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# TOWNSHIP OF LOWER MAKEFIELD COMPREHENSIVE MASTER PLAN UPDATE 2019

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August 2019



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# TOWNSHIP OF LOWER MAKEFIELD COMPREHENSIVE MASTER PLAN UPDATE 2019

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Adopted  
August 7, 2019

by the  
Board of Supervisors  
Township of Lower Makefield  
Bucks County, Pennsylvania

Township of Lower Makefield  
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**RESOLUTION NO. 2341**

**A RESOLUTION OF THE BOARD OF SUPERVISORS  
OF LOWER MAKEFIELD TOWNSHIP  
APPROVING AND ADOPTING THE TOWNSHIP OF LOWER MAKEFIELD  
COMPREHENSIVE MASTER PLAN UPDATE 2019**

**WHEREAS**, the Board of Supervisors of Lower Makefield Township adopted its first Comprehensive Master Plan in 1954; and

**WHEREAS**, in accordance with the provisions of the Municipalities Planning Code of the Commonwealth of Pennsylvania, the Township has periodically reexamined its planning program in light of changing conditions and has adopted revisions to its Comprehensive Master Plan, the last revision having been adopted in 2003; and

**WHEREAS**, the Township Planning Commission has prepared a Comprehensive Master Plain Update 2019, which it has recommended for approval by the Board of Supervisors; and

**WHEREAS**, pursuant to the authority contained in the Pennsylvania Municipalities Planning Code, the Board of Supervisors of Lower Makefield Township has determined to adopt a Township of Lower Makefield Comprehensive Plan Update 2019.

**NOW, THEREFORE**, be it resolved by the Board of Supervisors of Lower Makefield Township as follows:

1. The Township of Lower Makefield Comprehensive Master Plan Update 2019 is hereby approved and adopted, together with all revisions presented at the public hearing.
2. The aforesaid Comprehensive Master Plan Updated 2019, as adopted, shall include the maps, charts, textual and other matters listed on the attached Exhibit "A".

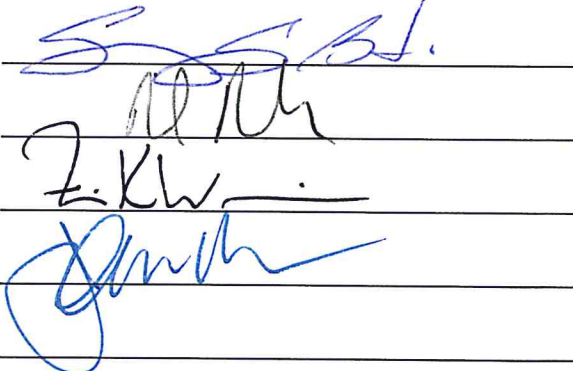
3. The adoption of this Resolution adopting and approving the Lower Makefield Comprehensive Master Plan Update 2019 shall be duly recorded on the adopted Plan.
  
4. All portions of any previously adopted Comprehensive Master Plan shall be repealed to the extent that they are inconsistent with the Township of Lower Makefield Comprehensive Master Plan Update 2019.

This Resolution was duly adopted by the Board of Supervisors at its meeting on the Day of \_\_\_\_\_, 2019.

LOWER MAKEFIELD TOWNSHIP  
BOARD OF SUPERVISORS

Attest/

  
Kurt M. Ferguson, Township Manager



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## TOWNSHIP OF LOWER MAKEFIELD

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2019





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## INTRODUCTION AND SUMMARY

### A COMPREHENSIVE MASTER PLAN FOR LOWER MAKEFIELD TOWNSHIP

Lower Makefield Township has taken positive steps to manage growth and guide its future for more than 75 years. In 1939, when its first zoning ordinance was adopted, Lower Makefield was one of the first communities in Pennsylvania to enact zoning rules. In 1954, the township adopted its first comprehensive plan. At the beginning of each decade since then, the township has re-examined its planning program in light of changing conditions and has adopted revisions to past plans.

The Pennsylvania Department of Community and Economic Development has described the comprehensive plan as: "...more than just a document disclosing past and present land use trends with a proposed course of action. It is a process of organizing for the future. It creates a blueprint for our land use patterns of tomorrow. This process results in a comprehensive plan that is not a legal document nor is it a land use ordinance. However, like a land use regulation, it can and should be adopted. It is an overall plan embracing general goals and objectives with which a governing body agrees, based on input from its constituents, to observe in making day-to-day decisions."<sup>1</sup>

By combining an understanding of past trends, the limitations imposed by the pattern of development that already exists, the potential for future growth in the township, and the community's vision for the future, a plan has been prepared which can be used to guide change in a positive way. The assets of the township can be protected; problems can be defined, and possible solutions identified.

### UPDATE OF THE 2003 COMPREHENSIVE MASTER PLAN

The last master plan was prepared in 2003 and continues to be a useful reference on township characteristics. Its description of the role of Lower Makefield in the region, the natural environment, and past population and development trends are as valuable today as they were 16 years ago.

An update of the 2003 plan was begun because the township had reached the time horizon envisioned by that plan, and because changing conditions, continued growth, and the approach of full development needed to be taken into account. Also, special studies undertaken by the township needed to be viewed comprehensively.

Within the last decade, the township has been a participant in the Delaware River Flood Task Force, has committed to achieving specific actions identified in the Bucks County Hazard Mitigation Plan and has adopted ordinances for low-impact design standards, stormwater management, pervious pavement, LEED (Leadership in Energy and Environmental Design) development, FEMA floodplain management, and landscaping with native plantings. An update to the township's open space plan, which provides recommendations about preservation and acquisition of land for open space purposes was adopted in 2009. Along with efforts to preserve ecologically sensitive lands and establish greenways, the township has continued to acquire farmland through its farmland preservation efforts.

The current plan has been expanded in several areas to reflect new areas of planning interest and expertise, and to emphasize sustainability, as the township approaches full development. In this update, the areas of expanded focus include planning to mitigate hazards and minimize injury and damage from

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<sup>1</sup> Pennsylvania Department of Community and Economic Development, The Comprehensive Plan in Pennsylvania, Planning Series #3, 2001, [http://www.newpa.com/webfm\\_send/1507](http://www.newpa.com/webfm_send/1507), accessed August 4, 2014.

natural disasters or other emergencies, as well as environmental initiatives, particularly management of stormwater, watersheds, and sewage, which necessarily entails not only local action, but also regional cooperation. All these changes and special efforts become important elements of a revised master plan.

## THE PLANNING PROCESS

The preparation of the master plan has been initiated and directed by the township’s planning commission, which guides plan preparation, and by the board of supervisors, which must adopt the final plan. At the outset of the process, various township boards and commissions were invited to participate in discussions with the planning commission to provide input on the plan update.

The township boards and commissions that serve as advisors to the board of supervisors have specific program ideas and goals that need to be considered in the long-term planning process. A list of discussion questions was developed to find out what issues should be addressed as the township moves into the next decade, what forces or factors are likely to affect the township in the future, and what aspects of the township should be protected and improved.

The discussion questions were distributed to the following groups:

Electronic Media Advisory Committee	Emergency Management Committee
Environmental Advisory Council	Economic Development Advisory Committee
Farmland Preservation Corporation	Veterans Committee
Historical Commission	Historical Architectural Review Board
Park and Recreation Board	Disabled Persons Advisory Board
Citizens Traffic Commission	Citizens’ Budget Commission

Discussions and feedback from various township boards and committees provided an opportunity for idea sharing that enhances the planning process. The findings were taken into account in preparing the plan.

## COMPONENTS OF THE PLAN

The plan covers a wide range of topics—from early township history to future facility needs. The Pennsylvania Municipalities Planning Code provides guidelines for the contents of the master plan. These suggested contents are modified by each community that undertakes the planning process so that plans are tailored to municipal needs.

The plan begins with an early history of the township, followed by a statement of community goals—a vision for the future. These are followed by plan components on the following topics:

- Natural environment and natural systems
- Current demographic and development patterns and trends
- Community facilities and services
- Parks and recreation
- Open space and conservation
- Energy conservation
- Historic resources
- Transportation planning
- Planning in surrounding municipalities

For each of the plan topics, current planning policies were examined, future needs were identified, and recommendations to address the future needs are provided.

The final section of the plan summarizes the key recommendations from each chapter, so that the topics are linked together into an integrated program of implementation actions.

## PLAN FINDINGS

Since the 2003 Master Plan Update, many changes have taken place. Even though population growth has leveled off, there has been continued land development activity within the township. To help understand the current situation, and possible directions for the future, some existing conditions and characteristics relative to the township have been examined. These findings include:

- *The township is past the major development phases of previous decades.*
  - Following significant population increases in each of the previous three decades (increases of 17.2 percent from 1970 to 1980; 44.6 percent from 1980 to 1990; and 30.3 percent from 1990 to 2000), the township's population declined by 0.4 percent from 2000 to 2010. However, that decline reversed between 2010 and 2017 when the population increased slightly by 0.2 percent. According to U.S. Census data, the township had fewer residents in 2017 (32,621) compared to 2000 (32,681).
  - After several decades of double-digit growth in the number of housing units in the township, housing growth slowed considerably, increasing by only 2.1 percent from 2000 to 2010, and by 2.5 percent from 2010 to 2017.
  - The township is nearly developed with little suitable land remaining for new larger-scale construction.
- *The township's population is aging.*
  - Between 2000 and 2017, the number of individuals between the ages of 55 and 64 increased by slightly greater than 6.5 percent, which is more than any other age set. Residents aged 55 years and older make up one-third of the township's population.
  - Middle-aged residents between the ages of 35 to 54 years, make up almost a third of the township's population. School-aged children, ages 5 to 17 years, represent almost a fifth of the township population.
- *The township has high levels of educational attainment and higher than average median household incomes.*
  - Lower Makefield has higher rates of postsecondary education attainment than any surrounding municipality. In 2017, slightly more than 67 percent of township residents had earned a bachelor's degree or higher, with 32 percent having earned a graduate degree or higher.

- In 2017, the township’s median household income was \$139,808. This is higher than that for the county, as well as all surrounding municipalities except for Upper Makefield. This figure suggests a strong correlation between township residents’ high education levels and types of employment.
- *The township has expanded and enhanced park and recreation lands and facilities.*
  - Major additions to the township’s park and recreation system include: Memorial Park, which features the Garden of Reflection memorial and various playgrounds, athletic, and recreation facilities; the Lower Makefield Township Dog Park located off of Heacock Road; and the development of the Lower Makefield Township Community Center along Oxford Valley Road.
- *The township has experienced significant flooding events due to natural disasters such as hurricanes and tropical storms.*
  - Flooding events along the Delaware River caused major property damage and disruption of services to numerous communities along the river, including Lower Makefield.

## IMPLEMENTATION

The Plan includes an Implementation chapter containing a compilation of specific tasks recommended to be completed in order to carry out the Plan’s vision. While Plan chapters contain policy recommendations as well as recommendations to continue with many current actions, the Implementation chapter primarily focuses on new actions. The primary recommendations of this plan include:

- *Housing* – Consider appropriate housing of varied types to ensure continued housing diversity, such as considering regulations to allow for in-law suites or accessory apartments to supplement age-qualified housing.
- *Stormwater Management* – Prioritize township stormwater problem areas including locations where obstructions and drainage issues exist for remediation. Such efforts will help to reduce impacts following major rainstorm events.
- *Hazard Mitigation* – Continue to implement the township’s hazard mitigation plan; evaluate and implement the most effective mitigation projects when financial assistance is available; attempt to address the needs of vulnerable community members in event of severe weather; assess and mark emergency evacuation routes or exits for all areas/neighborhoods in the township.
- *Parks and Recreation/Transportation* – Continue to connect segments of the bicycle/pedestrian paths throughout the township and consider long-term maintenance needs of such paths. The bicycle/pedestrian path should be linked to the towpath along the Delaware Canal.
- *Transportation* – Correlate land use considerations and transportation planning to ensure transportation facilities have adequate capacity and that heavy, commercial traffic is oriented to interstate and major highways, rather than local streets.
- *Land Use* – Reevaluate permitted uses in the O/R Office Research District to determine whether they should be updated, taking into account pending or approved development within the district



and in adjoining Edgewood Village. Ways to maximize pedestrian connectivity between the O/R District and Edgewood Village should be considered.

