favored by our local amphibians and birdlife. Their use will make your garden a sanctuary for songbirds, hummingbirds, butterflies, bees, and other insects that are essential for plant pollination, thereby attracting an array of desired wildlife to your yard or garden. Native plants will need a little care in their infancy to develop healthy root systems, so provide them with supplemental water the first couple of years. After that, most natives planted in a favorable site require little additional attention.

Landscaping your yard with native plants also helps to maintain ecological balance in the region. You do not need to "go native" all at once. Getting started with native plant landscaping can be as simple as planting a small garden area with a mix of colorful native wildflowers that attracts butterflies. Look at your property and choose an area where you will be able to enjoy the wildlife you attract. A small plot near your front door or off a back deck might be the perfect place to plant a new garden that you can observe on a regular basis.

If you work with a landscape architect or garden planner, ask about native plant choices that would be appropriate for your property's soils and sun. Local garden centers are familiar with native plants and can make recommendations. Also there is literature available on this topic from the township.

Suggestions on Landscaping Your Yard

Once you have cleared your property of noxious weeds, consider landscaping in a manner sensitive to our limited water supply, yet with an eye toward enhancing the surroundings. An excellent resource is the Bucks County Penn State Extension Master Gardener Program <http://extension.psu.edu/plants/master-gardener/counties/bucks> (215-345-3283). Master gardeners have been trained to educate local community members to manage their landscapes and gardens in a science-based, sustainable manner. They address environmental and social priorities such as water conservation, the protection of water quality, reducing the impact of invasive species, increasing public awareness of the value of home and public landscapes, and the opportunities for healthy living through gardening. This is a free service.

Suggestions on Landscaping Your Yard *continued*

Consider having a pollinator friendly garden. Pollinators need our help. Both native bees and domestic bee populations are declining, affected by habitat loss, disease and contact with pesticides. In recent years the Monarch butterfly population has dramatically declined due in large part to loss of milkweed and other native plants to our area. Plant or nourish milkweed and play an active role in saving the Monarch. Penn State Extension Master Gardeners are taking action to protect pollinators by planting pollinator friendly gardens and providing education for the gardening public. You can join this effort by providing food and habitat for native insects/animals. Pollinators will, in turn, provide the pollination needed to protect our plant diversity and food sources. Certifying your property as “Pollinator Friendly” will help support a healthy ecosystem for our community and our future.

Water Conservation and Your Yard

Over half of all household water can go into landscaping, which makes watering efficiently one of the best and easiest ways to save water. You can save water in your garden or yard without compromising an attractive setting. Many techniques such as using an irrigation controller to deliver water at the most effective time of the day (or not during times of drought), using water-saving tools, practicing xeriscape gardening, and other information on conserving water outdoors can be found at www.wateruseitwisely.com. Xeriscaping is a new style of water-wise gardening reducing the environmental imprint by using drought tolerant plants. Xeriscape gardening does not mean filling your yard with rocks and gravel or boring mono-culture of spiny plants. Xeriscape means planning your garden for water conservation and beauty, selecting low-water plants, mulching properly, and watering in the right amount at the most effective time of day. For ideas on how to incorporate xeriscaping into your landscaping, visit the Penn State Extension Master Garden Program website.

The ABCs of Deer Resistant Plants

Another factor to consider while choosing plants for your yard, other than their need for water, is whether they are resistant to deer. Deer roam much of the county and are more prevalent around homes in winter. You can try to fence them out, but that is not always an option. Using deer resistant plants can be a lot cheaper and a lot more aesthetically pleasing. A walk or drive through your neighborhood can give you the best idea of what plants are less palatable to deer. Whether or not a particular plant will be eaten depends upon several factors: the deer’s nutritional needs, its previous feeding experience, plant palatability, time of year, and availability of other food. When preferred foods are scarce, there are few plants that deer will not eat.

