A walking path in Kohler Park winds through tranquil woodlands.

Environmental Sustainability

Many factors influence the environmental sustainability of a community. This chapter looks at stewardship of the township's ecology and natural resources, conservation and protection of water resources, planning for essential infrastructure, and waste reduction.

Summary of Recommendations

- Preserve and enhance the township's natural resources, including streams, floodplains, riparian corridors, and wooded areas.
- Encourage stormwater best management practices and water recycling as part of the township's MS4 permit requirements.
- Encourage the increased use of renewable energy and energy efficiency technologies.
- Continue to provide for the long-term maintenance and planning of integral infrastructure systems.
- Increase the township's recycling rate and reduce the township's overall production of solid waste.

Top: Park Creek passes through a wooded area within Cedar Hill Road Park.
Bottom: Naturalized stormwater basins control the amount of stormwater runoff while also improving water quality.

Ecological Stewardship

Geology

A region's geology can have a major influence on other natural features such as topography, soils, hydrology, and vegetative character. Geology also influences site suitability, development capacity, and the cost of construction due to issues such as depth to bedrock. The township's underlying bedrock geology is shown in Map 14 on the following page. A region's bedrock, which is the parent material for the local soils, can impact other factors such as infiltration rates, nutrient content, and agricultural capacity.

The rock formations that make up the bedrock of Horsham Township are:

- **Stockton Formation**, which is a sedimentary formation made up of light-gray to buff, coarse-grained sandstone and shales that were deposited in a river setting millions of years ago. This formation covers the majority of the township.[1]
- **Lockatong Formation**, which is characterized by dark-gray to black metamorphic and sedimentary rock, covers the western portion of the township, west of Cedar Hill Road and Chestnut Lane. These deposits formed as mud and silt deposited in layers on river floodplains and in shallow lakes.[2]

[1] "Stockton Formation." USGS. https://mrdata.usgs.gov/geology/state/sgmc2-unit.php?unit=PATRs;5

[2] "Lockatong Formation." USGS. https://mrdata.usgs.gov/geology/state/sgmc-unit.php?unit=PATRl%3B3

Soils

Soil is the accumulation of particulate matter generated by the gradual weathering of bedrock, the deposition of organic matter, and soil organism activity. As the region was developed, human activity also influenced the soil type and makeup of the region by manually shifting and mixing soils. Soils are characterized based on many different factors, including color and mineral characteristics. Two important soil classifications are shown in Map 15 on page 90: hydric soils and important agricultural soils.

Hydric Soils are soils that are periodically wet and are located in areas that often support the growth of wetland vegetation. Hydric soils are located throughout the township, primarily along the stream corridors in the western and southern portions of the township.

Important Agricultural Soils are located throughout the township, but primarily in areas with less history of earth disturbance such as preserved open space, utility line corridors, and along streams. The agricultural potential of soils is determined by measuring fertility, depth to bedrock and groundwater, texture, erodibility, and slope. Important agricultural soils are further described as:

- **Prime Agricultural Soils** are deep, well-drained, and moderately-sloped soils that can support high yields of crops with little management.
- **Agricultural Soils of Statewide Significance** include soils that support cultivation but require careful crop management.

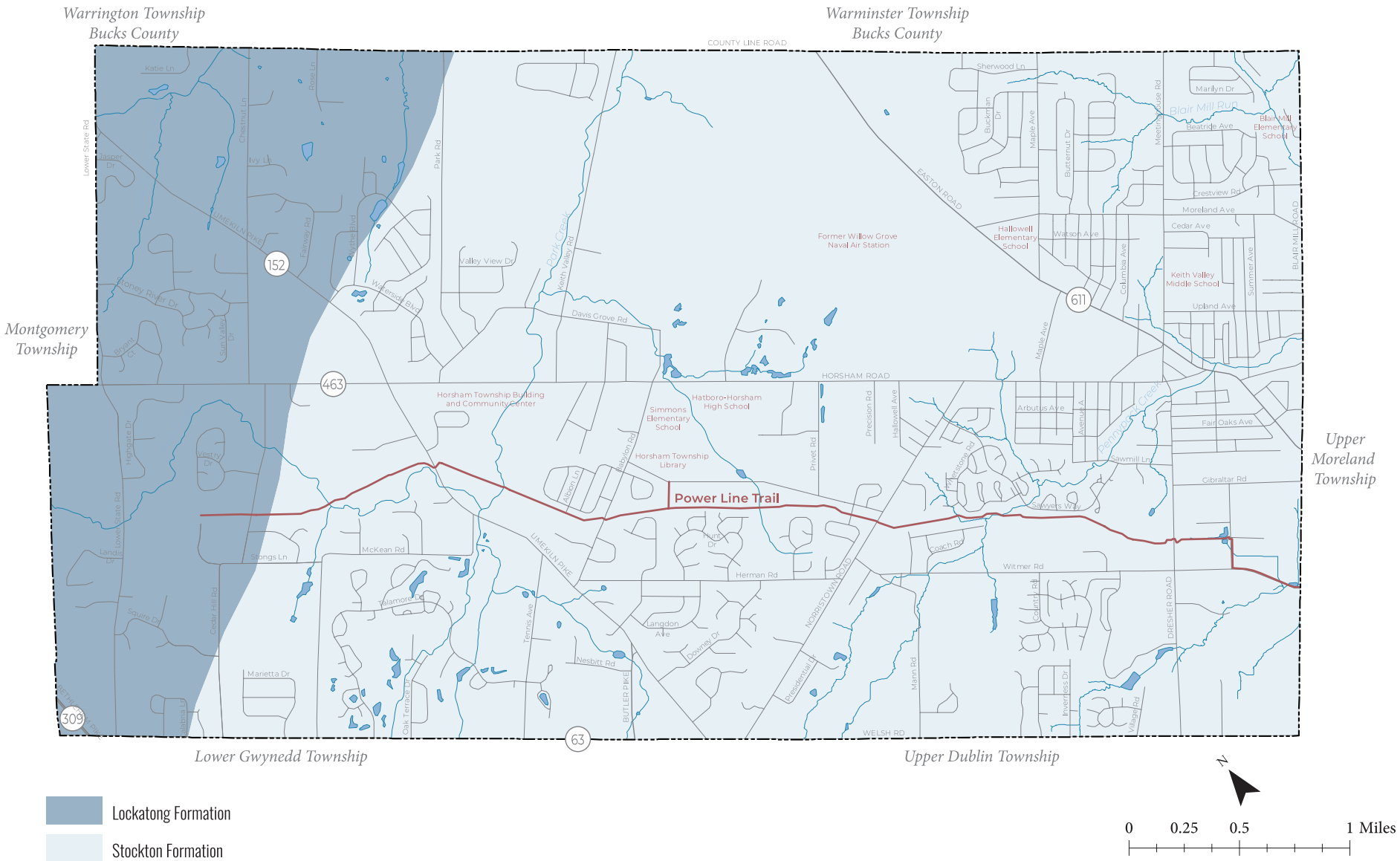
Steep Slopes

Map 16 on page 91 illustrates the topography of the township and highlights areas of greater than 8% slope. Areas with slopes in excess of 25% are considered undesirable for development because of the increased risk of erosion and runoff during storm events, and the amount of grading that would be needed to prepare the site for development.

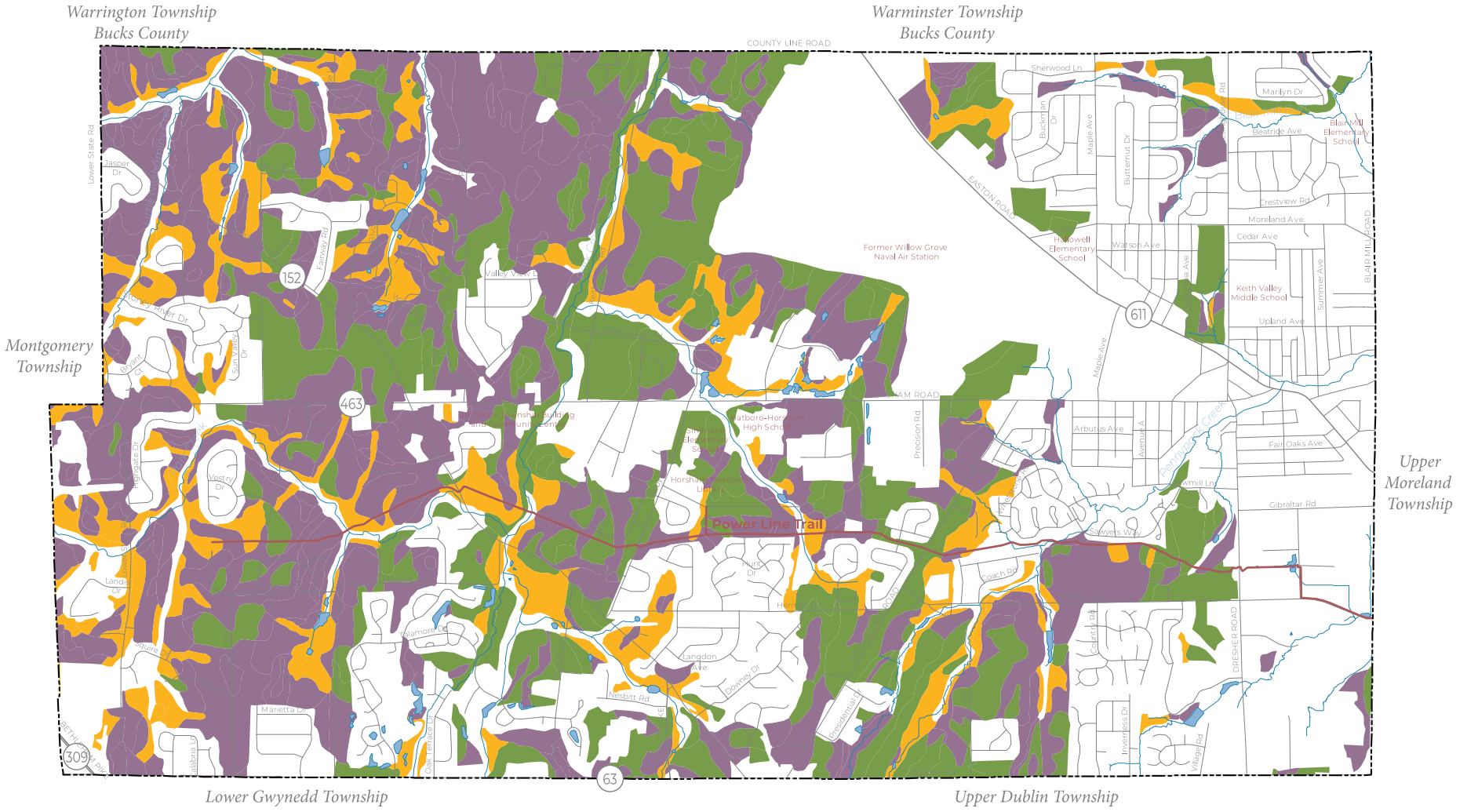
Within Horsham Township, there are areas with slopes in excess of 25% along the Pennypack Creek and Park Creek corridors, and in the vicinity of Davis Grove Road. Areas of moderate slope (15-25%) are also primarily located along the stream corridors, on the College Settlement Camp property, and Squires Golf Club property.