- *Sustainability* – An emphasis is placed on sustainability with a focus on sound management of the township’s infrastructure and resources. Looking ahead, efforts should focus on following a solid course of maintaining public and community assets to continue to meet the needs of those who live and work in Lower Makefield.



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## EARLY HISTORY OF THE TOWNSHIP<sup>2</sup>

The early history of the township set the foundation for present-day development patterns. Although understanding this early history plays a lesser role in setting future planning policies, this history is incorporated into the master plan because of its interest to residents. The history and development of the township's early villages should be understood because of their role in determining development patterns and the stated township desire to preserve the character of its oldest crossroads village. The history of the development of its adjacent farm tracts reflects the agrarian origin of many current residential subdivisions.

Many of the names of the earliest settlers, their families or occupations, have been perpetuated in the names of places, creeks, roads, developments, and well-known buildings. Tradition states that the name "Makefield" was chosen by Richard Hough, a provincial councilor, and may have been a corruption of Macclesfield, his English home in Cheshire.

Much history predated the founding of the township. Recent archaeology for the rebuilding of the Scudder Falls Bridge has revealed human habitation in the area that was older than the pyramids at 8000+ BCE. The legacy of the indigenous people of this region by the riverfront was covered by centuries of inundation. We know very little about the indigenous people of the area that followed these early groups, but by the time of European contact they were called the Lenape, a tributary tribe of the Iroquois Confederacy. Most of them left the area as Europeans arrived.

Henry Hudson, sailing for the Dutch, discovered the Delaware River in 1609. Dutch settlers established a trading post in 1625, and their alliance with Sweden created Swedish and Finnish settlements along the rivers and creeks as early as 1638. The British conquered the Dutch in 1664, seized their American colonies, and "restored" King Charles II to the throne of England. He granted his brother James, the Duke of York, all land from the St. Croix River to the Delaware River. English settlers arrived along the Delaware as early as 1677, taking title from James' seat of government in New York, East and West Jersey. Some early deeds in Makefield referred to these land grants.

William Penn, son of Admiral Sir William Penn of the Royal Navy, became a Quaker while he managed his father's estates in Ireland. The Quakers were one religion among many persecuted in England, and young Penn spent time in prison contemplating how he would organize a province should he get the chance. When Penn's father died, the British King personally owed the Admiral's estate and his son more than £16,000. In 1680, Penn petitioned King Charles II for land in America in lieu of the money and on March 4, 1681, he received letters patent to the land that was to become Pennsylvania, as a refuge for Quakers. Penn appointed his cousin, William Markham, Deputy Governor and Commander-in-Chief of the Province, and Thomas Holme his land surveyor.

Markham proceeded to America to carry out Penn's instructions to select a city site and get counties organized. Penn's constitution provided for a Provincial Council and Assembly to be elected by the freemen of the province, while each of his three counties: Chester, Philadelphia, and Buckinghamshire (shortened to Bucks), was to be run by three commissioners and administered by a sheriff. He offered

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<sup>2</sup> Early History of the Township prepared by Ralph Thompson, March 1991, edited and updated by Helen Heinz, Ph.D., November 2013

generous terms for land purchasers, usually giving them a city lot, as well as more than 500 acres of land in one of the counties. Extra land was added for bringing over indentured servants.

Penn's own country estate was located in Bucks at Pennsbury. Quakers were rarely members of the aristocracy in Great Britain, but rather the entrepreneurial tradesmen and rising middle class, or conversely, poor farmers. Those who settled in Makefield were tradesmen and farmers, mostly from Cheshire and Herefordshire in northwest England, or servants of wealthier city merchants. Their presence on the county acreage ensured the designated owner could hold the land through the long land patent process.

In September 1682, William Penn sailed for Pennsylvania in the ship *Welcome*, arriving in Newcastle on October 27. Many local settlers were on that ship with Penn, or arrived shortly afterwards. During 1682, 23 ships arrived, followed by more than 50 ships the next year. Immigration steadily expanded because Penn welcomed and tolerated all, religiously persecuted or not. Anyone who wished to pay the price could buy land. During the first decade not only English Quakers arrived, but also Dutch and Welsh Quakers, German and Scandinavian Lutherans, Pietists and Catholics, Scotch-Irish Presbyterians, some French Huguenots, and Italian and Polish settlers.

Thomas Holme began his survey of the lands on the west bank of the Delaware in 1681, and his map of the region was published in London in 1687. Not all the people named on the area of the map covering Lower Makefield actually settled here. Those who settled in Lower Makefield were: William Yardley, George Pownall, George Stone, John Clowes, John Brock, Samuel Overton, Thomas Janney, Richard Hough, Joshua Hoops, John Palmer, Andrew Elliot, William Beakes, Samuel Dark, William Venables, and John Luffe. All were Quakers and many came with several indentured servants. Some of them managed to become land owners in the area within one or two generations.

In 1690, the Provincial Council authorized magistrates in the counties to appoint grand juries for the purpose of dividing the counties into townships. Bucks County acted in September 1692, when the court appointed a jury. Upon the recommendations of this jury, five townships were established: Makefield, Falls, Middletown, Bristol and Bensalem. The village of Bridlington, later renamed Bristol, was the county seat until it moved to Newtown in 1726, and then Doylestown in 1813. Based on a 1693 tax list, Lower Makefield had a population estimated at about 100 persons.

Several of the early settlers left an imprint on the area. William Yardley belonged to an ancient landed family of Staffordshire. He settled on a tract of more than 600 acres of land located on what is now Dolington Road. He and many in his family were stricken with smallpox and died by 1702. His nephew, Thomas Yardley, came to settle the estate and decided to stay. He was the ancestor of most of the Yardleys living here today. Within 3 decades Thomas Yardley acquired all the riverfront land from Dolington Road through the borough, south to the present Macclesfield Park. This became the foundation of the family's success. He and his sons built mansion houses such as Lakeside, set up mills, taverns, distilleries, leased farms, and established the inn and ferry across the Delaware. His daughters and grand-daughters intermarried into most of the important other local families, creating kinship ties throughout the region. The present borough bears the family name.

John Brock came from Bramhall in Cheshire and settled along the creek that bears his name. He built a gristmill and a sawmill and the mill pond known as Lake Afton. His son, Ralph Brock, sold out to John Lambert in 1713 and his son, Thomas Lambert, sold to Thomas Yardley in 1732. The present mill building was built by Thomas Yardley, Jr. in 1769.

Thomas Janney, a local surveyor and provincial councillor, had a large grant of land extending from the Delaware River into present-day Newtown Township. Today we see his mill pond filled by Core Creek where it crosses Route 332. He gave the first section of the Slate Hill Cemetery to the Falls Friends Meeting in 1690 and his son, Abel Janney, gave the second section in 1721. The cemetery was deeded to the township in 1990.

Richard Hough, who is said to have named the Township of Makefield, served in both the Provincial Council and Assembly. His stone house, although altered and enlarged, stands on Moyer Road and was in the Hough family until about 1850.

John Palmer arrived before Penn from Yorkshire and settled in the west-central part of the township. His descendants acquired more than 500 acres on both sides of Stony Hill Road and still owned some of this property in the early twentieth century. There are several old family houses on this tract and one may be the original Palmer house built in 1682.

Throughout the 18th century, Makefield was essentially devoted to farming. Forty-five years after its founding, the upper portion of the township was split off in 1737 to form Upper Makefield, and the original township, with part of Falls, became known as Lower Makefield. A census taken in 1784 showed the township had a population of 748 persons with 101 dwellings; and at the time of the U.S. House tax collection in 1798, there were 137 dwellings. By 1810, the population had grown to 1,089 persons, representing about a thousand percent growth since 1693.

Many of these new residents were no longer Quakers. Some Quakers, including many Yardleys, returned to the Anglican faith, while an influx of Dutch settlers from Long Island around 1710 brought Dutch Presbyterians to Lower Makefield. This was particularly evident among the Slacks, Beans, Van Hornes, and Vansants in the northern and central region of the township. Quakers from the southern region went to meeting in Fallsington, while after 1755 those from the northern end formed a meeting at Dolington Village with Quakers from Upper Makefield.

In 1774, the first public school in Bucks County was built by public subscription. It was situated in the southwestern part of the township on Oxford Valley Road and was intended to serve pupils from Falls, Middletown, and Lower Makefield. The building was the first octagonal school house in America and was one story with 480 square feet of floor space. The ruins of the building still remain. During the American Revolution, the area saw much military activity in 1776. Older Quakers tried to maintain their neutrality, but most young Quaker men joined the "Association" to defend the township from a British invasion. The Presbyterians and those of other religious persuasions or ethnicities had no interest in the British government and also supported the Continental Army. The discovery of artifacts such as musket balls and cannon balls around many of our old houses and barns indicate the presence of troops during the critical encampment before the Battle of Trenton. Stories of spies and counterspies, foraging parties, and tory robberies by the infamous Doan Outlaws demonstrate how this war divided our local population. After the battles moved southward, Quaker meetings "pardoned" those who were shunned for military service on both sides, or not, but most families healed the breaches and went back to work.

At the beginning of the 19th century, two villages sprang up in the township. In 1807, a plan was drawn up for Yardleyville, the site of the grist and saw mills and the ferry to New Jersey. From Yardleyville, the Great Road to Philadelphia, now the Langhorne Road, ran southwest through the township. The "Flying Machine" stage coach line stopped near the crossing where the Great Road intersected the Newtown-

Fallsington Road, now Stony Hill Road. The second village developed around the taverns and inn near this crossroads.

The tavern/house on the northwest corner built in 1800 by Jesse Palmer was known as Biles Corner for its first owner, Dr. Thomas K. Biles. On the northeast corner, the blacksmith, Thomas Stradling, kept his forge and built a new house. A blacksmith had operated there since the 1730s, and the foundation of the original shop is under the recently restored Berell's store building. The stone house still standing on the southwest corner was built by James Gilkyson about 1810. The vacant lot on the southeast corner was originally the site of a house built in 1798 by Jesse Palmer for Phineas Thackery, a Revolutionary War veteran.

At the point formed by Langhorne and Edgewood roads, a small stone house was built around 1790 by James Doughty, a tailor. Its occupant, as cited on the 1798 Federal Direct Tax List, was a free black, Ishmael, also a tailor.

This village was originally called Stradlington and later Summerville, or Woodside. By 1858, the same year it acquired a post office, it was called Edgewood Village, as it is to this day. Most of the other houses in the village were built for artisans and workers during the middle of the 19th century. Just to the northeast, along the Langhorne Road, was the stage stop, inn, and tavern built by Daniel Palmer, Jr. in 1765. The oldest house in the area, it was enlarged by subsequent owners, and is known as Edgewood.

During the 19th century, Lower Makefield remained largely agricultural, with the exception of the village of Yardleyville, which developed as a town and a commercial center of the township. Yardleyville obtained a post office in 1828. In 1831, the Delaware Canal was completed and the village became a transfer point for tons of materials being barged along the canal. The following year, the ferry was moved to the foot of Afton Avenue, and the White Swan Tavern, now the Yardley Inn, was opened. The ferry was replaced by a covered wooden bridge in 1835. This was swept away by the great flood of 1841, but was soon rebuilt. After the flood of 1955 it was not rebuilt. During the Civil War, the gristmill produced thousands of tons of flour for the Union Army, and a magnet manufactory and bleachery went into production after that time.

The Reading Railroad's main steam freight and passenger line, four tracks wide, came to Lower Makefield in 1876 with stops at Stony Hill Road for Edgewood and Reading Road for Yardleyville. Its bridge over the Delaware River was an engineering marvel, but succumbed to the flood of 1904. It was re-built in spectacular fashion, both higher and wider by 1912. It is one of the only bridges on the National Register, and highlights the beauty of Makefield's riverfront scenery.

Tourism became a major local economic boom after the arrival of the railroad. Areas of Yardley Borough encouraged developers who constructed summer cottages for tourists, while larger residences spread along the township's river banks. Mark Palmer, who lived just north of the Edgewood railroad stop, added an entire floor to his old stone manor house to create a hotel for summer visitors, and those who wished to enjoy the country air during the 1876 Centennial Fair in Philadelphia. He also provided a boardwalk from the railroad stop to his 12-room inn, which was advertised in the Reading RR Centennial brochure, and still stands on Stony Hill Road. Many other local houses and farms opened their doors then and to summer boarders in the early days of the 20th century. Rumor has it that a dance hall for vacationers and local youth operated on the upper floor of Berell's Store in Edgewood Village on summer evenings.