Rutgers New Jersey Agricultural Experiment Station has a well-respected rating of landscape plants by deer resistance (<https://njaes.rutgers.edu/deerresistance/>):

- A = Rarely Damaged
- B = Seldom Severely Damaged
- C = Occasionally Severely Damaged
- D = Frequently Severely Damaged

The ABCs of Deer Resistant Plants *continued*

No plant is deer proof, but **Native Noninvasive species** in Categories A and B (rarely and seldom severely damaged) are **NOT FAVORED by deer** and are best suited for landscapes such as ours which are prone to deer damage. **These species can protect your garden and help you avoid feeding the growing regional deer population:**

Trees

Amelanchier canadensis Serviceberry, shadbush
Betula lenta, nigra Sweet or black birch, river birch
Carpinus caroliniana American hornbeam
Fagus grandifolia American beech
Ilex opaca American holly
Juniperus virginiana Eastern red cedar
Sassafras albidum Common sassafras

Small Trees and Shrubs

Asimina triloba Pawpaw
Clethra alnifolia Sweet pepperbush (or Summersweet)
Hamamelis virginiana Witch hazel
Lindera benzoin Spicebush
Myrica pennsylvanica, Bayberry
Leucothoe fontanesia or axillaris Drooping leucothoe or coast leucothoe
Rhus aromatica Sumac
Pieris floribunda Mountain pieris
Mahonia aquifolium Grape holly

Annuals, Perennials, and Bulbs

Andropogon gerardii Big bluestem
Coreopsis tripteris Tall coreopsis
Dryopteris marginalis Marginal shield fern, evergreen wood fern
Onoclea sensibilis Sensitive fern
Panicum virgatum Switch grass
Rudbeckia spp. Coneflower, black-eyed Susan
Pachysandra procumbens Allegheny spurge
Dicentra eximia Dutchman's britches
Arisaema triphylum Jack-in-the-pulpit
Chasmanthium latifolium Northern sea oats (a little invasive, but maybe no more so than *Lindera*)
Rodgersia Roger's flower
Asarum canadense Ginger

Note: Before planting any of these species, make sure that they are suited to your specific yard conditions.



Minding Your Turf: *Healthy Lawns for Healthy Streams*

Each yard has the potential to send a potent dose of chemicals and fertilizers into local streams and the Delaware River. Improper or excessive lawn fertilization is a significant source of nutrient runoff. Yard runoff carries nutrients from fertilizers, increasing the growth of algae and reducing water clarity, which stresses aquatic plant and animal life. Furthermore, poisonous pesticides and herbicides washed off chemically treated lawns can kill fragile aquatic insects, depriving fish of critical food supplies.

You have a strong responsibility to keep this water as clean as possible as it crosses your property. Use of pesticides, fertilizers, and cleaning products on your property can cause them to end up in our streams. Never pour anything in or near our waterways. Take advantage of the Hazardous Waste Collection events in the County. Before you pour anything on the land or especially near a creek or drainage ditch, ask yourself if it belongs in our waterways and whether you or your children would like to swim in it.

Seven simple steps to help maintain a healthy and attractive lawn while protecting the health of our streams:

- 1. Mow high with a sharp blade.** The easiest way to ensure a greener, fuller lawn is to avoid cutting more than one-third of the length of the grass blade. For cool-season grasses of our area (such as tall fescue, Kentucky bluegrass, and perennial ryegrass), leave your lawn two to three inches long. Cutting the grass too short will dry out your lawn. Also, take care not to mow your lawn when the grass is wet or under drought stress.
- 2. Leave clippings on your lawn.** Grass clippings reduce the need for extra nitrogen fertilizer by as much as one-third, saving you money and time. If clippings clump, spread them over your lawn with a rake or pick up extra clippings for compost. Many mulching mowers on the market are designed to finely shred grass clippings, eliminating extra yard waste and work.
- 3. Apply the correct amount of fertilizer for your lawn's needs.** Over-fertilizing is a common mistake. The best way to determine whether your lawn needs fertilizer is to test the soil. You can get information on soil testing through the County Cooperative Extension agent <http://extension.psu.edu/bucks/directory> or call 215-345-3283. However, soil tests do not determine nitrogen needs. Nitrogen should be applied based on established requirements of grass species and their growth seasons. Remember, more is not better. Lawn fertilizer is measured in pounds per 1,000 square feet. Never apply more than one pound of soluble nitrogen per 1,000 square feet of lawn at one time. For more information, contact your local nursery.
- 4. Choose the right type of fertilizer.** All fertilizer packages have three numbers on them, such as 10-10-10 or 16-4-8. These numbers represent the percentages of nitrogen (N), phosphorus (P), and potassium (K), in that order, by weight. This is also referred to as the N-P-K ratio. So, 16-4-8 fertilizer is 16 percent nitrogen, 4 percent phosphorus, and 8 percent potassium. While all three are necessary for proper growth, many soils naturally have enough of certain nutrients. Your soil test will help you understand which nutrients your lawn lacks. When selecting fertilizers, look for those with high levels of water insoluble nitrogen (WIN). These release fertilizer slowly so your lawn can make better use of it.
- 5. Fertilize at the correct time.** Fertilize when your grass is actively growing and can take up the nutrients. Never fertilize during the cold winter months when your grass is dormant. The proper timing or fertilizer application varies with the species of grass. September through November is best for cool-season grasses. If you don't know what type of grass you have, ask your local cooperative extension agent or a landscape professional.
- 6. Apply fertilizer properly.** Nitrogen fertilizer will generally "green up" a lawn. Therefore, it is important to apply the fertilizer uniformly. Use a drop-type or rotary spreader, and be sure to overlap applications adequately. Check the applicator settings often to be sure you're applying the fertilizer at the proper rate. Applying fertilizer by hand is not recommended. To ensure uniform fertilizer application, apply half in one direction and the other half in a perpendicular direction.
- 7. Choose certified yard care companies.** If you pay a yard management company to help care for your lawn, consider those certified by the County's cooperative extension program which may maintain lists of companies that follow "green" yard care practices, including proper fertilizer use and waste disposal.