Kohler Farms on Limekiln Pike is the township's largest active farm and is characterized by Agricultural Soils of Statewide Significance.

Map 14. Geology



Map 15. Soils



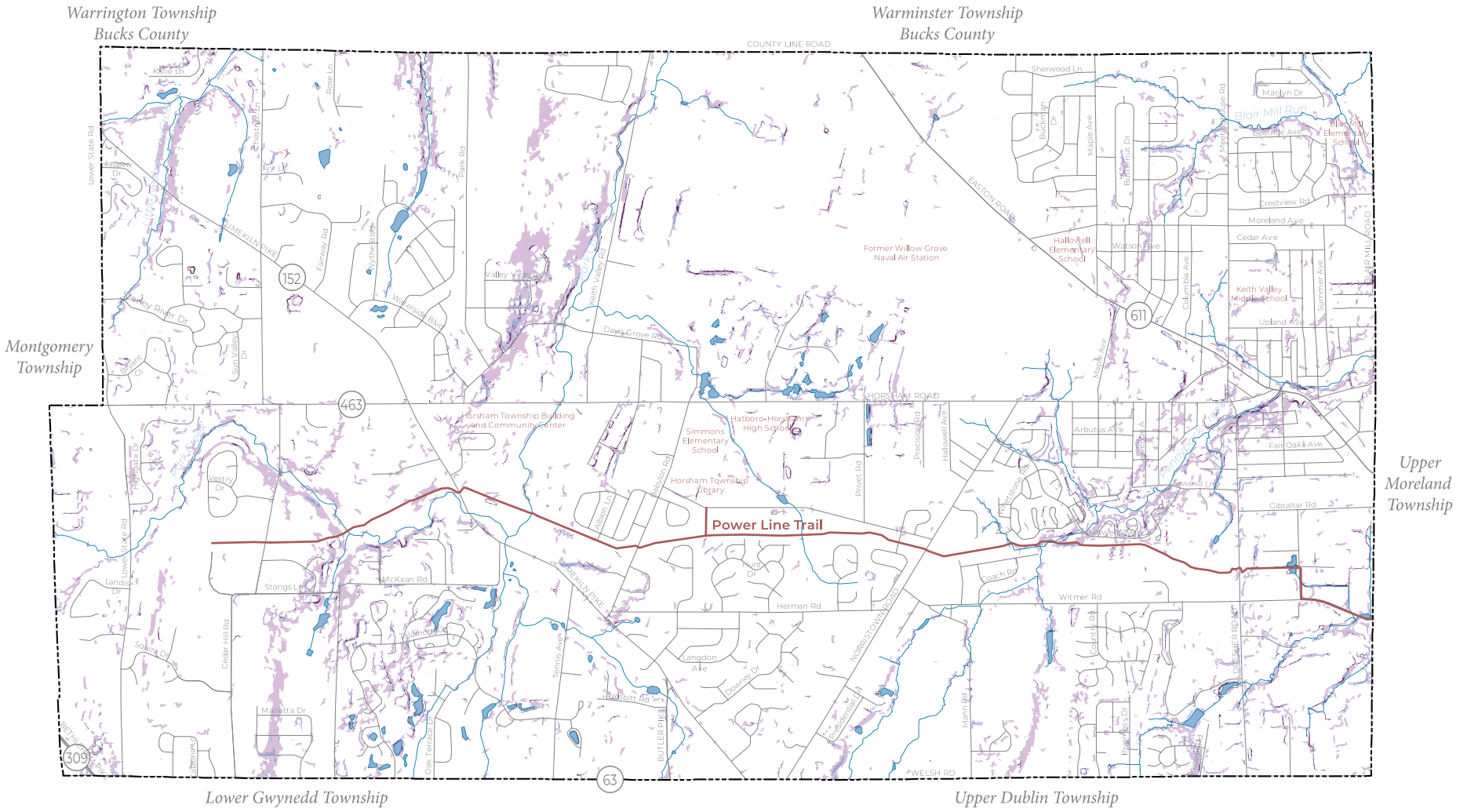
- Hydric Soils
- Prime Agricultural Soils
- Agricultural Soils of Statewide Significance

Source: Natural Resources Conservation Service

N

0 0.25 0.5 1 Miles

Map 16. Topography



Source: US Geological Society

Tree Cover

Shade trees contribute many social and environmental benefits to a community, including providing shade, improving air quality, and enhancing the visual aesthetic of a neighborhood. Trees also help reduce stormwater runoff by encouraging infiltration of rainwater and provide habitat for a variety of animal, bird, and insect species.

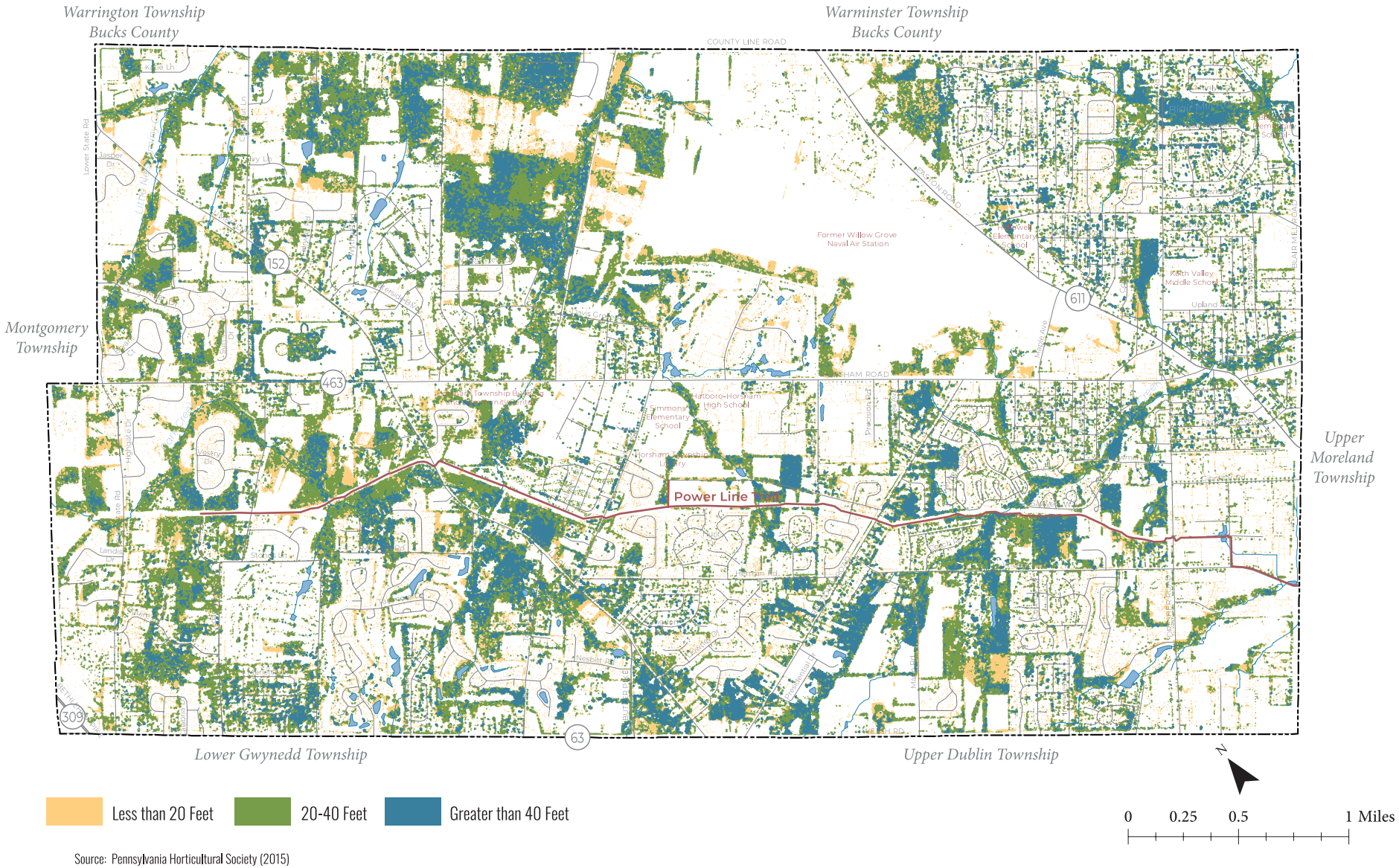
Map 17 on the following page shows where trees are located in the township and the approximate height of the tree cover, based on a 2015 Pennsylvania Horticultural Society analysis. Taller trees are more concentrated on the undeveloped lands between Park Road and Keith Valley Road, as well as on the College Settlement Camp property, along some stream corridors, and in very, low-density residential areas. Based on the date of the tree canopy analysis, this map may show areas of tree cover that have subsequently been removed or reduced by land development, particularly on the Myanlo property near County Line Road and Park Road and the residential developments on the former Horsham Valley and Limekiln golf clubs. Areas of the township where there is very little tree coverage include the former WGNAS, large institutional properties, some of the business and industrial campuses, and some township-owned parks. In addition, a large grove of trees was damaged by a tornado associated with Hurricane Ida in summer 2021.