Yardleyville seceded from Lower Makefield in 1895 and became Yardley Borough. Prohibition during WWI ended the sale of alcohol in the township, but stories are told of hidden stills and speakeasies in many

areas of the township. Lower Makefield continued largely agricultural until after World War II. In 1940, the township's population was 1,841 persons, a modest increase from 1,089 persons in 1810.

All changed after World War II, when the opening of the Fairless Steel Works, the development of Levittown, and the construction of major highways bisected the township's farmland, creating opportunities for suburban development. While largely built out today, the township has been transformed from essentially agricultural to a suburban community of residential homeowners, covering 18 square miles.





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## VISION FOR THE FUTURE

The township's master plan envisions the continuation and improvement of the quality of life in Lower Makefield. Elements of this quality of life include protecting community aesthetics, preserving aspects of the natural and historic environment, accommodating expected growth without adversely affecting residents, and creating and supporting necessary community services that enhance life in the township.

The township has a responsibility to protect the public health, public safety, and public welfare. Each of the specific goals relates to this charge of protecting public welfare.

### COMMUNITY GOALS AND POLICIES

- Adequately safeguard the health, safety, and welfare of residents.
- Provide a full range of public facilities and services to meet the existing and projected needs of the township's residents in a cost-effective and equitable manner. Guide development and set development standards so as to minimize future public expense.
- Ensure proper planning in order to communicate with and protect all residents in all areas/neighborhoods in the township during emergency events.
- Develop a complete and coordinated transportation system that facilitates the safe, convenient and efficient movement of people and goods throughout the township.
- Provide an adequate supply and mix of recreation facilities to serve the existing and projected population of the township.
- Provide for conservation of the natural environment, including prime agricultural soils, the drainage areas of creeks and their tributaries, wooded areas, steep slopes, wetlands, floodplains, and other sensitive environmental areas.
- Preserve elements of the traditional historic character of the township. Permit a variety of uses and supportive improvements to Edgewood Village that reflect and complement the original architectural and historic character of the village. Recognize the importance of cultural and recreational resources to the character of the area.
- Accommodate the township's fair share of regional population growth; permit the development of housing at a variety of densities, types, and sizes to meet the needs of the population by taking into account economic levels, age groups and living styles.
- Allow for a balance among residential, industrial, office/research, and commercial development to meet the needs of township residents and to enhance the economic vitality of the township.
- Develop a plan that can be implemented and that promotes sustainable practices and energy conservation to balance the demands of the future population with the township's future resources.
- Consider the changes resulting from the completion of development of the township, in terms of financial and management responsibilities.



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## THE NATURAL ENVIRONMENT AND NATURAL SYSTEMS

Communities have become increasingly aware of the importance of natural features in the land use planning process. Flooding, water pollution, soil erosion, destruction of wildlife habitat, and loss of visual character are a few of the consequences of permitting development without regard to the natural environment. Understanding the township's natural resources can help determine the proper location and the desirable intensity for development of different types.

Understanding the township's natural resources can provide the framework within which informed decisions can be made regarding the accommodation of community needs. The 1981 township comprehensive plan set a pattern for future development by analyzing the suitability of the land for development. It recommended, in general terms, that the north and west sections of the township remain more "rural" in character in recognition of limitations imposed by the natural environment and suitability for urban development. The 1992 and 2003 master plans reaffirmed this approach, as does this current master plan.

This chapter provides an overview of the regulatory authority of resources, identifies important natural features and resources with the township along with recommended actions to protect and enhance these resources, and lists opportunities and strategies to promote natural resource protection.

### REGULATORY AUTHORITY

Many of Pennsylvania's natural resources are protected by state and federal regulations. Some of these regulations, such as those pertaining to wetlands or woodlands protection, establish standards that must be adopted into local government zoning ordinances. However, not all natural resources are protected by state or federal law. Local governments, empowered with land use planning authority, have the ability to plan for and develop local ordinances to protect the natural resources they deem most valuable in accordance with federal, state, and local law.

### GEOLOGY

The geology of the township has been documented in a 1955 U.S. Geological Survey of Bucks County and can be described as follows. (Map 1 illustrates the geologic formations.)

1. Quaternary deposits, located in the area along the Delaware River and west of the Canal in the southern part of the township, include two types of formations: the Wisconsin (Pleistocene) and the Pre-Wisconsin Pleistocene. These unconsolidated formations are composed of sand and gravel, giving them good water-bearing qualities. Precipitation and drainage from higher areas help to recharge the water held in these deposits.
2. Triassic rock formations underlie most of the township. These include the two most common rock formations in Bucks County: the Lockatong Lithofacies and the Stockton Lithofacies. The Stockton formation, one of the best sources of groundwater in Bucks County, is composed of sandstone and red shale. The quality of the groundwater is generally good, and wells rarely exceed 500 feet in the Stockton areas.
3. The Lockatong Lithofacies, which run across the northernmost portion of the township, consist of argillite, sandstone, and shale, but have water-bearing capacities inferior to the Stockton

formation. Recharge of the water supply in the Lockatong areas depends on how permeable the soil conditions are.

4. A Cambrian formation, known as the Chickees Quartzite, is found in a thin band in the southern end of the township. Within the Quartzite areas, there is a moderate to low water supply, but groundwater, when not affected by drought, is generally available within 150 feet of the surface.
5. Baltimore Gneiss, part of the Pre-Cambrian system of rocks, is found in the southern portion of the township. This is a medium-grained crystalline rock that yields moderate water supplies of good quality.
6. The significance of geology to future planning and land use decisions depends primarily on the role of geology in water supply. Most of the township depends upon public water rather than on individual on-lot wells. Public water is provided from groundwater sources and surface water from the Delaware River.
7. The adequacy of water supply for existing and future development is discussed in the community facilities and services chapter.

## **TOPOGRAPHY**

Geology also affects township topography. The township tends to have gently sloping topography with slopes of less than 15 percent except in the areas along streambeds and along the western bank of the Delaware Canal. The elevation in the township ranges from 20 to 300 feet above sea level, with the lowest areas located along the Delaware River and the highest in the northwest corner near Newtown Township. Areas of steep slopes (8 percent and greater) are shown on Map 2.

Topography is a concern in land-use planning because of the effects of development on the steep slopes. The disruption of steep slopes can cause excessive amounts of soil to be lost through erosion when the vegetative cover is disturbed. Erosion can cause diminished water quality and siltation of streams.

Removal of vegetation and the construction of impervious surfaces diminish groundwater recharge and cause greater erosion and sedimentation in streams. This ultimately affects the quality of the water in the community by affecting the quality of surface waters and may diminish the capacity of streams to carry water, leading to flooding.

Development on steep slopes can also require greater township expenditures for road maintenance and repair. For these reasons, the township has regulated the amount of development that can occur on steep slopes. Lower Makefield Township enacted and adopted a zoning ordinance setting protection standards to greatly reduce the adverse environmental impacts of new development.

## **SOILS**

Soils have historically determined how land has been used in the township. Land optimal for farming, due to soil or slope conditions, has been farmed. Land too wet or too steep or of poor composition has been left in woods or used for grazing areas. Often the soils that are good for farming are also good for development because of topographic and drainage patterns.

The role played by soils in controlling development patterns has weakened in recent years. Public sewerage has eliminated the limitations imposed on septic systems by soil conditions. Alternative types of sewage treatment have also changed the picture by opening up new areas for development that a decade ago would have been incapable of sustaining building with on-lot septic systems.

Soils in the township fall into two broad groups. The Urban Land-Howell Association of soils is located in the southeastern portion of the township and is associated with gently sloping, well- drained land. Urban land is built up and the soils have been disturbed and altered by development. Howell soils are found on the coastal plain and are deep with limited permeability.

The other main soil group is the Lansdale-Lawrenceville soils, which are found both in valleys and in uplands. Lansdale soils are common in higher elevations and are usually deep and well drained. Lawrenceville soils are found in the lower elevations and in valleys.

The delineation between the two main soil associations in the township follows the fall line that runs through the southern corner of the township. The fall line divides the Coastal Plain from the Piedmont Region. These two physiographic regions have distinct patterns of vegetation, soil characteristics, drainage, topography, and climate. The level ground in the coastal plain results in wider, slower moving streams, a high water table, and marshes and swamps. Slopes along the fall line are in excess of 25 percent, with 50-foot drops in some locations.

From a planning point of view, soils can be significant because they will affect to some degree the nature and location of on-site sewage disposal facilities; however, the extensive public sewer system in Lower Makefield means that soils play a diminished role in determining development patterns. Soils should be considered in the preservation of agricultural lands and in making recommendations on construction in areas with shallow water table or depth to bedrock.

Current township regulations for restrictive soils and the use of erosion and sedimentation control plans to minimize impacts from construction activities support policies established by the Bucks County Conservation District.

### **AGRICULTURAL SOILS**

Lower Makefield, like much of eastern and lower Bucks County, has large areas of prime agricultural soils (Classes I, II and III, according to the U.S. Department of Agriculture) and soils of statewide importance that traditionally have been farmed, and contribute to the state and local farming economy and production. Within the township, the prime undeveloped soils are generally located north of Yardley-Langhorne Road. Map 2 shows prime agricultural soils and other natural resources.

Further discussion on agricultural soils and agricultural preservation can be found in the chapter on Open Space and Conservation Planning.

## WOODLANDS<sup>3</sup>

Woodland areas play an important role in maintaining the balance and health of the environment by:

- reducing water runoff and soil erosion on slopes
- helping to prevent water pollution by minimizing the sedimentation of lakes and streams
- stabilizing stream banks
- contributing to a more pleasant climate by adjusting the amount of dust and humidity in the air, providing shade, and reducing strong winds
- serving as wildlife habitats, recreational areas, and land use buffers
- adding interest, variety, and beauty to the landscape
- providing shade to keep the water temperature low in streams, thus helping to support the aquatic life in streams
- absorbing carbon dioxide

The Pennsylvania Municipalities Planning Code states that the preservation of forests is one of the purposes of planning; preservation of woodlands is important to community aesthetics. The environmental, aesthetic, and recreational benefits of woodland areas justify their protection in the development process. Map 2 shows the location of woodlands.

Because much of the township was once cultivated, the primary woodland areas remaining are located along stream valleys, along the Delaware River, and on wet soils that were not tillable. Five Mile Woods is a permanent conservation area owned by the township that preserves native woodlands. Five Mile Woods, an area of approximately 285 acres, is not only a forest preserve but also an area for passive recreation and nature study.

The township preserved this area because the fall line runs through Five Mile Woods making it one of the few areas where vegetation of the Piedmont Plateau and Coastal Plain can be found. It also contains rare and endangered plant species including wild orchids and a sphagnum bog.

Protection of existing woodlands is addressed through natural resource protection standards located in the Lower Makefield Township Zoning Ordinance. The ordinance prohibits the removal of more than 30 percent of woodlands on a site by requiring a minimum of 70 percent remain as resource protected land. This protection ratio, however, does not apply to developed residential lots which cannot be further subdivided or for approved applications for forestry/timber harvesting use. The subdivision and land development ordinance has tree protection standards which protect remaining trees during construction.

Recognizing the ecological benefits associated with native plants, the township officials amended the subdivision and land development ordinance in 2007 by adopting regulations for the use of native plants. The ordinance requires that all major subdivisions and land developments contain a landscape plan which addresses the conservation of the natural landscape and that all required plantings shall be native plants.

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<sup>3</sup> A report entitled "Vegetation and Stream Survey, Lower Makefield Township," was prepared in 1978 by the Academy of Natural Sciences of Philadelphia. It describes the character and locations of terrestrial vegetation, wetland vegetation, and biological and chemical quality of surface waters. This information was used in developing the natural resource protection standards for the township zoning ordinance.

## **WETLANDS**

The definition of wetlands used by the U.S. Army Corps of Engineers is:

*Those areas that are inundated and saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs and similar areas.*

Soil type, the presence of wetland vegetation, and hydrology (the saturated soil conditions and the drainage characteristics) are the three indicators of wetlands.

Areas of hydric or wet soils are located throughout the township and are regulated by the U.S. Army Corps of Engineers and the Pennsylvania Department of Environmental Protection under the federal Clean Water Act and other state laws. The hydric or wetland soils within Bucks County are Bowmansville, Croton, Doylestown, Fallsington, Hatboro, Holly, Lamington, and Towhee.