Alternatives to Pesticides and Herbicides

The chemicals you use in your yard can harm you and your family, your pets, and the environment. Pesticides contain toxic ingredients. Often these products are toxic by ingestion, inhalation, and skin contact. Many pesticides are toxic to pets. Most insecticides are toxic to all insects, including those that are harmless or beneficial. Many pesticides are also highly toxic to birds, bees, and fish. Some pesticides and herbicides are highly mobile and can contaminate ground water or surface water.

Despite the misleading term, “inert” ingredients can also be toxic, flammable, or corrosive. Sometimes they are more hazardous than the active ingredients. Scientific studies show that pesticides applied to lawns are tracked in the home and can be found in carpet dust and on tables, window sills, and other surfaces. Children pick up these residues on their hands and transfer them to their mouths. Seek out safer methods of dealing with lawn and garden pests. Use pesticides and herbicides sparingly, if at all.

Consider Using Non-Chemical Pest Controls which are effective for longer periods of time. Also, they are less likely to create hardy pest populations that develop the ability to resist pesticides. Many non-chemical pest controls can be used with fewer safeguards because they are generally thought to pose virtually no hazards to human health or the environment. Two examples of non-chemical pest control methods are biological and manual treatments:

Biological Pest Controls: Pests themselves may be eaten or otherwise controlled by birds, insects, or other living organisms. You can use a pest’s natural enemies (predators) to your advantage.

- **Beneficial predators** including **purple martins** and other birds eat insects; bats can eat thousands of insects in one night; lady beetles (ladybugs) and their larvae eat aphids, mealybugs, whiteflies, and mites. Other beneficial bugs include spiders, centipedes, ground beetles, lacewings, dragonflies, big-eyed bugs, and ants. You can install a purple martin house in your yard. You can also buy and release predatory insects, which are available from gardening catalogs and magazines.
- **Parasitoids** such as miniature wasps lay their eggs inside the eggs or bodies of insect pests such as tomato hornworms. Once the eggs hatch, the offspring kill their insect hosts, making parasitoids highly effective pest controllers.
- **Microscopic pathogens** including fungi, bacteria, and viruses control pests. An example is milky spore disease, which attacks Japanese beetles. A number of these biological pesticides are available commercially at hardware and garden stores.
- **Biological pesticides** include pheromones and juvenile insect hormones. Pheromones are chemical substances released by various organisms (including insects) as a means of communicating with others of the same species, usually as an aid to mating. Pheromones lure pests inside a trap. Juvenile insect hormones interfere with an insect’s normal growth and reproductive functions by mimicking the effects of compounds that occur naturally in the pest.

Manual Pest Controls include spading and hoeing to cut up weeds; hand-picking weeds/pests from indoor and outdoor plants; using a flyswatter; setting traps to control rodents and some insects; and mulching to reduce weed growth.