Due to the township's agrarian history and multiple golf course developments, the remaining forested lands are somewhat fragmented which can result in an "edge effect." Edge forests and fragmented woodlands can degrade the quality of the forest habitat and encourage invasive plants and nest parasites. Deer are also known to thrive in edge forests where they can overbrowse native vegetation and cause public health and safety issues as they enter more heavily populated areas.

Established tree canopies, such as in Whitemarsh Memorial Park, contribute to the township's character as well as provide a comfortable environment to visit.

Requiring a minimum amount of tree plantings within commercial parking lots as redevelopment occurs can increase tree coverage.

Map 17. Tree Canopy Height



Source: Pennsylvania Horticultural Society (2015)

Riparian Corridor Protection

That area of land located adjacent to stream corridors and other water bodies is known as the "riparian corridor." Existing woodlands within the riparian corridor provide many benefits, such as filtering stormwater runoff, stabilizing streambanks, and providing important habitat. Therefore, the preservation and enhancement of vegetated buffer zones within riparian corridors is important to water quality and habitat protection.

A 2012 study by the Heritage Conservancy evaluated the status of riparian corridors on selected streams in Montgomery and Bucks counties (see Map 18 on the following page). The area within 50 feet of either side of the stream was evaluated and categorized as follows:

a. *No Buffer*: neither side of the stream has 50% or greater tree canopy coverage
b. *Half Buffer*: only one side of the stream has 50% or greater tree canopy coverage
c. *Full Buffer*: both sides of the stream have 50% or greater tree canopy coverage
d. *Culverted Area*: areas where the stream is not visible

Many of the township's stream corridors have significant tree canopy. For example, large sections of the Park Creek and Pennypack Creek south of Horsham Road correspond with township-owned open space where it is easier to maintain tree canopy and riparian corridor protection over the long-term. However, some stream corridors, especially within the Horsham Business Parks, along the Horsham Road frontage of the Commonwealth Corporate Campus, and through the former Limekiln Golf Club, could benefit from additional tree canopy.

The actual make up of plant communities within the riparian corridor also influences the stream's health. For example, replacing invasive plants with native vegetation that is suited to the riparian habitat can help further stabilize streambanks and attract native animals.

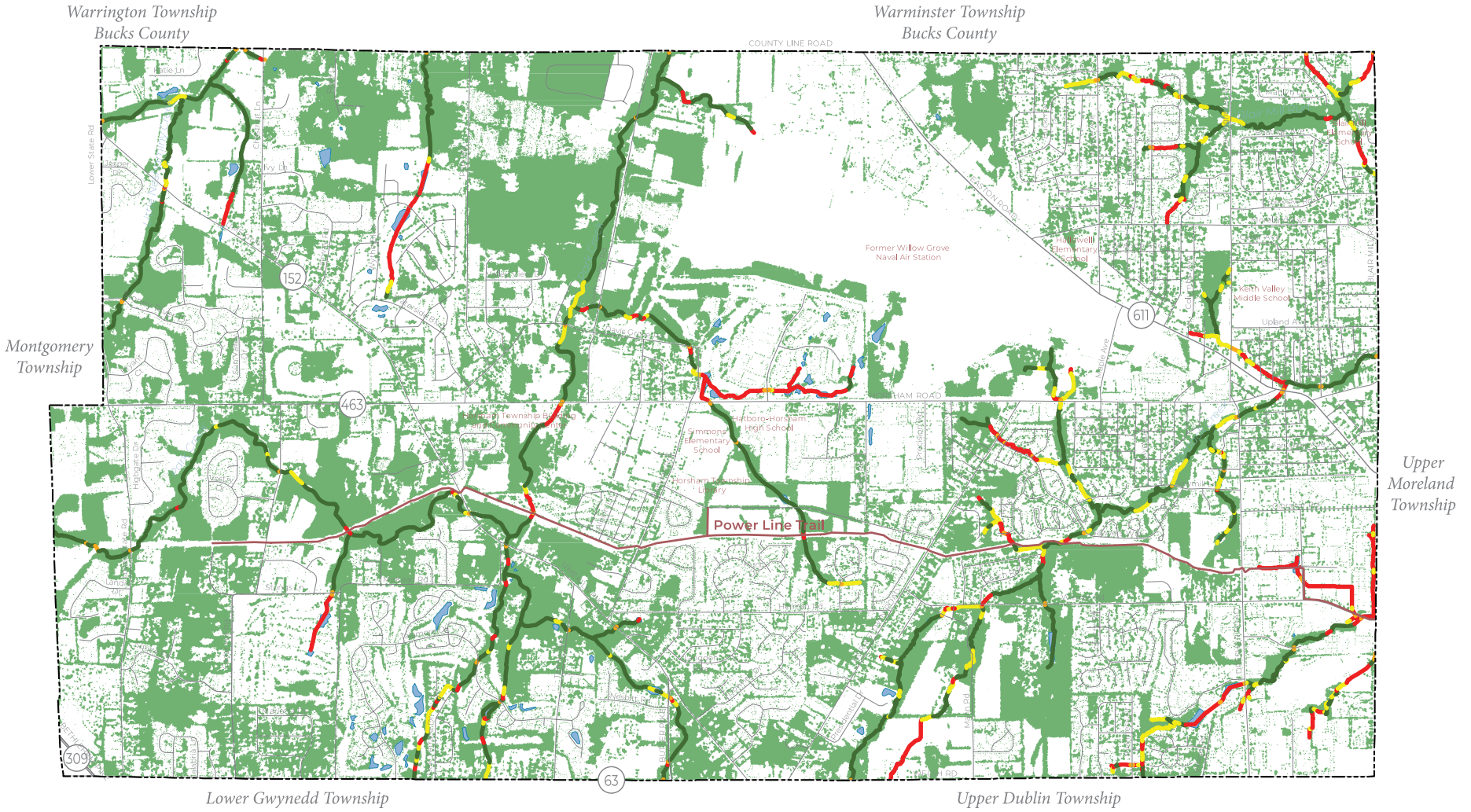
Greenways

The Future Land Use Plan (Map 3 on page 25) shows a designated greenway corridor encompassing lands within 75 feet of a stream or water body, meant to correspond closely with those areas of land within the township's current Riparian Corridor Conservation District. Existing vegetation in these areas should be preserved and enhanced in order to maximize the environmental benefits of the greenway, which include enhanced biodiversity through habitat conservation, water and air quality protection through natural filtration processes, and attenuation of potential downstream impacts of storm events through additional infiltration of runoff.

Greenways can also function as important corridors to allow the movement of people and wildlife, and therefore often evaluated as part of exploration of green connections, such as trails, for the community.

Park Creek thorough Kohler Park is lined by woodlands that help filter stormwater runoff and stabilize the streambanks.

Map 18. Existing Tree Canopy and Riparian Buffer Status



Source: Montgomery County Planning Commission; Heritage Conservancy (2012)

Water Resource Management

Watershed Protection

A "watershed" is defined as that area of land where water resources drain into a common water body, either overland or underground. Within each watershed, managing water resources helps to maintain healthy waterways by preserving the ecological health of an area and ensuring water supplies remain unpolluted. Horsham Township is located in three watersheds (see Map 19 on the following page).

Upper Neshaminy Creek Watershed

The western two-thirds of the township is located in the Upper Neshaminy Creek Watershed. The 2010 *Neshaminy Creek Watershed Stormwater Management Plan*[3] was developed to encourage comprehensive stormwater management planning throughout the watershed and to develop standards for municipalities to implement sound water and land use practices and ordinances.

Approximately 5% of the Neshaminy Creek Watershed is located within Horsham Township. As part of the planning process, Horsham indicated flooding issues within their portion of the Neshaminy Creek Watershed due to water obstruction (such as undersized bridges or culverts) which caused property damage.

[3] Neshaminy Creek Watershed Stormwater Management Plan, 2010. https://www.buckscounty.gov/DocumentCenter/View/1818/Neshaminy-Creek-Watershed-Plan-PDF

Pennypack Creek Watershed

The eastern one-third of the township is located in the Pennypack Creek Watershed. The 2011 *Pennypack Creek Watershed Act 167 Plan*[4] was drafted with the main objective of controlling stormwater runoff on a watershed-level basis, rather than on individual sites. Other goals of the plan include reducing erosion and sedimentation and protecting and conserving groundwater and groundwater recharge areas.

Approximately 10% of the Pennypack Creek watershed is located within Horsham Township, including the watershed's headwaters, which is the upstream-most section or origin of the watershed. The plan recognizes that the watershed is largely "built-out" and recommends focusing on retrofitting stormwater facilities and restoring riparian stream buffers in order to reach stormwater runoff volume reduction targets.