Many of the wetlands areas in Lower Makefield Township are found along creeks and their tributaries. Based on the National Wetlands Inventory (NWI) maps which include water resources, approximately 689 acres of wetlands are located within the township. Wetlands consisting of one acre and greater are shown on Map 3.

The U.S. Army Corps of Engineers, a federal agency, has adopted regulations designed to protect wetlands because of their value to protection of water quality, provision of animal habitats, and their ability to absorb floodwaters. These regulations require a permit from the corps to disturb wetlands areas. State and/or federal agencies that permit wetland disturbance may require that the loss of wetlands be mitigated by the creation of wetland areas elsewhere.

Wetland areas are also subject to regulation by the Pennsylvania Department of Environmental Protection. These regulations are somewhat more restrictive than the federal regulations because the Army Corps exempts some small areas of wetlands as part of its routine permitting procedures.

The township has enacted innovative wetlands regulations in its zoning that minimize disturbance of this natural resource well beyond what is required under minimum state or federal standards. The township's policy has been to prohibit not only disturbance of wetlands of any size, but to provide and protect wetlands buffers as well. Township regulations for wetlands/watercourse buffers call for a minimum required width of 50 feet but may be increased based on adjacent slopes and adjacent vegetation type/height.

## **FLOODPLAINS**

Floodplains accommodate floodwater during periods of heavy precipitation. In addition to containing floodwaters, they contribute to the township's scenic beauty, to groundwater recharge, and because of the natural vegetation associated with them, to soil erosion and sedimentation reduction, wildlife protection, and healthy stream conditions. Map 3 shows the location of floodplains.

Lower Makefield Township participates in the National Flood Insurance Program, which is designed to reduce flood hazards through floodplain regulation. The program is the result of an earlier shift in Federal

policy away from structural flood control solutions to more comprehensive floodplain management approaches.

The floodplain areas mapped by the National Flood Insurance Program, as may be amended from time to time by the federal government, are located along the Delaware River, Buck Creek, Core Creek, Brock Creek, Dyers Creek, Rock Run, and Silver Creek.

Areas not regulated under the Flood Insurance Program but vulnerable to flooding nonetheless are those adjoining smaller order streams and containing floodplain or alluvial soils. The Soil Conservation Service's Soil Survey identifies seven floodplain soil types in Bucks County, at least two of which are located in parts of Lower Makefield Township: Bowmansville silt loam (Bo) and Alton gravelly loam (AIA). The Alton soil series is typical of the areas along the Delaware River.

The township regulates development in floodplains and on floodplain soils through its zoning ordinance. The National Flood Insurance Program maps have been revised and became effective on March 16, 2015. The township has revised its ordinance to correlate with the regulatory changes.

The 1981 and 1992 master plans identified stream corridors as areas meriting preservation in permanent open space and the zoning ordinance was amended to include required buffers for watercourses along with wetlands. In addition to the obvious benefits of reducing flooding, the preservation of stream valleys and floodplains also results in the preservation of woodlands, steep slopes, wildlife habitats and passive areas for recreation.

Flooding events, particularly those in 2004, 2005, and 2006, along the Delaware River caused major property damage and disruption of services thus requiring numerous evacuations in communities along the river's banks. The township participated, along with the other 16 riverfront communities in Bucks County, in the county-organized Delaware River Flood Task Force. The task force made fifteen recommendations:

1. Bucks County should support and the Delaware River Basin Commission should adopt a policy of maintaining adequate year-round safety voids at the New York City reservoirs.
2. Support and expedite actions relating to reservoir operations and flood control options, including, but not limited to, the expansion and updating of existing reservoirs and leaving voids in place.
3. Support and expedite new federal floodplain mapping.
4. Support stronger municipal land use tools to control development in the floodplain, without hampering the commercial viability of historic town centers in Bucks County's riverfront communities.
5. Support County and local emergency management organizations and first responders and seek significant funding from federal and state agencies for buyouts, elevations, and floodproofing, where appropriate.
6. Re-activate discussion with our local congressman and his staff of the original Corps of Engineers' study of the Pennsylvania side of the Delaware River to see if the non-federal match can be found.



7. If the Corps study is funded and completed, pursue recommended mitigation projects on behalf of the Task Force.
8. Investigate options to change the DRBC Compact and U.S. Supreme Court decree to increase the importance of flood control as a primary goal of the Delaware River Basin Commission.
9. Make sure all municipalities have adopted the Bucks County Hazard Mitigation Plan to ensure that each will be eligible for federal hazard mitigation grants following floods; follow through with the required update of this plan in 2011. Note: This has been completed.
10. Participate in the Bucks County Open Space Plan's riverfront program and use County grant funds to reduce flood damages by preserving open space in the floodplain.
11. Examine local zoning ordinances to assure that the intensity of development in floodplain areas is as low as possible to reduce the potential for new high intensity development.
12. Seek federal and state funding for flood gauges in the Bristol area and other needed areas along the river and to upgrade existing gauges, where needed, so that adequate flood warning systems are in place.
13. Ensure that warning systems are in place so that all residents in floodprone areas can receive alerts and evacuation orders. Improve intermunicipal cooperation during flood events.
14. Work with PennDOT, Department of Conservation and Natural Resources, and state legislators to ensure that River Road and other flood-damaged roads are opened as soon as possible after floods by making sure that adequate funding is allocated and that work progresses quickly. Repairs should also be expedited to the Delaware Canal to ensure that Bucks County retains its tourism potential.
15. Remain vigilante by keeping abreast of all activities that affect flooding; keep Task Force members informed.

In addition to the above, the township should continue to pursue opportunities for acquiring or elevating flood-prone repetitive loss properties.

## **WATERSHEDS**

Lower Makefield lies mostly in the Delaware River watershed, except for a portion of the northern end of the township, which lies in the Neshaminy Creek watershed. Within these areas are 10 smaller drainage areas, or sub-watersheds: Core Creek, Dyers Creek, Buck Creek, Scudders Falls, Brock Creek, Silver Creek, Rock Run, Delaware River/Canal, Queen Anne Creek, and Mill Creek basins.

Most of the watercourses in the township drain directly into the Delaware River through a historic aqueduct system under the Delaware Canal. The Rock Run and Queen Anne Creek basins drain south to Falls Township. The drainage areas of Dyers Creek, Brock Creek, Buck Creek, Scudders Falls, and Silver Creek flow east and north to Yardley Borough and the Delaware River. (Silver Creek flows directly into the Delaware Canal near Yardley Borough.) The Delaware River/Canal drains south to Morrisville Borough.

Core Creek, however, drains west to Newtown Township, and flows into the Neshaminy Creek. Mill Creek drains west to Middletown Township. Map 3 shows the major streams and drainage basins in the township.

Stormwater management issues are detailed in the chapter on Community Facilities and Services.

## **DELAWARE RIVER**

Running along most of the township's eastern border, the Delaware River forms the boundary between Lower Makefield and New Jersey upstream from Morrisville Borough to a point about 1.5 miles upstream from Yardley Borough. The flat lowlands flanking the Delaware River provide a transition area between the township's characteristic gently rolling hills and the majestic waterway. The river provides opportunities for recreation and stormwater drainage and is also a source of drinking water for many communities including the township.

Running roughly parallel to the Delaware River is the Delaware Canal. Stream tributaries to the Delaware River, such as Brock Creek, traverse the canal in order to continue their path to meet the river. The combination of the natural drainage regime and the man-made infrastructure of the historic canal, modern hard-surface roads, and development create myriad flooding issues along most of the length of the township boundary with New Jersey.

## **AIR QUALITY**

Typical pollution that is experienced in the area may be attributed to regional industrial activity and motor vehicle emissions. For uses within the township, the zoning ordinance contains performance standards which include regulations on smoke, dust, fumes, vapors and gases. In addition, restrictions on backyard burning are in place.

Although Lower Makefield Township is an automobile-dependent suburb, future planning to reduce pollution and improve air quality will be important. Reducing dependence on the personal automobile and encouraging alternative travel by foot or bicycle are means of reducing emissions. This can be done by facilitating public transit and by providing pedestrian and bicycle trail networks. A further discussion of implementation measures is provided in the chapter on Transportation Planning.

## **GREENHOUSE GAS EMISSIONS**

Through recommendations by the township's Environmental Advisory Council (EAC), Lower Makefield has taken steps to monitor and reduce greenhouse gas emissions. Some of the actions include: adopting low-impact design standards in the township zoning and subdivision and land development ordinances (2006); passing a resolution endorsing the U.S. Mayors Climate Protection Agreement and the Sierra Club's Cool Cities Program which embrace programs that combat climate change by reducing the township's carbon footprint (2007); and undertaking a greenhouse gas inventory to calculate the township's carbon footprint (2008). Further discussion as related to energy is located in the chapter on Energy Conservation.

## **BUCKS COUNTY NATURAL AREAS INVENTORY**

In 1999, an inventory was performed to identify and rank the most significant natural areas remaining in the county. This survey, titled Natural Areas Inventory of Bucks County, Pennsylvania (1999), was conducted by the Morris Arboretum of the University of Pennsylvania (Ann F. Rhoads and Timothy A. Block) for the Bucks County Commissioners, to provide guidance for implementation of the natural areas protection component of the Bucks County Open Space Program.

While the 1999 inventory identified specific sites worthy of preservation, the Bucks County Pennsylvania Natural Areas Inventory Update (2011) takes a slightly different approach by focusing on broader geographical areas which include many of the individual sites previously recognized. By recommending protection and preservation of these broader areas, referred to as Natural Landscapes, the plan aims to protect sustainable natural communities or ecosystems by promoting connectivity of sensitive areas rather than focusing on individual sites.

The 2011 Natural Areas Inventory Update contains “Figure 1.1 – Conservation Landscapes” map which shows parts of the township being located in the Atlantic Coastal Plain and the Delaware River designated Conservation Landscapes. The Update recommends continued preservation and management, as well as some expansion, of the 286-acre Five Mile Woods preserve which is located within the Atlantic Coastal Plain Conservation Landscape. Township-owned Macclesfield Park is noted as part of the Delaware River Conservation Landscape, which the Update recommends monitoring for additional opportunities to protect land in the river corridor.

## **CURRENT PLANNING AND ZONING POLICIES**

### **NATURAL ENVIRONMENT**

The 1981, 1992, and 2003 master plans discussed the importance of the natural features of the township. Based upon a composite picture of natural features and limitations on growth imposed by the natural environment, the 1981 master plan set and the 1992 and 2003 plans continued to support a policy of limiting development in the northern and western areas of the township (above Interstate 295) and encouraging necessary growth in the more urbanized areas of the township in the southern sectors, near Yardley and Morrisville.

That plan recommended conservation of important natural features, including floodplains, steep slopes, woodlands, wet areas, and stream corridors, and also recommended that the township set zoning standards that would require the preservation of these areas while allowing for “design techniques which afford a high degree of market and land planning flexibility to the developer.”

These recommendations resulted in a zoning approach that has been in effect for more than 30 years and that requires the preservation of sensitive environmental areas. The following areas are now restricted to some degree from intrusion by development by the zoning ordinance: floodplains, floodplain soils, lakes and ponds, wetlands, watercourses, lake and pond shorelines, steep slopes (greater than 8 percent), and woodlands.

The lot size required and the density on the “net buildable area” is set by the zoning ordinance. Properties encumbered by large sections of land restricted by natural features can be developed with smaller lot sizes, high densities on the net buildable area, and larger open space requirements.<sup>4</sup>

## **FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION**

### **NATURAL FEATURES**

The township has adequately addressed the protection of environmental features through its ordinances. The following actions are recommended:

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<sup>4</sup> Township of Lower Makefield, Zoning Ordinance, Section 200-52.

1. Wetlands—Continue to ensure that the most stringent wetland restrictions apply to township wetlands. Future changes in the federal government definitions of wetlands may affect what is deemed to be a wetland by its standards, but the township ordinances should abide by the most restrictive wetland definition to ensure adequate protection for these areas. The township should continue to minimize wetland disturbance.
2. Protecting environmental features—Continue the planning and zoning policies that require preservation of environmental features.
3. Watershed management—Pursue efforts to develop intermunicipal watershed plans for Brock Creek and Rock Run.
4. Delaware River—Continue to pursue opportunities for acquiring or elevating flood-prone repetitive loss properties and supporting the recommendations of the Delaware River Flood Task Force (2010).