One or a combination of several non-chemical treatments may be just what you need for your pest problem. You must be patient because results may not be immediate. Most pest problems can be prevented by early detection and very basic management measures. The Integrated Pest Management Program of the Penn State Extension Center has been compiling resources to help deal with our local yard pests using the least toxic method (<http://extension.psu.edu/pests/ipm/what-is-ipm>).



Considerate Neighbors Make Good Neighbors

Open Burning: When Is It OK?

Tinicum is in the state's Department of Environmental Protection's (DEP) Southeast Regional Air Basin. An "air basin" is an area where the air is too polluted to allow for open burning. DEP allows only the following exceptions for residential burning:

- A fire set solely for cooking food.
- A fire set for the purpose of burning domestic refuse, when the fire is on the premises of a structure occupied solely as a dwelling by two families or less and when the refuse results from the normal occupancy of the structure.
- A fire set in conjunction with the production of agricultural commodities in their unmanufactured state on the premises of the farm operation.
- A fire set solely for recreational or ceremonial purposes.

This does not include demolition waste, home insulation, shingles, treated wood, paint, painted or stained objects, furniture, tires, mattresses, box springs, metal, rubber insulated cooper wire, television sets, appliances, automobiles, automotive parts, or batteries. All of these must be disposed of as solid waste according to DEP regulations.

Keep in mind that open burning of residential waste sends soot particles and noxious fumes into the air and scientific studies have linked these exposures to adverse health effects including damage to multiple organs of the body. Long-term exposure may lead to cancer or emphysema. Smoke can irritate the lungs of asthma sufferers, with children most vulnerable.

If you must burn residential waste, do it in a manner that minimizes off-site effects. Recycle as much as you can. Burn the remaining waste at the highest possible temperature and make sure the fire has plenty of oxygen. If you're using a barrel, make plenty of air holes in the sides, bottom, and lid (or use a grate on the top). This will create a draft and ensure higher temperatures and more complete combustion. Do not let the fire smolder. Pollution and fire risk increase when a fire smolders. DEP regulations also state that open burning is not permitted if emissions:

- are visible when they pass beyond the property where the opening burning is occurring
- contain foul smelling air contaminants detectable beyond the property limits
- cause damage to vegetation or property
- are or may be deleterious to human or animal health, or
- interfere with the reasonable enjoyment of life or property.

Never leave an open burn unattended. And always think of how your burning affects your neighbors and your environment.



Noise : Keeping the Peace...and Quiet

According to Tinicum's Police Department, the greatest number of complaints in our township relate to noise: primarily loud music, some dog barking, and seasonal firing of guns. Ordinance 15 was enacted in 1965 and prohibited "certain nuisances" including "unreasonable noise". In part, it states that it is unlawful for any person to make or cause to be made any loud noise which annoys, disturbs, or endangers the comfort, repose, health and safety of others within the township. With the advent of technology and relatively inexpensive sound level meters making it possible to quantitatively define "loud noise" - **Tinicum's Noise Ordinance 181** (enacted in 2007) further sets out general sound standards and time periods for each of the township zoning districts. It also addresses six sources of potential disturbances: stereos, televisions, musical instruments or equipment; excessively and frequently barking, howling or other noise-producing animals; construction or demolition equipment; repair or operation of motor and recreational vehicles; operation of power tools, including snow blowers and similar devices; and the discharge of firearms while not actively engaged in hunting. This ordinance was amended in 2009 by **Ordinance 192**, to revise the hours during which construction, drilling, or demolition work may occur. In 2012, **Ordinance 215** amended the previous ordinances by adding sound level (decibel) limits and limiting the number of "specified motorized" vehicles; revising hours of construction, manufacturing, and industrial operations; and clarifying regulations for firearm discharges (See the ordinance for the specific prohibitions—times of day, for example—regarding each of these categories).

Lighting:

Twinkle, Twinkle, Little Star: *Minimizing Bright Outdoor Lighting and Preserving Our Night Sky*

Tinicum's residents are fortunate enough to be in an area where the night sky can still be enjoyed. While many people are aware of air and water pollution as serious forms of environmental degradation, few recognize light pollution — the artificial illumination of our night sky — as negatively affecting the quality of life. Bright floodlights and poorly designed outdoor light fixtures are the primary cause of our diminished ability to view stars and planets. Light pollution is not merely a nuisance to humans and an economic waste - it disturbs wildlife habitats. Scientific studies indicate that artificial night lighting disrupts the migrating, feeding, and breeding habits of many wildlife species, as well as growth patterns of trees. Outdoor lighting alters the behavior, especially of nocturnal animals, including owls, migrating birds, insect eaters such as toads and bats, and sea turtles. Migrating birds are affected because they use the constellations to navigate and artificial lighting can slow their migration and make it harder for them to find food as the seasons change.