[4] Pennypack Creek Watershed Act 167 Plan. 2011. https://water.phila.gov/pool/files/Act167_mainreport_Revision-Dec2012.pdf

The Pennypack Ecological Restoration Trust (PERT) is a private, non-profit land conservancy that manages 852 acres in Montgomery County, most of which is downstream of Horsham's section of the Pennypack Creek.[5] One example of PERT's work in the region is Upper Moreland's Farmstead Park project which included wetland restoration, development of meadows and riparian forest buffers, and implementation of a green stormwater infrastructure improvement plan to enhance water quality.[6]

Wissahickon Creek Watershed

Small sections of the township along Welsh Road drain to the Wissahickon Creek. The 2014 *Wissahickon Creek Watershed Act 167 Plan*[7] focuses on controlling existing runoff and criteria for future development. As part of this plan, each

[5] Pennypack Ecological Restoration Trust. "History," https://pennypacktrust.org/about/history/

[6] The Reporter. "State gives grant for Farmstead Park restoration in Upper Moreland Township," https://www.thereporteronline.com/2021/12/14/state-gives-grant-for-farmstead-park-restoration-in-upper-moreland-township/

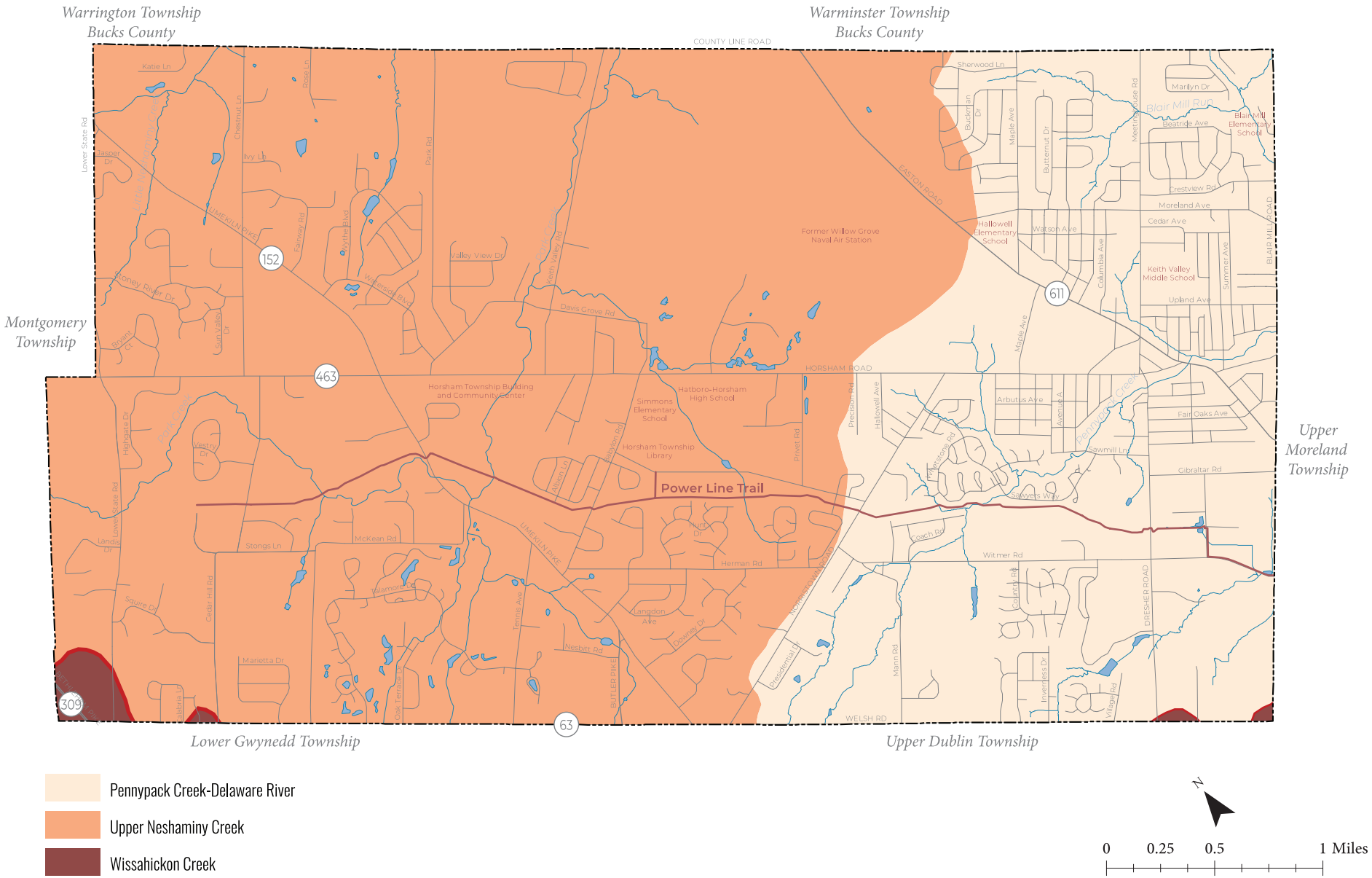
[7] Wissahickon Creek Watershed Act 167 Plan, 2014. http://archive.phillywatersheds.org/sites/default/files2/Introduction_Revised_Nov2014.pdf

College Settlement Wetland Project

In 2017, the College Settlement Wetland Project was completed, creating three stormwater basins at the College Settlement Camp. These naturalized stormwater basins contain a variety of local plant materials instead of the typical mown grass and function as wetlands, slowing and infiltrating runoff and filtering pollutants. Ultimately, the basins are designed to control and treat stormwater runoff from 40 acres of adjacent development prior to discharging at the headwaters of Pennypack Creek. The benefits of the project are reduced erosion, increased base flow downstream, and improved water quality, as well as an educational opportunity for College Settlement campers.

More information: Upstream Suburban Philadelphia Collaborative. "Celebrating Upstream Suburban Philadelphia," https://storymaps.arcgis.com/stories/22439ef193b24cdca5d7280a176b0f45

Map 19. Watersheds



municipality was surveyed regarding problem areas and Horsham Township identified flooding as a problem area.

Stormwater Management

Areas with high percentages of impervious coverage (such as parking lots and building roofs), can experience greater volumes of runoff during and after storm events, which can also result in greater erosion and sedimentation issues downstream. Most rainfall that falls on impervious surfaces, such as parking lots, ends up contributing to stormwater runoff, rather than infiltrating back into the ground slowly. Map 20 on the following page shows areas of existing impervious coverage within the township, including roads, parking lots, and rooftops. Golf courses, farms, cemeteries, parks, and low-density residential areas tend to have less impervious cover, while office and industrial campuses with large building roofs and surface parking lots have greater amounts of impervious cover.

Because the township's stormwater runoff drains into local streams, the township is required to maintain a Municipal Separate Storm Sewer System (MS4) permit from the Pennsylvania Department of Environmental Protection (DEP) who administers the program as part of the requirements of the Federal Clean Water Act. Every five years, DEP evaluates the MS4 program and makes adjustments as needed. One recent change requires that municipalities prepare a Pollution Reduction Plan (PRP)[8] for impaired streams, and a TMDL plan for streams with a designated Total Maximum Daily Load (TMDL).[9]

According to DEP's Municipal MS4 Requirements Table,[10] five creeks in the township (Wissahickon Creek, Little Neshaminy Creek, Park Creek, Pennypack Creek, and Trewellyn Creek), as well as Warrington Lake, are impaired for either nutrients, pathogens, PCB, or siltation. As part of the MS4 program, the township needs to prepare and implement a PRP for these five creeks. TMDL plans for siltation have already been completed for the Wissahickon Creek and Neshaminy Creek.

Sustainable Green Parking Lots

Providing adequate parking is an essential component of economic growth and business success in every community. However, it is also important to recognize the significant impact that large paved surfaces, such as parking lots, can have on a community's appearance and the environment. By using innovative stormwater management practices, landscaping design, and sustainable paving materials, green parking lots can help mitigate the adverse environmental impacts of large expanses of paving and improve aesthetics. Green parking lots can also incorporate sustainable practices such as energy-efficient lighting and pedestrian circulation.

The Montgomery County Planning Commission guidebook "Sustainable Green Parking Lots" provides design guidance and sample ordinance language to help communities create "greener" parking lots.

More information: https://www.montgomerycountypa.gov/DocumentCenter/View/9735/Green-Sustainable-Parking-Guide-2_10_2016-Web

Parking lots should be designed to maximize landscaped areas while helping to manage stormwater, like the one shown here at the Horsham Gate Shopping Center.