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## DEVELOPMENT TODAY AND PROJECTED CHANGES

The township's development pattern today is the result of several trends and events:

1. The historical development of the township and its traditional villages created centers of population in the Yardley, Morrisville, and the Edgewood areas. These centers became the focus for most of the community-oriented commercial development in the area.
2. Good soils for farming created an agricultural base that has persisted until the last 50 years. These areas have been relatively easy to develop for suburban residential communities.
3. The construction of the Fairless Steel Mill in Falls Township in the 1950s brought unprecedented residential growth to lower Bucks County.
4. The availability of public sewerage in Lower Makefield accommodated the development of the southern and eastern sections, while the northern and western sectors, with less availability of public sewer, developed later and more sparsely.
5. The construction of Interstate 95 created easy access to Philadelphia, New York, and the central New Jersey corporate centers. This created demand for residences in Lower Makefield.
6. The intersection of I-95 (renamed in 2018 as I-295) and U.S. Route 1 just outside the southwest corner of the township creates a strong demand for corporate/commercial activities. This intersection and the location of I-295 fixed the location for the township's largest commercial/industrial/office area.
7. Since the 1980s, development has extended into the northern and western areas after vacant land in other areas was developed. Sewage disposal by way of the Neshaminy interceptor facilitated development in these areas. The real estate boom of the 1980s resulted in substantial growth in and around Lower Makefield Township.

## POPULATION PATTERNS

### POPULATION AND HOUSING

Since 1970, the township's population has more than doubled. Peak growth years were from 1980 to 2000, in which the population increased by almost 75 percent over 1970 figures. The decade of the 1980s saw the greatest change with an increase of almost 45 percent in the number of township residents. With growth leveling off between 2000 and 2010, Lower Makefield's population declined by approximately one-half percent (122 individuals), resulting in a population of 32,559 in 2010, according to the U.S. Census. However, according to the American Community Survey's 5 year estimates, between 2010 and 2017 Lower Makefield's population marginally increased by 0.2 percent (62 individuals).

All four Pennsbury School District municipalities (Lower Makefield, Falls, Tullytown, and Yardley) show decreases in population between 2000 and 2010. Falls Township and Yardley Borough continued to show decreases in population between 2010 and 2017. With the exception of Middletown Township and Morrisville Borough, which also show a population decrease, all other surrounding municipalities exhibited increases in population as did the county overall.

Growth in housing units for many years has outpaced the rate of population increase, fueled not only by new construction but also by declining household size. Today the rate of new residential construction has been slowing while household size has been stabilizing.

Table 1 lists changes in population and housing units for Lower Makefield. Table 2 compares population change for Lower Makefield, its neighboring municipalities, other Pennsbury School District municipalities, and Bucks County.

**Table 1**  
**Population and Housing in Lower Makefield, 1970–2017**

Year	Total Population	Percent Change	Housing Units	Percent Change
1970	14,804		3,982	
1980	17,351	17.2	5,542	39.2
1990	25,083	44.6	8,861	59.9
2000	32,681	30.3	11,931	34.6
2010	32,559	-0.4	12,184	2.1
2017	32,621	0.2	12,486	2.5

Source: U.S. Census, 1970, 1980, 1990, 2000, 2010  
American Community Survey, 2013-2017 5-year estimate

**Table 2**  
**Population Growth in Lower Makefield, Nearby Municipalities, and Bucks County, 2000–2017**

Municipality	2000 Population	2010 Population	2000-2010 Percent Change	2017 Population	2010-2017 Percent Change
Lower Makefield	32,681	32,559	-0.4	32,621	0.2
Falls	34,865	34,300	-1.6	33,954	-1.0
Middletown	44,141	45,436	2.9	45,224	-0.5
Morrisville	10,023	8,728	-12.9	8,630	-1.1
Newtown Twp.	18,206	19,299	6.0	19,582	1.5
Tullytown	2,031	1,872	-7.8	1,887	0.8
Upper Makefield	7,180	8,190	14.0	8,291	1.2
Yardley	2,498	2,434	-2.6	2,289	-6.0
Bucks County	597,635	625,249	4.6	626,486	0.2

Source: U.S. Census, 2000, 2010  
American Community Survey, 2013-2017 5-year estimates

## Households

Household size has been declining nationwide in recent years due to later family formation, declining birth rates, rising divorce rates, and more young people and older people living alone. There are signs that this trend has begun to abate.

The average household size and family size in Lower Makefield dropped slightly.<sup>5</sup> In 1970, the average household size in the township was 3.7, with a decline to 2.83 in 1990, 2.77 in 2000, 2.74 in 2010 and 2.7 in 2017.

The number of households in the township totaled approximately 12,000, in 2017, an increase of nearly 200 households from 2010. Households in the township were somewhat larger and more likely to have children than the countywide average. In 2010, nearly 39 percent of Lower Makefield households had at least one child under age 18, compared with 42 percent in 2000. Almost 25 percent of township households had at least one member age 65 or older compared with 19 percent in 2000.

The corresponding numbers for Bucks County in 2010 were 33.5 percent of households with at least one child under age 18, and 27.3 percent of households with at least one member age 65 or older. The average household size in the county was 2.63 persons per household.

As of 2010, about 78 percent of Lower Makefield residents lived in traditional family households; that share exceeded the countywide rate of 71.8 percent. By 2017, about 80 percent of Lower Makefield residents lived in traditional family households. Most of the township’s family households were married couples, with or without children.

While almost 80 percent of township households are family households with approximately 37.5 percent of those having children under 18 years of age, the number of family households actually declined since 2000, reversing a trend shown in the previous decade. The number of nonfamily households grew by approximately 11 percent between 2000 and 2010, and within that category, the number of householders living alone increased by almost 12 percent. From 2010 to 2017, nonfamily household trends contradicted the patterns established in the previous decade. The number of nonfamily households declined by approximately 2 percent, or 130 households. Similarly, the number of householders living alone decreased by 1.5 percent. Table 3 lists characteristics of township households.

**Table 3**  
**Characteristics of Lower Makefield Households, 2000–2017**

Characteristic	2000	2010	2017
Number of Households	11,706	11,805	12,000
Average Household Size	2.77	2.74	2.7
Average Family Size	3.13	3.14	3.0
Family Household	9,390	9,233	9,553
Married Couple Families	8,482	8,107	8,365
Nonfamily Households	2,316	2,572	2,447
Householders Living Alone	1,891	2,116	2,009

*Source: U.S. Census, 2000, 2010.  
American Community Survey, 2013-2017 5-year estimates.*

<sup>5</sup> A household is one or more persons occupying a housing unit. The occupants may be related, or not. A family household consists of two or more individuals related by marriage, birth, or adoption.

## POPULATION CHARACTERISTICS

### AGE

The township’s population has been aging, and this trend can be expected to continue. The median age in the township has been edging steadily upward, from 33.7 years in 1970, to 46.1 years in 2017– almost a full 13-year increase. The median age in Bucks County as of 2017 was somewhat lower, at 43.6 years. As the township’s population continues to age, the demand for specialized services, facilities, and housing for the elderly will likely heighten.

The upward momentum in the township’s age distribution reflects the number of baby boomers, members of the massive post-war generation born between 1946 and 1964, along with notable gains in the 65-and-older population. At the same time, the share of young adults has been diminishing. From 2000 to 2010, the township saw a decrease in the number of young adults between the ages of 18 and 34 years. This decrease is consistent with regional trends and is known as the “Brain Drain”– the trend of young professionals moving to other areas that offer more options for employment and housing.

In 2017, adults in the 35-to-54 age bracket formed the largest segment, about one-third, of the township’s adult population. Children, between the ages of 5 and 17 accounted for 19 percent of the population, and adults between the ages of 55 and 64 represented 16.7 percent of the population, while seniors age 65 and up accounted for 16.5 percent of the population.

Residents aged 55 years and older make up 33 percent of the township’s population. Middle-aged residents aged 35 to 54 decreased by 4 percent from 2010 to 2017, while the 55-to-64 age group increased by almost 2 percent.

Table 4 shows changes in the age distribution in the township from 2000 to 2017.

**Table 4**  
**Change in Age Distribution in Lower Makefield, 2000–2017**

Age	2000		2010		2017	
	Number	Percent	Number	Percent	Number	Percent
Under 5 years	2,457	7.5	1,645	5.1	1,374	4.2
5-17 years	6,560	20.1	6,841	21.0	6,191	19.0
18-34 years	4,929	15.1	4,063	12.5	4,598	14.1
35-54 years	12,060	36.9	10,914	33.5	9,621	29.5
55-64 years	3,292	10.1	4,813	14.8	5,459	16.7
65-74 years	2,017	6.2	2,380	7.3	3,399	10.4
75 years and over	1,366	4.2	1,903	5.8	1,979	6.1
<b>Total</b>	<b>32,681</b>	<b>100.0</b>	<b>32,559</b>	<b>100.0</b>	<b>32,621</b>	<b>100.0</b>

*Source: U.S. Census, 2000, 2010.  
American Community Survey, 2013-2017 5-year estimates.*

### RACE, ETHNICITY AND GENDER

The population of Lower Makefield was mostly white and native-born as of the 2013-2017 American Community Survey 5-Year Estimates. The share of white township residents was 88.5 percent, and native-born residents numbered 92.1 percent. The population was 50.9 percent female and 49.1 percent male.



The largest single minority group was Hispanics (of any race), who represented 5.0 percent of the population. African Americans represented 4.0 percent of the population, and Asian, 4.6 percent. Approximately 2 percent of residents identified as two or more races. The percentages of minorities increased slightly between 2010 and 2017.

**SOCIAL AND ECONOMIC CHARACTERISTICS**

According to the 2013-2017 American Community Survey 5-Year Estimates, township residents had incomes and levels of educational attainment that were among the highest in the county, The median (half are higher, half lower) household income was \$139,808. This is higher than that for the county, as well as all surrounding municipalities except for Upper Makefield. Almost 97 percent of residents were at least high school graduates, and 67.1 percent held bachelor’s degrees or higher. Almost a third of residents (32.3 percent), aged 25 and over, hold graduate degrees or higher. This is more than double the county average of 14.2 percent. Table 5 shows median household income for Lower Makefield, nearby municipalities and the county. Table 6 shows education attainment rates for residents in Lower Makefield, nearby municipalities and Bucks County.

**Table 5**  
**Median Income in Lower Makefield and Surrounding Municipalities, 2010-2017**

Municipality	2010 Median Household Income	2017 Median Household Income	2010-2017 Percent Change
Lower Makefield Township	\$121,260	\$139,808	15.3
Falls Township	\$62,799	\$70,000	11.5
Middletown Township	\$78,861	\$85,136	8
Morrisville Borough	\$50,980	\$68,214	33.8
Newtown Township	\$107,430	\$114,319	6.4
Tullytown Borough	\$50,677	\$64,250	26.8
Upper Makefield Township	\$155,221	\$152,981	-1.4
Yardley Borough	\$71,360	\$82,614	15.8
Bucks County	\$74,828	\$82,031	9.6

*Source: U.S. Census, 2010. American Community Survey, 2013-2017 5-year estimates*

**Table 6**  
**Educational Attainment of Residents in**  
**Lower Makefield and Surrounding Municipalities, 2017**

<b>Educational Attainment</b>	<b>Lower Makefield Township</b>	<b>Falls Township</b>	<b>Middletown Township</b>	<b>Morrisville Borough</b>	<b>Newtown Township</b>	<b>Tullytown Borough</b>	<b>Upper Makefield Township</b>	<b>Yardley Borough</b>	<b>Bucks County</b>
High school graduate or higher	96.6%	91.8%	94.2%	93.0%	96.8%	92.7%	96.0%	98.2%	93.3%
Associate's degree or higher	71.7%	28.9%	46.0%	42.1%	66.2%	17.3%	69.9%	69.0%	44.2%
Bachelor's degree or higher	67.1%	21.2%	37.9%	32.8%	60.5%	13.4%	63.8%	60.6%	37.2%
Graduate degree or higher	32.3%	6.1%	13.9%	10.4%	24.4%	2.6%	29.6%	28.7%	14.2%

*Source: American Community Survey, 2013-2017 5- year estimates.*

Compared with other municipalities in the county, Lower Makefield continued to have the largest proportion of people employed in white-collar management, professional, sales, and office occupations, at 87 percent. Table 7 shows occupation by percentage in Lower Makefield, nearby communities and the county.