Tinicum's Lighting Ordinance 159 enacted in 2004, regulates outdoor lighting so that safety, security, and economic benefits are maintained while minimizing dangerous glare, negative environmental impact, disturbance of wildlife habitats, energy waste, light pollution, and light trespass. For specific details of the ordinance regulations, refer to the township's zoning ordinance handbook at the township's office or website.

What You Can Do to Avoid Light Pollution

- **Use Lighting Only When Necessary.** Good lighting should provide adequate light for the intended task but never over-lights or throws light onto neighboring properties. Turn off lights or consider using timers and/or motion sensors.
- **Direct the Light Downward.** Use "fully-shielded lighting fixtures, fixtures that control the light output in order to keep the light in the targeted area.
- **Ask yourself: What do I need to light and how much light do I need?** Higher wattage does not necessarily mean better lighting. Lower wattage lights have lower operational costs and typically last longer. For domestic security lights, a 150-watt lamp is adequate.

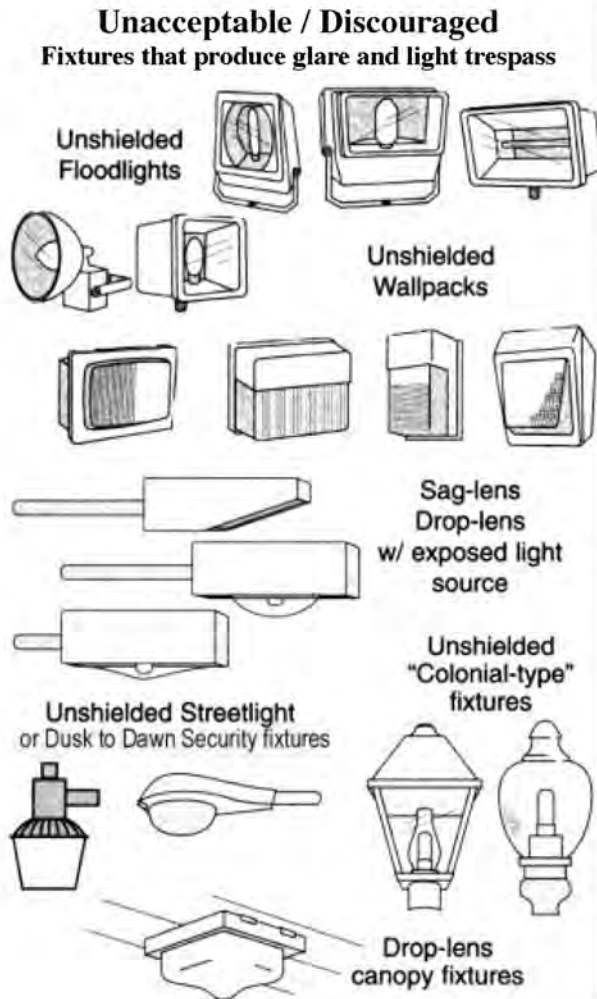
Lighting *continued*

Pole mounted lighting fixtures should be run underground, not overhead. The township office has information on specific standards, recommended illumination levels, retrofitting existing lights, choosing security lights, and talking to your neighbor about intrusive lighting. It should be pointed out that the initial cost of retrofitting is quickly counterbalanced by savings in electricity with a full recoup within approximately three years.