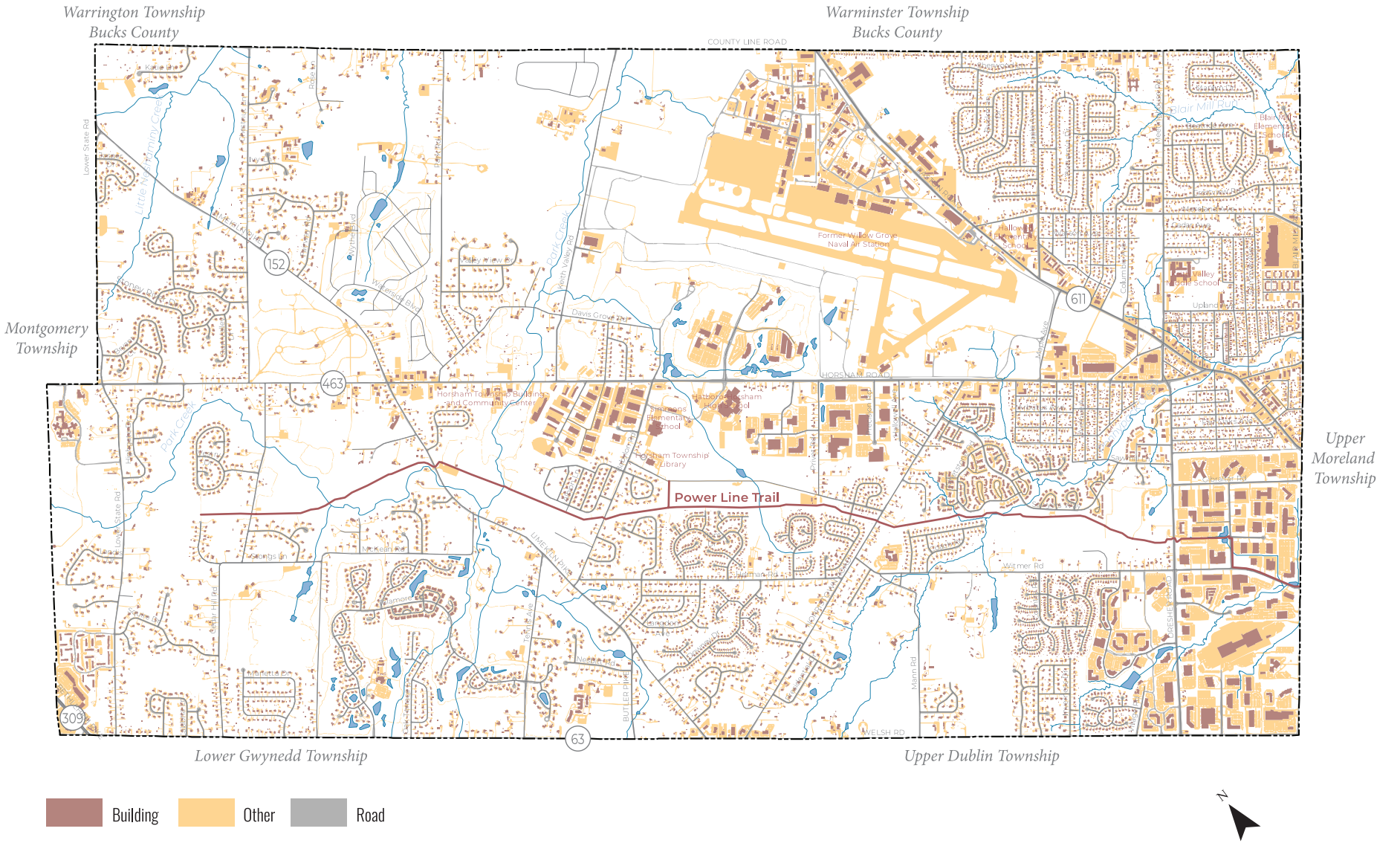
Parking lots can also be designed to incorporate other sustainable elements such as the solar-powered parking lots lights at the Montgomery Township Community Center.

[8] Gilmore & Associates, Inc. "Total Maximum Daily Load (TMDL) & Pollutant Reduction Plan (PRP)," Revised December 2020.

[9] A TMDL is the total maximum amount of a pollutant that can be present in a water body before it is considered impaired. This is determined by the EPA and it establishes the necessary reduction of one or more pollutants in order for that stream to meet water quality standards.

[10] Pennsylvania Department of Environmental Protection. Municipal MS4 Requirements Table. Updated 11/18/19.

Map 20. Existing Impervious Surface



Wetlands

Wetlands are defined as areas of land that are either permanently or seasonally saturated with water. Wetlands provide valuable ecological benefits including riparian habitat, flood and erosion control, groundwater recharge, and filtration of pollutants and sediment from runoff. In addition, certain aquatic and amphibious animals, and different species of grasses, sedges, and wildflowers are part of the unique wetland ecosystem.

Map 21 on the following page shows the locations of wetlands in Horsham Township, according to the National Wetlands Inventory. Wetlands are located along the township's many stream corridors and drainageways, especially along the Park Creek.

Floodplain Protection

Map 21 on the following page also shows both the 100-year floodplain (that area of land with a 1% chance of being flooded in any given year) and the 500-year floodplain (that area of land with a 0.2% chance of being flooded in any given year), based on the 2015 Federal Emergency Management Agency (FEMA) flood insurance rate maps.

Horsham's largest floodplains are located along the Park Creek corridor in the central portion of the township. Other areas of 100-year and 500-year floodplain are located along the many stream corridors throughout the township. According to the "Montgomery County 2022 Hazard Mitigation Plan," flooding of Park Creek has caused property damage and road flooding, especially along McKean Road, Keith Valley Road, and Davis Grove Road. The township has worked to establish a substantial vegetative riparian buffer along Park Creek through township-owned open space which has lessened the impact of flooding on the parks. In addition, repetitive flood damage was noted to take place along the Pennypack Creek in the vicinity of Olive Avenue, Summer Avenue, Blair Mill Road, and Colonial Drive.[11]

Heat Island Effect

According to the U.S. Environmental Protection Agency, "Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water pollution."[12]

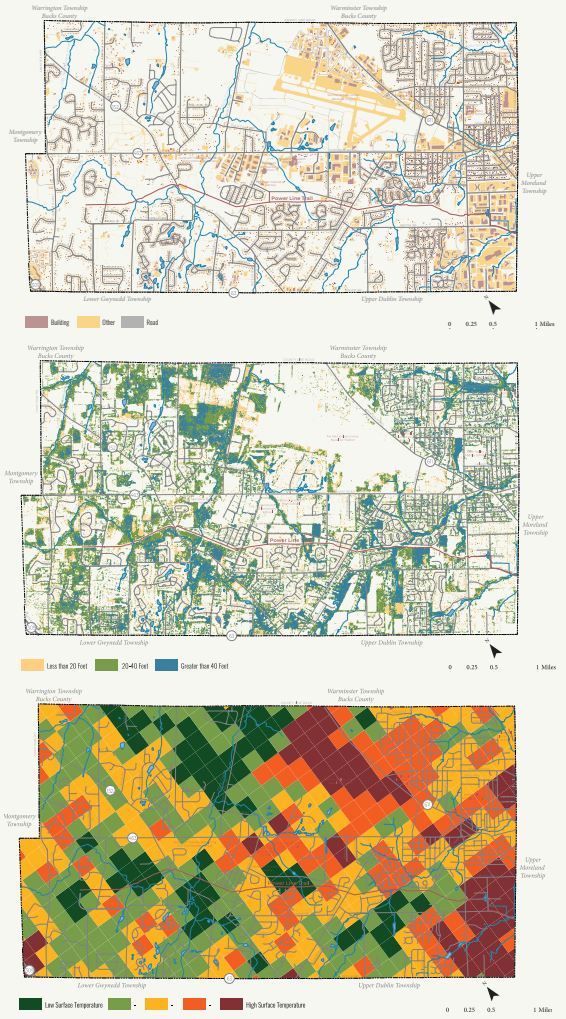
The heat island effect map in the callout box to the right shows the relative difference in the average surface temperature in different parts of the township. Those areas of the township that are more heavily developed with greater concentrations of impervious coverage are noticeably warmer than areas of the township where there is more tree canopy and less impervious coverage.

[11] "Montgomery County 2022 Hazard Mitigation Plan." Montgomery County Planning Commission. https://www.montgomerycountypa.gov/DocumentCenter/View/39270/Hazard-Mitigation-Plan

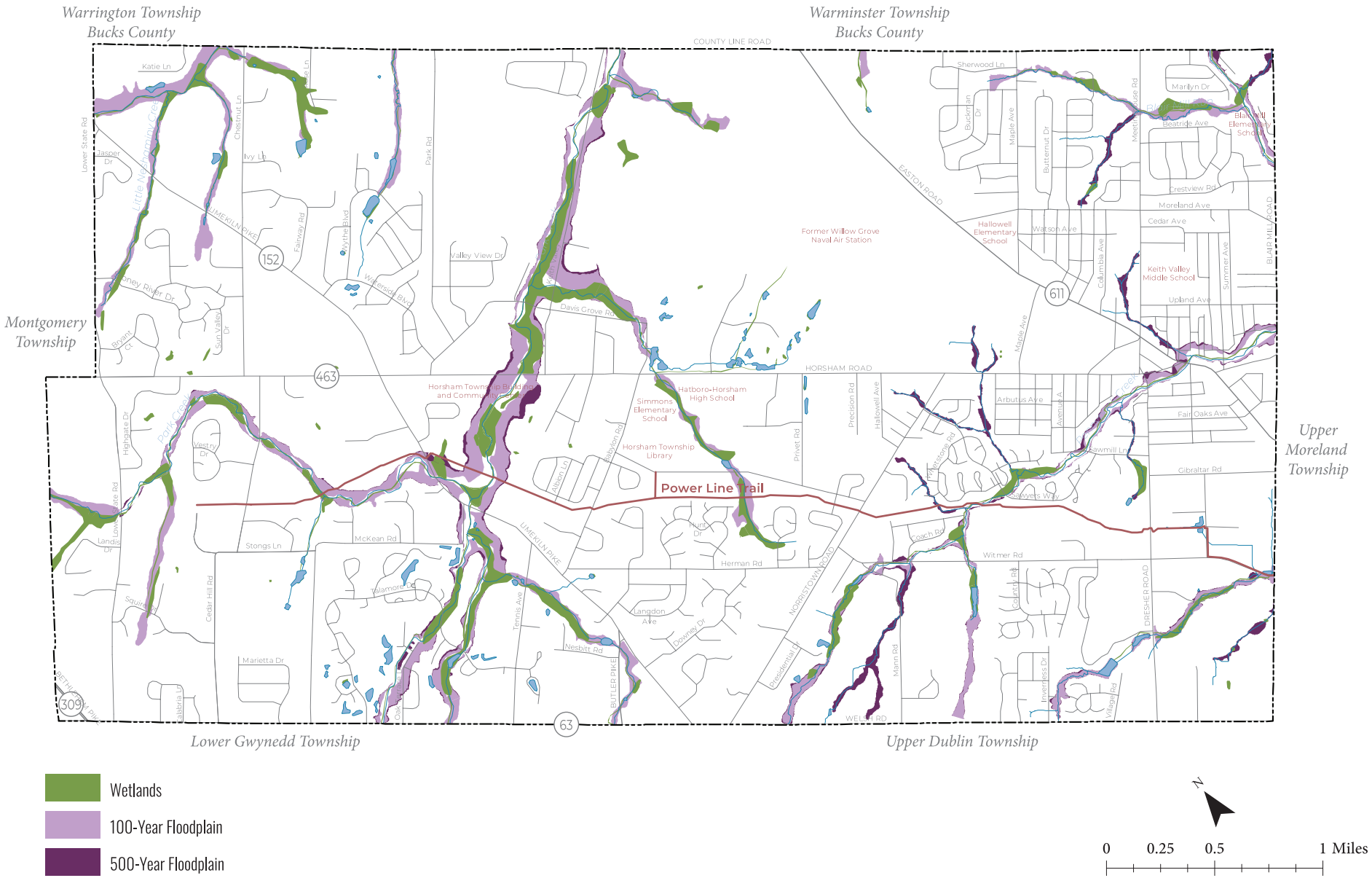
[12] United States Environmental Protection Agency. https://www.epa.gov/heatislands

Heat Island Effect

This series of maps helps illustrate the importance of maintaining established tree cover and requiring new canopy trees to be planted along roadways and in large surface parking lots. Township parks and open spaces are also important opportunity areas for additional tree planting.