**Table 7**  
**Occupation by Percentage in Lower Makefield**  
**and Surrounding Municipalities, 2017**

<b>Occupation</b>	<b>Lower Makefield Township</b>	<b>Falls Township</b>	<b>Middletown Township</b>	<b>Morrisville Borough</b>	<b>Newtown Township</b>	<b>Tullytown Borough</b>	<b>Upper Makefield Township</b>	<b>Yardley Borough</b>	<b>Bucks County</b>
Service Occupations	6.9%	15.5%	14.0%	12.1%	10.5%	13.7%	7.6%	8.0%	13.9%
Management business, science, & arts occupations	64.9%	32.4%	43.0%	39.5%	60.4%	23.8%	62.5%	57.1%	43.1%
Sales & office occupations	22.3%	30.1%	24.9%	30.8%	22.5%	30.9%	20.8%	19.5%	25.2%
Natural resources construction, & maintenance occupations	2.7%	9.0%	7.2%	7.0%	1.7%	14.5%	5.0%	5.1%	7.8%
Production, transportation, & material moving occupations	3.2%	13.0%	10.9%	10.6%	4.8%	17.1%	4.2%	10.3%	9.9%

*Source: American Community Survey 2013-2017 5-Year Estimates*

**COMMUTATION PATTERNS**

Census data on residents’ travel to work is useful in transportation and housing planning. The location of workplaces and the duration of daily commutes help explain traffic patterns. People generally prefer to live no more than a half-hour travel time from where they work (the home-to-work distance is known as the “commutershed”), so changes in the employment base within that radius will have an impact on the local housing market.

The percentage of employed township residents working out of state has declined 5.1 percent from 2000 to 2017. That percentage correlates with the 5.1 percent increase in the percentage of residents who now work within Pennsylvania compared to the year 2000. Of those residents who work in Pennsylvania, approximately 45 percent work within Bucks County, which is over a 6 percent increase from year 2000. This shift has resulted in more residents now working within Bucks County than surrounding areas. Table 8 shows workplace data for township residents in the years of 2000, 2010, and 2017.

**Table 8**  
**Place of Work for Residents in Lower Makefield, 2000 - 2017**

Place of Work	2000		2010		2017	
	Number	Percent	Number	Percent	Number	Percent
Worked in state of residence	9,821	58.7	10,309	63.2	10,646	63.8
Worked in county of residence	6,525	39.0	7,389	45.3	7,583	45.5
Worked outside of county of residence	3,296	19.7	2,919	17.9	3,063	18.4
Worked outside state of residence	6,910	41.3	6,003	36.8	6,029	36.2
<b>Total</b>	<b>16,731</b>	<b>100.0</b>	<b>16,312</b>	<b>100.0</b>	<b>16,675</b>	<b>100.0</b>

*Source: U.S. Census, 2000, 2010 and 2013-2017 American Community Survey 5-Year Estimates*

The percentage of Lower Makefield residents who work out of state is more than two times higher than the percentage of county residents who work out of state. Lower Makefield is close to the New Jersey border, and many township residents drive to work in that state. SEPTA transit links in nearby communities also provide ready access to jobs in New Jersey and New York. Table 9 contains workplace data for Lower Makefield residents and other county residents.

**Table 9**  
**Place of Work for Residents in Lower Makefield and Bucks County, 2010-2017**

Place of Work	Lower Makefield 2010	Bucks County 2010	Lower Makefield 2017	Bucks County 2017
Worked in state of residence	63.2%	85.5%	63.8%	85.7%
Worked in county of residence	45.3%	55.8%	45.5%	56.0%
Worked outside county of residence	17.9%	29.7%	18.4%	29.7%
Worked outside state of residence	36.8%	14.5%	36.2%	14.3%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

*Source: U.S. Census, 2010. American Community Survey, 2013-2017 5-year estimates.*

Compared to nearby communities in Bucks County, Lower Makefield residents generally have longer travel times to work, mainly because they commute to out-of-state jobs. Almost one third of working

township residents travel 45 minutes or more to work and, of that number, almost 20 percent travel more than an hour to reach their place of employment. Travel-to-work data are in Table 10.

According to U.S. Census information, three-quarters of working township residents drive to work alone. Almost 8 percent of working residents take public transportation to work, which is higher than that for any surrounding municipalities and more than two times higher than the percentage of workers within the entire county.

Working at home is a growing trend. The share of township residents who worked at home in 2017 was 8.1 percent, compared to 5.1 percent countywide.

**Table 10**  
**Mean Travel Time to Work for Residents in**  
**Lower Makefield and Nearby Municipalities 2010-2017**

Municipality	Mean Travel Time to Work 2010 (in minutes)	Mean Travel Time to Work 2017 (in minutes)
Lower Makefield	33	34.6
Falls Township	24	25.3
Middletown Township	24.8	29.2
Morrisville Borough	27.8	26.6
Newtown Township	31.3	32.9
Tullytown Borough	22.5	21.0
Upper Makefield Township	32.7	37.2
Yardley	26.1	29.2
Bucks County	28.1	29.8

*Source: U.S. Census, 2010. 2013-2017 American Community Survey 5-Year Estimates*

## POPULATION PROJECTIONS

Population projections are useful in helping a municipality plan for future needs, such as park and recreation facilities, emergency services, senior services, and economic growth. Population projections used for this comprehensive plan are from the Delaware Valley Regional Planning Commission (DVRPC). As part of the DVRPC’s long-range planning activities, the Commission is required to maintain forecasts with at least a 20-year horizon. The DVRPC incorporated 2015 Census population estimates in to the municipal-level population forecasts and created population estimates in five year increments through 2045.

The projections anticipate that the township’s population will increase to 33,683 in 2020, which is roughly 3 percent over the 2010 census figure of 32,559. The population is expected to continue increasing into the next decade, reaching a projected 34,474 persons by year 2030.

Population projections done for the 1992 master plan anticipated an ultimate build-out population of 42,000. The downward revision reflects a number of factors that have combined to contain population growth. They include growth management and open space preservation measures taken by the township, as well as broader trends resulting in an aging population and regional population loss.

Table 11 contains population projections for Lower Makefield for 2015 through 2045.

**Table 11**  
**Lower Makefield Population Projections, 2010-2045**

Year	Projected Population	Percent Change
2010	32,559	
2015	32,755	0.6
2020	33,683	2.8
2025	34,074	1.2
2030	34,474	1.2
2035	34,855	1.1
2040	35,181	1.0
2045	35,500	1.0

Source: Delaware Valley Regional Planning Commission 20 Year Population Forecasts

## HOUSING TYPES AND HOUSING CHOICE

Lower Makefield contains a mix of housing types. Most housing is of recent vintage. The vast majority of housing—more than 92 percent of all units—was built after World War II, with 56 percent of all housing in the township having been built since 1980. The age of housing is detailed in Table 12.

**Table 12**  
**Housing Age in Lower Makefield, 2017**

Year Built	Number	Percent
2010 or later	183	1.4%
2000 to 2009	469	3.8%
1990 to 1999	3,313	26.5%
1980 to 1989	3,035	24.3%
1970 to 1979	1,779	14.2%
1960 to 1969	1,366	10.9%
1950 to 1959	1,340	10.7%
1940 to 1949	409	3.3%
1939 or earlier	592	4.7%
<b>Total</b>	<b>12,486</b>	<b>100.0%</b>

Source: American Community Survey 2013-2017 5-year estimates.

The pace of new residential construction escalated in the 1980s and 1990s. About 20 percent of the housing stock was built before 1960, and another 25.1 percent from 1960 to 1979.

While the single-family detached dwelling continues to predominate, there are a number of residential units of different types. From 1990 to 2000, the share of townhouse, condominium, and apartment housing grew, while the share of detached housing decreased. Since then, the numbers have stabilized. Table 13 provides a summary.

**Table 13**  
**Housing Units by Type in Lower Makefield, 2000-2017**

Housing Type	2000		2010		2017	
	Number	Percent	Number	Percent	Number	Percent
Single-family detached	8,380	70.2	8,363	70.1	8,870	71.0
Attached (townhouse)	2,164	18.1	2,167	18.2	2,218	17.8
2 or more units (multifamily or apartments)	1,365	11.4	1,382	11.6	1,373	11.0
Mobile Homes	22	0.2	15	0.1	25	0.2
<b>Total</b>	11,931	100.0	*11,927	100.0	12,486	100.0

Sources: U.S. Census 2000, 2010. American Community Survey 2013-2017 5-year estimates

\*The total number of units shown in this chart is the sum total of the estimate for housing units which is different than the total number of housing units indicated from the 2010 census

The township's housing stock more than doubled in 20 years, growing from 5,542 in 1980 to 11,931 in 2000, before stabilizing at 11,927 in 2010 and slightly increasing by 2017, according to estimated data from the U.S. Census Bureau. Single-family detached housing accounted for about 70 percent of the residential stock in 2000, 2010 and 2017.

Construction of several small-to-medium infill developments of detached single-family homes has been approved or is underway, more than half situated in the more rural northwestern section of the township, off Dolington, Lindenhurst or Mt. Eyre roads. Other developments are largely situated in the vicinity of I-295 and Oxford Valley Road.

Housing other than single-family detached accounted for some 30 percent of the housing stock in 2000, 2010 and 2017. Attached housing (townhouse) was the second most common housing type in the township, representing about 18 percent of all dwelling units as of 2017.

The increase in the share of attached housing, most of which took place in the 1980s and 1990s, reflects the completion of sizable townhouse developments in the area between I-295 and Oxford Valley Road, which has been zoned for denser residential development. Because the cost of attached or multifamily housing tends to be less than single-family detached housing, this shift in the housing stock has broadened the range of housing choice in the township.

The mix of housing options in Lower Makefield is comparable to what exists in several neighboring municipalities, and offers more variety than some. The township's housing stock remains more weighted toward detached single-family homes than does the countywide housing supply, but its share of attached housing also exceeds the countywide level. Table 14 compares the township's housing stock with those of neighboring municipalities and the county.

**Table 14**  
**Housing Types for Lower Makefield, Selected Townships, and Bucks County, 2017**

Housing Type	Lower Makefield Township	Falls Township	Middletown Township	Newtown Township	Northampton Township	Upper Makefield Township	Wrightstown Township	Bucks County
Single-family detached	71.0%	60.8%	65.3%	47.1%	75.0%	88.3%	92.1%	63.3%
Attached (townhouse)	17.8%	4.4%	11.1%	41.3%	14.4%	9.3%	0.4%	15.5%
2 or more units (multifamily, apartments)	11.0%	24.2%	23.2%	11.6%	10.6%	2.4%	7.5%	19.2%
Mobile homes	0.2%	10.6%	0.4%	0.0%	0.0%	0.0%	0.0%	2.0%
<b>Total</b>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: American Community Survey 2013-2017 5-year estimates

Lower Makefield, two of its neighbors (Falls and Middletown), and Bucks County each have upward of 30 percent, but less than 40 percent, of the total housing stock in housing types other than single-family detached. Housing types other than single-family detached compose more than half of all housing in Newtown Township, 25 percent of housing in Northampton, almost 12 percent of Upper Makefield’s housing, and little less than 8 percent of housing in Wrightstown.

Newtown, Upper Makefield and Wrightstown townships conduct planning through a regional body called a jointure. In their regional planning, higher-density development has been concentrated in areas with commercial centers and available services and infrastructure.

### HOUSING COSTS AND AFFORDABILITY

The cost of Lower Makefield housing reflects a number of factors, including the convenient location of the township relative to New Jersey and Philadelphia, the desirable character of the community, the quality of community services, and the type of housing market that exists. The average cost of housing in the township has tended to be higher than the communities directly to the south and west but lower than the communities to the north (such as Upper Makefield and Solebury). According to the 2017 census five-year survey estimate, 36 percent of working Lower Makefield residents commute to jobs outside the state, and the average cost of housing in the township remains somewhat lower than in comparable suburban communities across the state border in New Jersey.

Direct intervention in housing markets is not a function of municipal government. Action at the local level may include encouraging the preservation of apartments, two-family housing, attached single housing, and other lower-cost, entry level rental and owner-occupied housing where possible, and the creation of apartments above retail as part of any redevelopment.