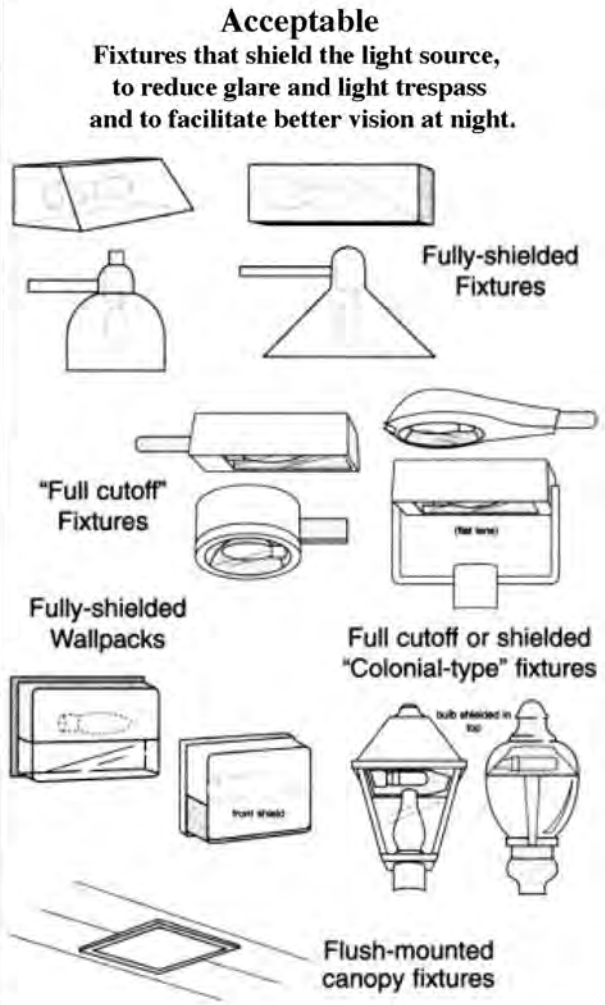
Remember that outdoor illumination should be aimed downward where the light is needed, not upward or sideways. Light that shines horizontally (or even worse, upward) does not address most lighting needs. It merely dissipates into the distance — a waste of energy and money, and a nuisance to neighbors. Full-cutoff shielding in light fixtures is a simple remedy for both glare and skyglow (the ambient haze in the night sky created from light pollution). Full-cutoff means that no light rays from the fixture shine above the horizontal plane, and that at least 90 percent of the light is blocked from up to 20 degrees below the horizontal plane.

Lighting Fixture Design- Be a Good Neighbor: Shield Your Lights and Switch Off after 10PM

UNSHIELDED FIXTURES



Full Cutoff and Fully Shielded Fixtures



Ordinances and Permitting Procedures

The table below provides a brief summary of selected township ordinances that may be useful to homeowners, several of which have already been covered in more detail. A complete list is available from the township office or website.

Permits are required for all new construction, for renovation to existing buildings, and for demolishing an existing building. If you have any questions, call the township zoning officer (610-294-8076).

Selected Ordinances of Homeowner Significance:

Ordinance # (Amendment)	Adoption Date (Amendment)	Description
1 (15)	1951 (1965)	Nuisance
103	2005	Flexible Development Option to provide greater design flexibility while minimizing impact of new development on township's rural character.
112	1995	Tree Harvesting regulations
123 (196)	1998 (2010) (currently under revision)	Water Ordinance amended to define bounded aquifer and draw down limits – demonstration of an adequate water supply for property development.
124 (141)	2000	Environmental Impact Assessment (EIA) regulations
150 (171, 190)	2002 (2005,2009)	Storm Water Management emphasizes low impact development techniques to retain storm water runoff and enhance recharge.
152 (191)	2005 (2009)	Grading, erosion and sediment control and dry hydrant requirement
159	2004	Outdoor Lighting regulations
161	2004	Driveway & Utility construction regulations
162	2004	Building Code specifications
163	2004	Adaptive Reuse of historic outbuildings
165	2000, 2005	Curative amendments to Zoning Ordinance and SALDO
181 (192, 215)	2007 (2009, 2012)	Noise limits and time of day
185	2008	Weight restriction on dirt & gravel roads depending on time of year.
188	2008	Sewage Management Ordinance formalizes the role of Bucks County Health Department in the implementation of the Township's Sewage Facilities Plan
204	2010	Outdoor Wood-fired boilers limits on installation and operation.
208	2011	Standards for fences, walls and gates
211	2013	Airport Overlay District height restrictions
225	2015	Bamboo growing restrictions and setback limits



Locally Grown Foods

Locally grown foods are widely available in Tincum. For fresh produce during the growing season, visit one of the small farms or fruit stands that you see along the road. Many farms sell to drop-in visitors even if there is no stand. Kimberton and the Ottsville farmers markets are readily accessible from route 611. There are three CSA (Community Sustainable Agriculture) farmers markets where you can buy fresh fruit, vegetables, breads, cheese, meats, flowers, and other goods directly from local farmers. Help support our local farmers and businesses and help save gas too. For information about our local farmers markets, contact the township or Tincum CSA <http://www.tincumcsa.com>. Also, Penn State Extension has a free farm market directory of roadside markets and “pick your own” farms in Bucks County, *Fresh from Bucks County Farms*: <http://extension.psu.edu/bucks/news/2013/2013-fresh-from-bucks-co.-farms-farm-market-directoryextension.psu.edu/bucks>.