Map 21. Floodplains and Wetlands



Source: National Wetlands Inventory; Federal Emergency Management Agency (FEMA)

Naturalized Stormwater Basins

Standard stormwater retention basins typically consist of mown grass that over time have reduced natural infiltration capacity. On the other hand, naturalized stormwater basins are typically planted with a variety of plant materials, such as warm-season grasses, native trees, shrubs, and wildflowers. This additional landscaping stabilizes the slopes of the basin and increases the infiltration capacity and environmental benefits of the basins such as filtering out pollutants found in runoff. Standard stormwater retention basins do not provide the additional water quality and habitat benefits of naturalized basins and are typically not as visually appealing as basins with more extensive landscaping and a more naturalized appearance. When designed properly, naturalized stormwater basins can require less maintenance, such as mowing, than standard basins.

The stated purpose of the township's PRP is to reduce 10% of sediment and 5% of nutrient loads to waters impaired by such pollutants. Naturalizing existing stormwater basins is part of the township's strategy to achieve those goals.

Naturalized stormwater basins, such as this one in Cedar Hill Road Park, are designed to provide greater water quality and habitat benefits relative to standard detention basins.

The Witmer Road basin was naturalized in 2023.

The Forrester Road basin is in the process of being naturalized in 2024.

The Whetstone Road basin is scheduled to be naturalized in 2024.

Current Natural Resource Protection Regulatory Controls

The township has several established land development ordinances that require or incentivize natural resource protection with certain land developments:

Environmental Resource Protection Zoning Requirements

Section 230-49 of the township's zoning ordinance was adopted in 1998 "in order to implement the objectives of the Horsham Township Comprehensive Plan and the Horsham Township Open Space Plan" by recognizing that many of the township's undeveloped parcels contain significant amounts of environmentally sensitive resources (e.g., floodplains, steep slopes, wetlands, streams, and woodlands).

This section requires the majority of a development's tract area containing these environmentally sensitive resources to be protected, the protected areas are then subtracted from the tract area before determining the density or development potential on the tract. A site's total protected area is determined by calculating the land area containing each environmental resource and then multiplying by the corresponding open space ratio.

Riparian Corridor Conservation District

Section 230-49.E. of the township's zoning ordinance establishes a Riparian Corridor Conservation District (RCCD) that applies to the stream valley network identified in the Horsham Township Open Space Plan of 1995. Excess

Historic Keith Valley Road bridge over Park Creek.

removal or disturbance of vegetation is prohibited with the RCCD (defined as the area within 75 feet of the edge of a surface water body, or the extent of the 100-year floodplain, whichever is greater), as well as the construction of roads, parking lots, or any type of permanent structure.

Montgomery County Hazard Mitigation Plan

The Stafford Act, (P.L. 106-390, the Disaster Mitigation Act of 2000) requires state and local governments to develop and adopt a mitigation plan as a condition for receiving certain federal disaster grants and loans. The 2022 Montgomery County, Pennsylvania Hazard Mitigation Plan provides the county (and each of the municipalities in the county that adopt it) with a strategy for mitigation of natural, human, and technological disasters.

More information: https://www.montgomerycountypa.gov/DocumentCenter/View/39270/Hazard-Mitigation-Plan

Tree Protection

Section 198-39.D.(8) of the township's subdivision and land development ordinance governs the replacement of existing trees that are removed as part of a subdivision or land development. If more than 20% of the existing trees that have a diameter of 6" or greater are removed, any additional trees removed must be replaced on a sliding scale based on the size of the existing tree being removed (e.g., if a 42" tree is removed, it must be replaced with 6, 3" trees).

Floodplain Conservation District

Chapter 115 Floodplain Management of the Township Code was adopted in 2016 in part to protect floodplain areas that help contain floodwaters to reduce the impact of downstream flooding during storm events. The ordinance establishes restrictions on development within the 100-year floodplain, as delineated on the most recent Flood Insurance Rate Maps (FIRM) maintained by FEMA, as well as in areas with certain soils that are more prone to flooding.

Infrastructure & Energy

Water Infrastructure

With the exception of a few dozen individual properties along the borders of the township, Horsham Township's public water is supplied by the Horsham Water & Sewer Authority (HWSA). In addition, about 3% of the township has individual on-lot wells for water supply. It is estimated that 270 properties contain private wells, and may eventually require public water

Green Stormwater Management Strategy Examples

Landscaped cul-de-sac islands, such as this one in the Talamore at Oak Terrace subdivision, can help mitigate the effects of adding the impervious surfaces associated with development, while also improving the aesthetics of a neighborhood.

The parking lot islands at the Horsham Gate Shopping Center incorporate attractively landscaped biofiltration basins to capture and infiltrate stormwater runoff from the adjacent parking lot.

Rain barrels allow rain water from a building's roof to be collected on-site and slowly discharged after the rain storm to reduce the peak flow of stormwater in nearby streams that can occur during a storm."

State Water Plan

The Pennsylvania Department of Environmental Protection is charged with maintaining a State Water Plan which studies the water resources supply within the Commonwealth and plans for the projected water needs of the population.

The State Water Plan outlines the regional priorities for the Delaware River drainage basin as: (1) Strengthen the link between land use and water resources management; and (2) Regional planning and land use coordination and collaboration, such as conducting integrated water resource planning on a holistic watershed-wide basis.

More information: https://www.dep.pa.gov/Business/Water/PlanningConservation/StateWaterPlan/Pages/default.aspx

service.[13] Within the township, public water is supplied by 14 groundwater wells with additional water supplies available through interconnections with Aqua Hatboro, Aqua PA Main Division, and North Wales Water Authority to supplement the water supply, as needed. Water is stored in five storage tanks with a total capacity of 4.25 million gallons. The water stored in the storage tanks also provides the township with pressure equalization, fire reserve, and emergency standby storage.[14]

Groundwater is treated at each well before being sent to the storage tanks. This treatment process includes gaseous chlorine disinfection at all wells, supplemental aeration to remove volatile organics at five wells, and iron sequestration at one well. Since July 2014 HWSA has implemented additional treatment processes to address the presence of perfluoroalkyl and polyfluoroalkyl substances (referred to collectively as PFAS) in the groundwater. The presence of PFAS in the groundwater has been linked to historical activity at the region's military facilities. HWSA has closely monitored health advisories from the EPA and taken actions by shutting down wells and temporarily purchasing additional water supplies from other sources while PFAS removal filter systems are in the process of being added to or have already been added to all of the wells within the township.

The capital costs of infrastructure improvements to install PFAS removal systems on the HWSA wells was largely covered by a $10 million PennVest grant from the Commonwealth of Pennsylvania, as well as grants from the Navy and the National Guard Bureau. However, a PFAS surcharge was instituted in September 2016 to cover operational costs and the cost of purchasing water from outside sources. The surcharge was subsequently suspended in October 2019 with the announcement of additional state funding and was reimbursed in late 2020 using grant funds from the Military Installation Remediation and Infrastructure Authority (MIRIA).[15] [16]

[13] Gilmore & Associates, Inc. "Capacity Analysis and Needs Evaluation." June 2023

[14] Horsham Water & Sewer Authority. https://www.horshamwater-sewer.com/

[15] Horsham Water & Sewer Authority. https://www.horshamwater-sewer.com/

[16] Military Installation Remediation and Infrastructure Authority. https://www.themiria.org/news

Wellhead Protection Committee

The Horsham Water & Sewer Authority Wellhead Protection Committee meets annually to discuss ongoing efforts to protect groundwater and drinking water supplies from source contamination. The committee is responsible for creating and executing strategies to ensure the objectives of the Wellhead Protection Plan are achieved. A wellhead protection area is the area surrounding a groundwater extraction well where land activities have the potential to affect the quality of groundwater that feeds the drinking water supply.

Sewer Infrastructure

The Horsham Water & Sewer Authority (HWSA) also manages the conveyance and treatment of sewage within the township. The township's sewer plan divides the township into five

Southeastern Pennsylvania Groundwater Protected Area

Horsham is part of the Southeastern Pennsylvania Groundwater Protected Area which was established in 1980, in part to help prevent long-term depletion of groundwater and protect stream flows during periods of drought. Within this area, the amount of groundwater that can be withdrawn is more closely regulated than in other areas of the Delaware River Basin.

More information: "Southeastern Pa. Groundwater Protected Area (SEPA-GWPA)." Delaware River Basin Commission. https://www.nj.gov/drbc/programs/project/gwpa.html

drainage areas, largely following the natural slope and drainage patterns of the township.