*Owner-Occupied Housing*—The median value of owner-occupied housing in Lower Makefield Township in 2017 was \$444,400, according to the census five-year survey. Housing prices peaked between 2007 and 2008, and have dropped since then, although there are now signs of a reversal in the trend. The data for Lower Makefield are detailed in the following two tables.

**Table 15**  
**Housing Cost Data for Lower Makefield, Neighboring Townships and Bucks County**

Township	Total Units Sold and Units for Sale	Average Price	Median Value
Lower Makefield Township	451	\$468,002.00	\$444,400
Falls Township	304	\$249,209.00	\$236,400
Middletown Township	451	\$330,022.00	\$306,300
Newtown Township	293	\$419,896.00	\$410,200
Northampton Township	476	\$446,667.00	\$392,900
Upper Makefield Township	149	\$940,886.00	\$693,500
Wrightstown Township	34	\$661,889.00	\$668,200
Bucks County	7,890	\$310,000.00	\$315,700

Source: Berkshire Hathaway Home Services, Fox & Roach Home Expert Market Report, 2019.  
American Community Survey 2013-2017 5-year estimate.

The overall rate of cost burden, which occurs when a household pays more than 30 percent of its income for home rental or ownership and related costs, was nearly 32 percent among Lower Makefield homeowner households, according to the five-year census survey, compared to 37.5 percent for Bucks County. About 22 percent of township homeowners were severely cost burdened (spending more than 35 percent of income on housing-related costs), compared to 27.2 percent in the county.

*Renter-Occupied Housing*—Housing occupied by renters accounted for 10.3 percent of all Lower Makefield Township housing units in 2017, down slightly from 2000 and 2010, when it was 11.1 percent and 12 percent, respectively. Table 17 provides 2017 data on median rents and proportion of renter-occupied housing for Lower Makefield, nearby townships, and Bucks County.

The vacancy rate for rental housing in 2017 in Lower Makefield was 4.9 percent, a rate slightly less than the countywide figure of 5.4 percent. A rate in the range of 5 to 7 percent is considered a “normal” vacancy rate to allow for market turnover. The township’s rate is a normal vacancy rate.

**Table 16**  
**Renter-Occupied Housing Units, 2000-2017: Lower Makefield, Selected Townships, and Bucks County**

Township	Percent Rental Units 2000	Percent Rental Units 2010	Percent Rental Units 2017	Median Rent 2017
Lower Makefield Township	11.1%	12.0%	10.3%	\$1,697
Falls Township	12.9%	28.3%	28.6%	\$1,108
Middletown Township	22.6%	24.4%	24.8%	\$1,270
Newtown Township	13.3%	13.6%	14.9%	\$1,548
Northampton Township	6.9%	8.2%	10.9%	\$1,681
Upper Makefield Township	6.9%	5.2%	7.6%	\$2,631
Wrightstown Township	11.7%	10.1%	8.6%	\$943
Bucks County	22.6%	22.9%	23.4%	\$1,171

Sources: U.S. Census, 2000, 2010. American Community Survey 2013-2017 5-year estimates.



The census five-year survey estimate of cost burden shows that the share of cost-burdened renters in Lower Makefield as of 2010 came to 51 percent, a figure almost identical with the countywide rate. Of township renters, nearly 39 percent were severely cost-burdened, compared to a rate of nearly 41 percent in the county.

## ADAPTED AND SPECIAL-NEEDS HOUSING

The share of the Lower Makefield adult (ages 21-64) population with a disability was 7.5 percent in 2017, rising to 48.5 percent for those 65 and older. Not all types of disability require housing modifications, but the incidence of disability provides at least a rough measure of potential demand for barrier-free adaptation or other types of housing tailored to special needs. The township's disability rates are lower than the corresponding countywide figures of 14.5 percent for adults and 64 percent for adults 65 and older. Universal design, increasingly being favored by builders, incorporates features and standards, like wider doorways and lower light switches, which can comfortably be used by occupants of all ages and abilities.

## RECOMMENDATIONS FOR ACTION

### HOUSING PLAN

1. *Mix of housing types*—The township has, through its current zoning, allowed for the required mix of housing types. Most of the areas zoned for higher-density and single-family housing have been developed.
2. *Preservation of housing mix*—The township housing stock encompasses a balanced mix of housing types, including both detached and attached housing and multi-family (apartment) housing. The latter two housing types are more affordable to many smaller, younger, elderly and lower-income household types, such as young singles and couples, single parents, and empty nesters. The zoning ordinance should continue to be monitored to ensure continued suitability of residential use types. And, through code enforcement and consideration of submittals of appropriate proposals for attached or multi-family infill housing, and for housing above retail shops, the township should make efforts to maintain its diversity of housing.
3. *Maintenance of housing stock*—Support private and public efforts to rehabilitate and maintain housing stock, including, but not limited to, disability-adaptive improvements, rehabilitation of owner-occupied and rental properties, code enforcement, and historic preservation. Give particular attention to maintenance of entry-level rental and owner-occupied housing to support affordability.
4. *Senior housing*—Since completion of the last comprehensive plan in 2003, the township has approved construction of a proposed 377-unit age-restricted housing development known as Regency at Yardley, now under construction along Oxford Valley Road and Big Oak Road, and a 62-unit age-restricted housing development by Matrix Development on Big Oak Road. This “active-adult” housing, well located near commercial development and major roads, is expected to address demand and need for independent living housing for older adults in the foreseeable future.
5. *Accessory apartments*—The township should consider potential need for in-law suites or accessory apartments as part of an overall housing strategy. This housing type supplements age-restricted-adult housing. Consideration should be given, however, to demonstrated need, ability

of the township to manage and control accessory apartments, and the regulations under which they should be permitted.

## **EXISTING LAND COVER**

Lower Makefield's location in relation to major highways and urban areas, such as Philadelphia, Trenton and New York, as well as its natural resources, have largely influenced how the township has developed over the years. While primarily a residential community, a variety of land uses exists in the township.

The northern half of the township contains the majority of Lower Makefield's agricultural lands and is more rural in nature. All of the township's preserved farmlands are located north of Interstate 295 and Route 332. The township-owned Patterson Farm, which is actively farmed, is also located in the northern section of the township, just to the southeast of Interstate 295.

Areas near the Delaware River contain mostly single-family residential uses and park areas. The presence of significant natural resources and floodplain areas between much of the canal and river have played a role in the development of park and recreational land in this area. The township's Macclesfield Park is located within this region, just south of Yardley Borough.

Residential development in the township consists of a mix of housing unit types with single-family residential the predominant land use. Single-family residential developments are located throughout the township, with many of the older neighborhoods located in the southern half of Lower Makefield, close to Morrisville and Yardley boroughs.

Multifamily residential developments are located in several different areas south of Yardley-Langhorne Road. The majority of multifamily residential development is located in the southwest portion of the township, along Oxford Valley Road and between Yardley-Langhorne Road, U.S. Route 1 and the municipal border with Middletown Township. Townhouse and multifamily dwelling communities also exist off of Big Oak and Stony Hill roads, near the intersection of Sutphin and Yardley-Morrisville roads, and just south of Yardley Borough along River Road.

Commercial and office uses are located mainly in the southwestern portion of the township paralleling the Interstate 295 corridor south of Route 332. Retail commercial land uses are generally clustered near Oxford Valley and Big Oak roads, in the village of Edgewood along Stony Hill and Yardley-Langhorne roads, and along Township Line Road at Shadybrook Farm and the commercial/office development along Route 332. Office developments exist along Oxford Valley Road, just south of the railroad tracks, and along both sides of Township Line Road near the municipal border with Middletown Township.

Parks, recreation lands, and protected open space are located throughout the township. Some of the larger protected areas include: Five Mile Woods Preserve along Big Oak Road in the southern portion of the township near Falls Township; the recreation fields and courts, pool, and playground near the municipal building along Oxford Valley and Edgewood roads; Macclesfield Park and nearby parklands bordering the Delaware Canal State Park in the southeastern portion of the township; and the township-owned Makefield Highlands Golf Course and Memorial Park, both located along Woodside Road in the northern portion of the township.

Map 4 identifies existing land cover within the township.<sup>6</sup> A detailed description of Bucks County land use classification definitions can be found in Appendix A.

### LAND USE PATTERNS IN 2019

The township has developed primarily as a suburban residential community. Since 2003, the amount of developable land in the township has declined by approximately 47 percent (608 acres). This decline is a result of both development activity and land preservation efforts that have occurred within the last decade. As land available for development decreases and the township approaches “build-out”, it can be expected that much of Lower Makefield’s future growth will consist of infill and redevelopment projects.

Map 5 illustrates land available for future development.<sup>7</sup> This map is an updated version of the map identified as Developable Open Space in the 2003 Lower Makefield Township Comprehensive Master Plan Update. In updating the map, lands previously identified as developable were reviewed against development proposals that had been submitted since 2003. Adjustments were made to the developable lands based on the status of applicable development proposals. The map includes the following categories: Developed Land; Township-Owned Property; County-Owned Property; State-Owned Property; Farmland Preservation (includes lands enrolled within Farmland Preservation programs); In the Development Process (includes lands where either a preliminary or final development plan has been submitted and where plans may be approved but construction hasn’t started); Sketch Plan (includes lands where a sketch plan for development is the most current plan submission for the site); and Developable (includes remaining lands having new development potential).

The breakdown of Developable Land within each zoning district is summarized in Table 17.

**Table 17**  
**Developable Land in Lower Makefield by Zoning District, 2019**

Zoning District	Developable land (acres)
Resource Protection - RRP	47
Residential Low Density - R-1	382
Residential Medium Density - R-2	81
High Density - R-3	6
High Density Modified - R-3M	0
High Density - R-4	9
Office Research - O/R	30
Commercial - C-1 and C-2	0
Commercial - C-3	1
Historic Commercial - HC	0
<b>Total</b>	<b>556</b>

*\*This includes lands within the agricultural security district that are presently farmed but available for future development.  
Source: LMT, 2003, 2019 and Bucks County Planning Commission data*

<sup>6</sup> Land cover classifications shown on the Existing Land Cover Map are different than those shown on Map 5 Developable Lands. Therefore, information portrayed on the maps may not be directly comparable.

<sup>7</sup> Categories shown on the Developable Lands Map are different than those shown on Map 4 Land Cover. Therefore, information portrayed on the maps may not be directly comparable.

Much of the vacant land in Lower Makefield lies in the area that was designated as the “rural” area by the 1981 master plan and by the R-1 zoning classification in the township zoning ordinance.

However, as with the rest of the township, developable land in this region has declined since 2003. One large tract, the Wright-Kimmel Farm at Lindenhurst and Yardley-Newtown roads, which contains 82.3 acres, has been permanently preserved under the county’s agricultural preservation program and is no longer a developable site. Also, several large parcels in this region have been subdivided into single-family residential lots, such as the Flowers-Madany site, now known as Brookshire Estates, in the northwest corner of the township (28 single-family lots), the Chanticleer development (19 single-family lots), the Oakmont development, formerly Moon Nurseries (15 single-family lots), and the Minehart site at Lindenhurst and Woodside roads (7 single-family lots). Several parcels in the R-2 zoning district have been subdivided, such as the Estates at Sandy Run (8-single-family lots). Many of the other residential zoning districts—R-3, R-3M, and R-4, which allow for higher density single-family and multifamily residences—are largely built up or committed for development. Two parcels on Big Oak Road in the R-3M zoning district have recently been permanently preserved; a portion of the Hildebrand property (10 acres) was purchased and the Guzikowski Farm (44.6 acres) through the purchase of an agricultural conservation easement.

The Regency at Yardley development (formerly the Matrix site) is located in both Lower Makefield and Middletown townships. The portion of the development currently under construction in the southwest portion of the township will contain approximately 377 age-restricted residential units when completed. This development also includes commercial and office components, most of which have been constructed since 2003. The nonresidential components that have been constructed include a 12,000-square foot office building located along Robert Sugarman Way, and an 11,000-square-foot pharmacy and 3,710-square-foot bank fronting on Oxford Valley Road.

Primarily office and industrial development has been planned in portions of the township along the I-295 corridor. This area had been selected for office/research uses because of the proximity to the highway and because of similar uses existing in or proposed for the surrounding area, including neighboring townships.