Recycling Your Household Materials

We can have a major impact on the amount of garbage produced in our area by becoming aware of how much we throw out and changing some of our habits about buying and using things. Organic materials comprise over half of the solid waste generated. In the past, organic materials have been dumped in landfills or burned. These disposal methods waste valuable landfill space and contribute to poor air quality. An estimated 40 percent of what is put in landfills could be eliminated if we all use better waste-reduction and composting practices.

An important form of recycling is composting. Composting is the controlled biological decomposition of organic matter, such as food and yard wastes, into humus, a soil-like material. It is nature’s way of recycling organic waste into new soil, which can be used in vegetable and flower gardens, landscaping, and many other applications.

Remember, environmentally responsible consumers produce less waste by practicing the **3-Rs: Reduce, Reuse, Recycle**. They buy products with less packaging, use reusable containers, maintain and repair products, participate in recycling programs, and buy products made from recycled materials. Waste is an expensive and inefficient use of our resources. When you avoid making garbage in the first place, you don’t have to worry about disposing of waste or recycling it later. Recycling conserves natural resources such as timber, water and minerals, saves energy, and decreases greenhouse gases that contribute to global warming. Changing your habits is the key, so before you buy, use or discard an item, ask yourself:

- Reduce:** Can I buy this product with less packaging?
- Reuse:** Can I or someone else use this again?
- Recycle:** Can I recycle this after I use it?
- Buy Recycled:** Can I get this item with recycled content?

For more information on reducing waste go to www.epa.gov/msw/reduce.htm.

Recycling Options

The township has recycling available at the Municipal Building for residents who do not have it at home. There are bins for cardboard, newsprint, office paper, aluminum, glass and plastic numbers 1 and 2. Drop offs do not require notification and the service is free. You can also dispose of and recycle appliances, refrigerators, air conditioners, tires, scrap steel and aluminum, furniture, and used oil at the Public Works Building, but most of these items require advance notice (610-294-9153) and a fee. (Please try using your trash hauler first.)

Refer to the township website for more details about recycling in Tinicum. If you have clothes, coats, shoes, boots, sneakers, belts or purses, bring them to the clothing shed at the Delaware Valley Fire Company at 75 Headquarters Rd. in Erwinna. Tax-deduction forms are available on site.

The county has a guide to recycling and disposal alternatives for various household materials and automotive tires and fluids. Also, periodic collections of household hazardous waste and electronics are held at various sites throughout the county. Latex paint may be dried to a hardened state and placed in the garbage. It is not considered hazardous once solid, and aside from using it up this is the preferred disposal method.

<http://www.buckscounty.org/government/CommunityServices/PlanningCommission/Recycling>

How to Properly Recycle

At drop-off locations please place recyclables in the correct bin. Dumping trash in recycling bins jeopardizes the recycling opportunity for everyone and may result in the contents ending up in the landfill instead of being recycled.

- Make sure all recyclable items are clean and dry.
- Remove lids to jars or bottles - they may not be recyclable (check with your recycle hauler).
- Remove labels from cans for some recycle haulers.
- To determine what type of plastic you have, look for the triangle with a number inside, usually located on the bottom.
- Some recycle haulers require separation of cardboard. "Corrugated cardboard" is a sandwich of cardboard with a wavy line (the corrugated part) in the middle. "Chipboard" is a solid piece of heavy paper or cardboard and is found in many cereal and cracker boxes.