Upper Moreland-Hatboro Joint Sewer Authority

For the most part, sewage from the eastern and southern parts of the township, which naturally drain to the east towards Pennypack Creek, is conveyed to and treated at the Upper Moreland-Hatboro Joint Sewer Authority (UMHJSA) Sewage Treatment Plant. The sewer collection and conveyance system in this area of the township dates back to 1964.

HWSA owns just under 30% of the treatment average daily capacity at the UMHJSA plant (or approximately 2.15 million gallons per day (MGD)). In 2019, HWSA began a project to construct a new pump station and transfer approximately 200,000 gallons per day (GPD) (0.2 MGD) of sewage flow from this drainage area to the Park Creek Sewage Treatment Plant (PCSTP) in order to free up treatment capacity at the UMHJSA plant to accommodate future growth in the eastern portion of the township.

The HWSA's Park Creek Sewage Treatment Plant is located off of Keith Valley Road.

HWSA completed a "Capacity Analysis and Needs Evaluation" in 2023 which evaluated available data and projected development and determined that the projected 5-year flow is 2.216 MGD, which exceeds the HWSA allocated capacity by 66,000 GPD (0.066 MGD). The projected flow in 10 years is 2.358 MGD, which exceeds the HWSA allocation by 208,000 GPD (0.208 MGD).[17]

Park Creek Sewage Treatment Plant

Public wastewater from the remaining central and western parts of the township, that naturally drains to the north towards Neshaminy Creek, is conveyed to and treated at the Park Creek Sewage Treatment Plant (PCSTP) on Keith Valley Road, which was constructed between 1987 and 1991 with an original capacity of 0.5 MGD. The PCSTP's most recent expansion took into account known land developments, zoning projections, redevelopment scenarios for the NASJRB, phase out of the English Village Apartments plant,[18] and the above-mentioned transfer of flows from the eastern drainage area. The most recent plant expansion was designed so that individual treatment units could be held "in-reserve" and will be activated as demand for additional sewage treatment capacity increases, up to 2.25 MGD.

[17] Gilmore & Associates, Inc. "Capacity Analysis and Needs Evaluation." June 2023

[18] The English Village Apartments were previously served by a privately-owned sewage treatment plant, but as of May 2019 are connected to the HWSA system so that their wastewater is treated at the Park Creek Sewage Treatment Plant. In 2006, the English Village Apartments had pre-purchased wastewater treatment capacity at PCSTP in order to accommodate this future connection. Horsham Water & Sewer Authority. https://www.horshamwater-sewer.com/

Sewage Treatment Plant Capacity

Each wastewater treatment plant, as well as the conveyance system to and from that plant, is monitored by DEP and is allocated a certain sewage treatment capacity. This capacity is measured in terms of a number of EDUs (equivalent dwelling units). Each sewer authority allocates sewage flow based on an Act 537 Sewage Facilities Plan.

According to the 2015 Sewage Treatment Facilities Status Report, the Park Creek Sewage Treatment Plant currently has excess treatment capacity; however, the Upper Moreland-Hatboro Joint Authority Sewage Treatment Plant does not have excess treatment capacity with no upgrade plans at the time of the publication.

More information: "Sewage Treatment Facilities in Montgomery county, PA: 2015 Status Report," (2018). Montgomery County Planning Commission. https://www.montgomerycountypa.gov/DocumentCenter/View/4343/2015-Sewage-Treatment-Facilities-Update

The PCSTP's recent expansion also incorporated several improvements to the treatment process including an enhanced biological nutrient removal treatment system using an activated sludge process and additional phosphorous removal through tertiary coagulation/flocculation and microfiltration. The effluent is then disinfected using an upgraded UV disinfection system before it is ultimately discharged into Park Creek.[19]

[19] Horsham Water & Sewer Authority. https://www.horshamwater-sewer.com/

Per- and Polyfluoroalkyl Substances (PFAS)

In 2014, testing conducted by the Environmental Protection Agency (EPA) revealed groundwater resources near the Willow Grove Naval Air Station (WGNAS) was contaminated with perfluoroalkyl and polyfluoroalkyl substances (collectively called PFAS), in part due to chemicals in firefighting foam used by the military at the base. Additional sampling discovered PFAS in many private wells surrounding the WGNAS at levels in excess of the EPA's Provisional Health Advisories. PFAS do not degrade in the environment, and have been linked to various medical conditions and cancers in humans and animals, including kidney and testicular cancer, thyroid disease, and effects on the immune system, among others. The EPA released a PFAS Action Plan in 2019 to help communities monitor and clean up groundwater for consumption and use.

In 2019, the Pennsylvania State Legislature created the Military Installation Remediation Program (MIRP), a tax incremental financing program to fund the improvement and development of designated parcels in a municipality with a former military installation, including costs associated with remediating PFAS contamination.

More information: "EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan," 2019. https://www.epa.gov/sites/default/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf

Military Installation Remediation Program

The Military Installation Remediation Program, which was established by Act 101 of 2019, is a tax incremental financing program managed by the Pennsylvania Department of Revenue and applied to certain parcels within a municipality with a former military installation. The funds collected are transferred to the Military Installation Remediation and Infrastructure Authority and can be used to defray the cost of remediation efforts related to PFAS contamination in local water supplies, fund connecting residents with contaminated private water wells, as well as fund economic development and infrastructure investments.

More information: MIRIA https://www.themiria.org/ and Military Installation Remediation Program https://www.revenue.pa.gov/IncentivesCreditsPrograms/MIRP/Pages/default.aspx

The 2023 "Capacity Analysis and Needs Evaluation" found that the projected 5-year flow for this area of the township is 1.503 MGD. The 10 year projected flow is 2.348 MGD, which exceeds the permitted capacity of the plant by 98,000 GPD (0.098 MGD). Ultimate projected flow is 2.623 MGD, which exceeds the permitted capacity by 373,000 GPD (0.373 MGD).[20]

These sewer need projections include the current sewer needs of the Biddle Air National Guard Base, as well as the redevelopment of the former Willow Grove Naval Air Station in the 10 year projected flow calculations; however, the actual timing and land use distribution of the redevelopment of the former WGNAS is still uncertain.

Capacity Analysis and Needs Evaluation

The Horsham Water and Sewer Authority (HWSA) completed a capacity analysis and needs evaluation in June of 2023.

The evaluation anticipates that the HWSA has at least five years before a small deficit in sewer capacity in the eastern portion of the township could exist (see Sewer Infrastructure discussion above), and recommends analyzing flow data quarterly.

The report also recognizes that additional water capacity will be needed to ensure an adequate supply of water is available to meet the long-term needs of the township, especially considering the extent of the PFAS contamination. Some of the recommendations include replacing and treating low-functioning wells, establishing easements for system expansion, and ultimately purchasing additional water supply.

[20] Gilmore & Associates, Inc. "Capacity Analysis and Needs Evaluation." 2023

Energy Infrastructure

Residents and businesses in Horsham Township can choose to purchase electricity from a number of different companies, including renewable energy sources. However, the electric transmission system that carries the electricity in the region is owned and maintained by PECO. The Limerick Nuclear Power Station produces 40% of the electricity used in the region. Gas supplies are obtained from interstate gas transmission companies.

Buildings are a major source of energy demand for heating, cooling, lighting, and ventilation. Designing and constructing buildings and building renovations with green building practices in mind can help reduce a building's energy use. Finding ways to increase the use of renewable energy is one way to help reduce the environmental impact of generating, transmitting, and using energy.

Sustainable Building Design

There are several different sets of criteria and certification programs for sustainable building design and development. For example, LEED (Leadership in Energy and Environmental Design) criteria, established by the US Green Building Council, focuses on reduction and efficiency of energy and water use within the building. Evaluating how LEED principles can apply to any construction project can be beneficial, even without formal certification.

Renewable energy refers to energy that can be harnessed from natural processes which help reduce reliance on fossil fuels and nuclear power for the region's energy needs. Interest in constructing facilities to generate renewable energy on individual properties, such as solar panels and geothermal wells, may increase as the cost of energy rises, or in response to concerns regarding the environmental impact of non-renewable sources of energy. Each municipalities should have clear regulations to encourage and accommodate the appropriate and safe installation of renewable energy infrastructure.

Natural Gas Pipeline

A natural gas pipeline crosses through Horsham Township, representing approximately 3.5 miles of the roughly 3 million miles of pipeline in the United States measured in 2021. Transporting natural gas involves a complex network of pipelines to move the raw natural gas from wellheads to processing plants, and then to local distribution companies to deliver the gas to individual consumers.

The specific pipeline that runs through Horsham Township is an interstate transmission pipeline, the Transcontinental Pipeline (Transco), owned by the Williams Companies. It runs from the origin points on the Gulf Coast up through Montgomery County to New Jersey and New York. It crosses several streams and wetland areas in the township. The Transco Pipeline system contains approximately 10,000 miles of pipelines and transports nearly 15% of the nation's natural gas.[21]

For safety purposes, these pipelines are designed to handle a much higher pressure than what is reached. The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration considers Horsham Township

[21] Gilmore & Associates, Inc. "Capacity Analysis and Needs Evaluation." June 2023

Natural meadow areas provide benefits in terms of habitat creation and stormwater management and require less mowing and other maintenance than traditional lawn areas.

Renewable Energy Ordinances

Renewable energy ordinance frameworks have been prepared by DVRPC's Alternative Energy Ordinance Working Group that can be used as a resource for the township as they evaluate ordinance language relating to the construction and operation of small renewable energy installations consistent with state laws while promoting sound community development.

DVRPC Renewable Energy Ordinance Frameworks:
http://www.dvrpc.org/EnergyClimate/AEOWG/

In addition, the Montgomery County Public Health Code (Chapter 17: Individual Water Supply, Irrigation Well, and Geothermal Well System Regulations) contains regulations relevant to geothermal well installation and operation.

Montgomery County Health Department, Geothermal Well Regulations: https://www.montgomerycountypa.gov/533/Individual-Water-Supply-Well-Permitting

a "highly populated area." Pipelines in "highly populated areas" typically operate at less than one-half of their design pressure level. Multiple federal and state agencies and commissions are involved in permitting and overseeing siting, construction, operation and maintenance of pipeline infrastructure in order to protect the environment and the communities affected by the infrastructure.[22]

[22] Gilmore & Associates, Inc. "Capacity Analysis and Needs Evaluation." June 2023

Vehicle Emissions

According to DVRPC, a quarter of the Greater Philadelphia region's greenhouse gas emissions come from on-road transportation.[23] In addition to lifestyle changes that reduce vehicle miles traveled and fuel efficiency changes, electric vehicles are another way to reduce greenhouse gas emissions from transportation.

Battery-operated electric vehicles are increasingly becoming a popular vehicle choice due to lower maintenance and fuel costs and reduced greenhouse gas emissions. Individuals with electric vehicles can charge their vehicle's battery by plugging it into the electric grid. Although most individuals with electric vehicles install chargers at their homes, also being able to charge your vehicle at your place of employment or while you are running errands is helpful. Therefore, incorporating EV charging infrastructure into all new development is important.

Waste Reduction

Trash and Recycling

Within the township, individual residents and businesses contract with a private company to pick-up their trash and recycling. There are four private trash haulers with permits for those services, and an additional two that have permits for commercial pickup only. The township requires through its Solid Waste Ordinance (Chapter 185 of the Township Code) that each

[23] Delaware Valley Regional Planning Commission. "Ready to Roll? Overview of Challenges and Opportunities for Alternative Fuel Vehicles in the Delaware Valley." https://www.dvrpc.org/Reports/10055A.pdf

Common Renewable Energy Types

Example of solar photovoltaic (PV) panels installed on a single-family residential home in Horsham Township.

Example of small-scale vertical axis wind turbines installed in the parking lot of the Montgomery County Community College campus in Pottstown Borough.

Example of an underground geothermal energy system being installed on a church property in Bryn Athyn Borough.

trash hauler provides for at least one collection each of spring yard waste, fall leaves, and holiday trees. The township also offers leaf and branch disposal drop-off at the public works facility once a month.

The total amount of residential and commercial recyclables collected from 2018 to 2022 is shown in Table 21 on the following page. The township's estimated total recycling rate, or that percentage of the total solid waste generated in the township (by weight)[24] that is recycled or composted, decreased by 3% from 2018 to 2022, a trend which is in line with the county-wide recycling rate over the same time period.

One potential data collection issue that may affect the recycling rate estimate is that "Horsham Drop-off" is the only reported hauler of yard and leaf waste listed in the recycling data for residential users, despite the requirement for trash haulers to collect yard waste. This could create a lower township-wide recycling rate if yard and leaf waste collected by private haulers is not comprehensively reported.

[24] The Estimated Total Recycling Rate uses an estimate for the township's generated solid waste, determined by dividing the total county solid waste amount by the percent of county residents within Horsham Township.

Table 21. Residential and Commercial Recyclables Collected Annually: 2018-2022

	2018	2019	2020	2021	2022
Residential Recyclables Collected (Tons)	3,649	2,891	2,592	2,749	3,406
Commercial Recyclables Collected (Tons)	3,696	2,931	2,990	3,338	2,652
Electronics & Appliances Collected (Tons)	6	8	5	14	5
Food Waste Collected (Tons)	113	131	125	104	305
Yard & Leaf Waste Collected (Tons)	101	105	256	198	34
All Other Recyclables Collected (Tons)	23	7	62	71	-
Combined Recyclables Collected (Tons)	7,588	6,073	6,030	6,474	6,401
Estimated Township Total Recycling Rate	32%	26%	26%	29%	29%
County-wide Recycling Rate	37%	34%	32%	33%	33%

Source: Township Annual Recycling Reports

Yard Debris and Composting

In general, food waste accounts for up to 40% of solid waste by weight. By encouraging households and institutions to compost their kitchen scraps, the total weight of solid waste generated can be greatly reduced. Reducing the amount of food waste in a community's trash can also reduce the unpleasant odors associated with trash collection and improve the township's overall recycling rates.

Many of the township's residential lots are large enough to accommodate on-site composting of food waste and smaller yard debris, such as leaves. Offering educational programs and low-cost compost bins to residents could help increase the practice of residential composting.

Recycling Grant Programs

The Act 101 Recycling Performance Grant Program provides grants to municipalities that offer recycling programs. Grant amounts are based on the weight of approved recyclable materials collected annually, as well as the municipality's population. Both residential and commercial recyclables can count towards the municipality's grant amount. Therefore, detailed and accurate reporting of recyclables collected by all haulers that operate within the township is important.

The Pennsylvania DEP also offers Recycling Program Development and Implementation Grants that reimburse counties and municipalities 90% of eligible recycling program development and implementation expenses, such as educational programs, curbside recycling bins, and leaf waste processing programs.

Residential Composting Guidelines

The Montgomery County Planning Commission publication "Suburban Homestead: A Primer on Best Practices and Management" provides guidance and resources for residential agriculture practices, including backyard composting.

More information: https://www.montgomerycountypa.gov/DocumentCenter/View/21788/Suburban-Homestead_web

Recommendations

Recommendation 15:

Preserve and enhance the township's natural resources, including streams, floodplains, riparian corridors, and wooded areas.

Implementation Strategies:

A. Complete a natural resource inventory, either prior to or as part of a township-wide parks, recreation and open space plan. *See the Parks & Recreation chapter for more information.*
B. Perform an audit of the township's zoning, subdivision and land development, and stormwater management ordinances to identify ordinance amendments which could encourage more sustainable development practices.
C. Plant additional trees on township-owned properties, such as within parks and along streams. For example, vegetation and trees along streambanks can help reduce erosion and siltation.
D. Maintain an updated floodplain ordinance to comply with any changes in federal floodplain regulations and/or mapping.
E. Partner closely with the Pennypack Ecological Restoration Trust and adjacent municipalities to identify and implement conservation efforts related to the Pennypack Creek watershed.
F. Work to implement the adopted TMDL plans to address siltation in those portions of the township located in the Neshaminy and Wissahickon watersheds.
G. Prepare and implement pollution reduction plans for the five creeks in the township: Wissahickon Creek, Little Neshaminy Creek, Park Creek, Pennypack Creek, and Trewellyn Creek.
H. Monitor the progress of the Wissahickon Creek Water Quality Improvement Plan and consider implementing recommended strategies, as appropriate.
I. Work with the township Environmental Advisory Board to pursue Tree City USA designation.

Recommendation 16:

Encourage stormwater best management practices and water recycling as part of the township's MS4 permit requirements.

Implementation Strategies:

A. Implement green stormwater management projects on township-owned properties.
B. Work with outside partners, such as the Hatboro-Horsham School District, large property owners, and homeowners associations to install green stormwater management projects on non-township-owned properties.
C. Provide for the ongoing inspection and ensure proper long-term maintenance of stormwater management facilities on both public and private lands.
D. Educate homeowners on ways they can naturally control stormwater runoff on their individual properties.
E. Adopt green parking standards to encourage additional landscaping and naturalized stormwater management techniques within new parking lots.
F. Participate in a free or discounted rain barrel program, such as through an advance group sales program. Explore ways to promote other water conservation practices.
G. Consider establishing a street sweeping program during the fall to remove leaves from storm drains along township-owned roads.

Recommendation 17:

Encourage the increased use of renewable energy and energy efficiency technologies.

Implementation Strategies:

A. Adopt a renewable energy ordinance to ensure the proper installation and use of renewable energy facilities.
B. Create standards for electric car charging stations. Consider requiring installation of charging stations with certain types or scales of development.
C. Provide information to residents and commercial property owners regarding renewable energy and energy reduction opportunities.
D. Consider incorporating incentives and standards for sustainable building and site design into the zoning and subdivision and land development ordinances.
E. Complete a municipal energy management study to identify opportunities to improve

energy efficiency within municipal operations, such as renewable energy production.

Recommendation 18:

Continue to provide for the long-term maintenance and planning of integral infrastructure systems.

Implementation Strategies:

A. Continue to maintain an up-to-date sewage facilities plan (Act 537 Plan) that reflects any zoning and/or land use changes that could impact the projected sewage treatment demand within the township.
B. Continue to work with Horsham Water & Sewer Authority to monitor and address PFAS concerns in the local groundwater supply and ensure quality public water supplies for local residents and businesses.
C. Continue to work with Horsham Water & Sewer Authority to address illegal sump pump connections.
D. Continue to support the work of the Wellhead Protection Committee in implementing the Wellhead Protection Plan.

Recommendation 19:

Increase the township's recycling rate and reduce the township's overall production of solid waste.

Implementation Strategies:

A. Continue to pursue funding opportunities through the Pennsylvania Department of Environmental Protection to advance the township's recycling and waste reduction efforts.
B. Continue to partner with Montgomery County to encourage residents to participate in household hazardous waste and other special collection events that are offered annually across the Southeastern Pennsylvania area.
C. Periodically evaluate Chapter 185 (Solid Waste), and update as need to encourage increased recycling and decreased solid waste production, especially on non-residential properties.
D. Participate in a free or discounted compost bin program, such as through an advance group sales program.
E. Periodically evaluate opportunities to standardize trash pickup, either through township-provided services or negotiating a contract with a single-hauler. A survey that is sent to all township residents regarding trash collection options could be utilized to gather more specific feedback on this topic.
F. Periodically evaluate opportunities to offer additional yard waste drop-off locations.
G. Encourage more comprehensive reporting from private haulers on recycling and yard waste collected within the township.