Agricultural Pesticides (optional)

CHEMSWEEP provides Pennsylvania farmers and other licensed pesticide applicators with a means to dispose of canceled, suspended or unwanted pesticide products. By participating in this program, applicators can legally dispose of waste pesticides, generally at little or no cost. Almost all of the waste pesticides collected are burned in EPA-approved incinerators. The remaining pesticides are treated and placed in EPA-permitted hazardous waste landfills. For more information, call 717-772-5210

http://www.agriculture.state.pa.us/portal/server.pt/gateway/PTARGS_6_2_75292_10297_0_43/AgWebsite/ProgramDetail.aspx?name=CHEMSWEEP-Waste-Pesticide-Disposal-Program&navid=12&parentnavid=0&palid=108&

Recycling Options *continued*

The County has a recycling guide to provide information on how and where to properly dispose of, if appropriate, materials typically generated from households

(<http://www.buckscounty.org/docs/government-documents/recyclingguide2008.pdf?sfvrsn=2>).

The following table is from the guide and summarizes recycling locations in Upper Bucks communities.

Recycling Drop-off locations in Bucks County

Upper Bucks Recycling Locations	Newspaper ❶	Magazines ❶	Catalogs ❶	Phone Books ❶	Office paper ❶	Junk Mail ❶	Corrugated Cardboard ❶	Cereal Boxes ❶	Aluminum Cans ❷	Steel Cans ❷	Clear Glass ❸	Brown Glass ❸	Green Glass ❸	#1 Plastic Bottles ❹	#2 Plastic Bottles ❹	#3 - 7 Plastics ❹	Yard Waste ❺	Scrap Metal ❻	HHW ❼
Bedminster Township (215) 795-2190. Kellers Church and Creek Rd. Open 24 hrs. Bedminster Twp. residents ONLY	✓								✓	✓	✓	✓							
East Rockhill Township Municipal Complex (215) 257-9156. 1622 Ridge Rd, Perkasie. Open 24 hrs. East Rockhill Twp. residents ONLY.	✓	✓	✓	✓				✓		✓	✓	✓	✓	❸	✓				
Geese Auto Salvage, Inc. (215) 795-2302. 1071 Spruce Lane, Bedminster Twp.																		✓	
Haycock Township Municipal Complex. (215) 536-3641. 640 Harrisburg School Rd. Open 24hrs.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Joe Matterno Recycling, Inc. (215) 855-4808. 316 W. 7th St, Lansdale. Open M-F, 8-4:30, Sat 9-1. This location is a buyback center.								✓	✓									✓	
Milford Township. (215) 536-2090. 2050 Krammes Rd, Spinnerstown. Open 24 hrs.	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓				
Nockamixon Township. (610) 847-5058. 589 Lake Warren Rd. 3rd Sat. of each month, 10am-2pm.	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓				
Perkasie Borough. (215) 257-5056 311 S. 9th St. Borough Residents ONLY. Open 24 hrs	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	❸	✓				
Waste Management of Indian Valley (215) 257-1142. 400 Progress Drive, Telford. Open Wed, 12-5pm, Sat 8am-12pm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
West Rockhill Township Municipal Bldg. (215) 257-9063. 1028 Ridge Rd., Sellersville. Open 24 hrs. West Rockhill residents ONLY.	✓							✓		✓	✓	✓	✓	✓	✓				

APPENDIX B-8

BUCKS COUNTY—Recycling Guide From "A" to "Z"

❶ Keep clean and dry. Cardboard should be flattened and banded. Newspaper and other paper should be banded or placed into paper grocery bags. No waxed-coated, dirty or food contaminated items. ❷ Empty and rinse. Flatten or crush to save space. No scrap metal, foil, or food residue. ❸ Empty and rinse. DO NOT break. No ceramics, mirrors, crystal, dishes, light bulbs, TV tubes, window auto glass or cookware. ❹ No plastic film, wide-mouth jars, tubs, styrofoam, motor oil containers, bags or containers coded #3-#7.

❺ Compost leaves. Leave grass clippings on lawn. Do not dispose as trash. ❻ No compressed gas cylinders, 55 gallon drums. Appliances containing freon (such as refrigerators), call for information about proper disposal. ❼ Up to 25 gallons or 220 lbs. of pesticides, solvents, toxic and caustic materials and oil based paints. NO LATEX PAINT, appliances, asbestos, biological wastes, explosives, gas cylinders greater than 20 lbs., radioactive wastes, or tires. For more information about the HHW collection program, go to www.buckscounty.org and click on "How Do I ... Recycle in Bucks" or call 800-346-4242. ❽ Milk jugs and soda bottles only.