Since 2003, several nonresidential developments have been completed. In the O/R Office/Research District bounded by I-295, Yardley-Newtown and Yardley-Langhorne roads, a 116,000-square-foot office building was added at 777 Township Line Road and an additional office building was constructed in Phase III of the Floral Vale complex. An approved 180,000-square-foot office development for a site along Stony Hill Road has not been constructed and is still pending. Over the past few years, vacancy rates in the township’s O/R Office/Research District have been higher than desired and, from a business-viability perspective, may not be sustainable.

One commercial center designed to meet the regular shopping needs of township residents exists near Edgewood Village, consisting of the Lower Makefield Shopping Center and the Edgewood Village Shopping Center. It contains two supermarkets, an office building, and small retail stores and restaurants. The area has been designed and controlled so that it is compatible with the Edgewood Village Historic District and with the surrounding residential neighborhoods. Recent development activity within the Edgewood Village Historic District includes both new and redeveloped buildings; a bank, a café, a restaurant, other small commercial uses, and a Traditional Neighborhood Development approved for 48 single-family residential attached units currently under construction, 12 apartments and 273,238 square feet of commercial space (not yet started).

Oxford Valley Road near Route 1 has also been a focus of commercial development in the township. Anchored by a department store, the 200,000-square-foot Oxford Oaks shopping center at the intersection of Oxford Valley and Big Oak roads includes specialty shops, restaurants and a bank. The Makefield Quarters center at Oxford Valley and Heacock roads consists of 50,000 square feet of office and retail space.

Regional shopping centers, such as the Oxford Valley and Neshaminy malls, and the Business Route 1 corridor, are located in neighboring municipalities and provide more specialized shopping facilities and retail outlets than are needed within Lower Makefield.

## **CURRENT PLANNING AND ZONING POLICIES**

The current development pattern has evolved largely in accordance with the policies and ordinances of the township, with few uncommitted vacant tracts of land left. Past township plans and ordinances have embraced the notions of accommodating moderately dense suburban-type development in the areas around Yardley and Morrisville and in the center of the township, allowing higher density residential development and nonresidential development along I-295 and in the western corner of the township, protecting the riverfront area by allowing low density uses, and preserving the rural character of the northern sector with low-density uses and farmland preservation options.

The 1981 township master plan emphasized the “contrast between the urbanized area in the south and east and the rural areas to the north and west.” The 1981 land use plan and its successor in 2003 recommended low-density residential uses to the north of I-295 and in the area between I-295 and Mirror Lake/Creamery Road. The township has developed in a way that reflects earlier plan policies, except that development and growth occurred at a faster pace than expected.

Today, the township is nearly fully developed, with little suitable land remaining for new larger-scale construction. Most of the development during the term of this plan is expected to take the form of infill or redevelopment of existing properties.

The Lower Makefield ordinances and plans allow for several types of housing. Diversity of housing types accommodates families and individuals at various stages of the life cycle, and helps promote sustainability, affordability, and a robust local labor market. Although the township has developed with a predominance of single-family units, the housing types permitted are:

- Single-family detached
- Single-family attached (townhouses)
- Multifamily
- Duplex
- Mobile homes
- Age-restricted housing.

The Pennsylvania Municipalities Planning Code requires that townships provide for four housing types: single-family, two-family (duplex), multifamily, and mobile homes.<sup>8</sup> The township ordinance addresses all four types. Single-family detached units are permitted on a range of lot sizes, with the smaller lots at 10,000 square feet.

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<sup>8</sup> Pennsylvania Municipalities Planning Code, §604 (4)

The township has seven zoning districts for residential uses.

1. The R-RP Residential Resource Protection District is a low-density residential district along the Delaware River and Delaware Canal that provides protection for the floodplain and wooded areas along the river.
2. The R-1 is a low-density residential district located primarily in the northern portion of the township. Farmland preservation developments are permitted.
3. The R-2 district allows single-family development on smaller lots and encompasses most of the area in a band around Yardley Borough where the older suburban-type developments have been built.
4. The R-3 district allows for attached housing (townhouses) and is located south of the railroad line and between Stony Hill and Oxford Valley roads.
5. The R-3M district provides for small-lot single-family residences. This district is located along the western side of Stony Hill Road, between medium- and higher-density residential districts.
6. The R-4 district allows for multifamily development, as well as duplexes and attached housing. The multifamily density is 12 units per acre; a 6-unit per acre density is permitted for duplexes and townhouses. The R-4 district lies south of Edgewood Village between Heacock Road, Yardley-Langhorne Road, the township's boundary with Middletown, and the railroad line.
7. The R-4 district and the C-3 district allow for mobile home parks. Also, housing and related amenities geared primarily for persons aged 55 and older are provided under the Age Qualified Community use which is permitted in both the C-2 and C-3 districts. The C-2 and C-3 districts lie along Oxford Valley Road, south of the railroad line in the southern portion of the township.

Providing opportunities for a variety of nonresidential uses is important from an economic development perspective. A land use scheme that includes both residential and nonresidential uses balances the tax base, helps to meet resident demand for goods and services, and provides employment opportunities.

The township has five zoning districts intended to accommodate nonresidential uses. In addition, the township has an overlay district intended to accommodate mixed uses.

1. The C-1 Commercial Neighborhood District allows retail and service uses on half-acre lots to serve nearby residential neighborhoods. This district is located along the western side of Heacock Road in the vicinity of Edgewood Village.
2. The C-2 Commercial Highway Services District provides for a variety of retail and service uses, many of which are highway-oriented uses, on sites of at least one acre. Age Qualified Community is a permitted residential use in the C-2 District. This district is located along both sides of Oxford Valley Road near the municipal border with Falls Township.
3. The C-3 General Business/Industrial District allows retail, service, and light industrial uses on sites of 2 acres and greater. This district also permits the Age Qualified Community residential

use. The C-3 District is located along the western side of Oxford Valley Road, south of the railroad tracks.

4. The H/C Historical Commercial District allows single-family residential uses and a variety of retail and office uses typically found in historical villages. This district is located at the crossroads of Stony Hill and Yardley-Langhorne roads.
5. The O/R Office Research District allows for various types of office and service uses, along with research and development uses on sites having at least 2 acres. This district is located west of Interstate 295, between Yardley-Newtown and Yardley-Langhorne roads.
6. The Traditional Neighborhood Development (TND) Overlay District was adopted in 2007 to allow new and infill development to consist of a combination of residential and nonresidential uses that are compatible with the character of Edgewood Village. The TND District is an overlay to the Village of Edgewood's Historic Commercial District and also includes several adjacent parcels to the north that are currently zoned R-1.

## MARKET AREAS

A review of retail market data for the township's two most significant concentrations of commercial activity: Edgewood Village and the Oxford Oaks shopping center (which forms a small part of the sizable Oxford Valley regional market), can aid in determining actions that could support the township's economic development objectives. Economic development requires a multi-pronged, nuanced approach that understands the local market and business environment, engages business owners and residents, and builds on community strengths.

Data generated by ESRI<sup>9</sup> can be used to create a market profile of retail sales supply and demand, which takes into account factors that include population, housing units, household income, median age, and driving time from the trade area under evaluation. Both the Edgewood and Oxford Valley trade areas are in portions of adjoining municipalities in addition to all or part of Lower Makefield.

They have variable scope, depending on whether the 5-minute, 10-minute, or 15-minute drive time is under consideration. Detailed data tables and market area maps can be found in Appendix B.

The market profiles derived from the data notes categories where retail "leakage" is taking place, that is, people are going outside of the trade area to purchase goods and services, resulting in excess demand, based on national consumer spending averages, and the potential opportunity for a retail category to locate in the area. Conversely, the market profile also notes categories where spending exceeds the national average, suggesting that a surplus of particular goods and services may exist within the trade area.

The median 2018 household income for the Edgewood market area ranged from \$122,537 within 5 minutes' driving time to \$84,341 within 15 minutes' driving time. The top categories showing leakage, or unmet demand, within up to 15 minutes' driving time of Edgewood, and of a nature potentially suitable for the Edgewood Village retail center, are: electronics and appliance stores (excluding department stores); clothing stores; sporting goods/hobby/musical instrument stores; general merchandise stores

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<sup>9</sup> ESRI Business Analyst is a web-based mapping and analytic tool for the analysis of demographic, economic, education, and business data.

(excluding department stores); florists; used merchandise stores (including consignment shops); and full-service and limited-service restaurants.

The median 2018 household income for the Oxford Valley market area ranged from \$102,912 within 5 minutes' driving time, to \$70,093 within 15 minutes' driving time. The top categories showing leakage, within up to 15 minutes' driving time of Oxford Valley, and potentially suitable for the Oxford Oaks shopping center area, are: electronics and appliance stores; lawn and garden equipment and supply stores; general merchandise stores (excluding department stores); florists; used merchandise stores (including consignment shops); banquet halls; and full-service and limited service restaurants. Given the minimal surplus, building materials and supply dealerships may also present retail opportunity in the Oxford Oaks shopping center area. (The Oxford Valley findings of the market analysis should be viewed with particular caution, since Oxford Oaks constitutes such a small part of the trade area.) Review of the range of data in Appendix B may reveal other potential opportunities to fill vacancies in Oxford Oaks.

## **FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION**

### **LAND USE PLAN**

Given the state of development in the township and the satisfaction with the land use pattern and type of development that has occurred, the plan recommends few modifications to the prevailing land use guidance program and zoning concepts. Where changes are suggested, they take into account current and anticipated future conditions in the township and innovations in growth management techniques. Map 6 shows recommended future land use patterns.

In opinion surveys, residents have expressed a strong preference for maintaining undeveloped sites as parkland, farmland or open space. Although it may not be possible to maintain privately owned land undeveloped in perpetuity, the township seeks through its land use policies and regulations to maximize and encourage the preservation of farmland and open space.

1. *Office, commercial and industrial development*—Review permitted uses in the O/R Office Research District to identify and incorporate additional uses, taking into account also the nature of pending or approved development within the district and in adjoining Edgewood Village. Consider allowing for mixed use projects consisting of office, retail, residential, entertainment and other similar uses, either as permitted uses or through the establishment of an overlay district. Review O/R Office Research District zoning and design standards to determine what should be updated to reflect current ways that allowed uses operate. The township continues to plan for:
  - Office/research uses in the area west of I-295 between and adjacent to Yardley-Newtown Road and Yardley-Langhorne Road;
  - Office/commercial uses in areas east of I-295 adjacent to Oxford Valley Road and the Middletown Township border;
  - Good design and architecture that are compatible with the community.

To promote healthy occupancy rates, and improve them where necessary, efforts should concentrate on supporting and strengthening existing commercial and office areas. Explore ways to renew or redevelop older nonresidential development, and encourage marketing and promotion. The ESRI data and other market surveys may be useful in determining demand for various classes and types of commercial, office, research, and light industrial space, or in discovering unmet needs for space or specialty facilities. The township's Economic Development



Committee, which has undertaken a business survey, is an important source of expertise and assistance that can be tapped to help conduct these and other activities involved in supporting the business sector.

High vacancy rates, in the range of 30 to 50 percent, now exist within the O/R District. This situation reflects, in significant part, socioeconomic changes that include a regional surplus of office space, contraction in the office sector, more home-based employment, and increased interest in locating offices near public transit (i.e., transit-oriented development). Locally, the closing of Lockheed Martin in Newtown Township vacated much of the 500,000 square feet of space including 21,000 within Lower Makefield. The trend is not likely to be reversed soon.

Vacant or under-used office and light industrial space can adversely affect the tax base, through successful tax appeals that result in reduced assessment value, as well as loss of potential consumer spending by companies and their individual workers. In reviewing uses for the O/R District, then, particular attention should be directed to the viability and marketability of the resulting development types. Regarding design standards, it is important to foster pedestrian connectivity to and economic synergies with Edgewood Village (see Item 2, below) and to promote efficient traffic flow and vehicular access to and from the Stony Hill Road/Newtown Bypass intersection. The outcome of pending plans for the Shady Brook farm site may also factor into the review of uses and standards, to ensure compatibility of uses, design, and vehicular access.

2. *TND*—Edgewood Village is in the process of being redeveloped under provisions of the TND overlay within the Historic Commercial District. In completing build-out of Edgewood Village, efforts should be made to maximize pedestrian connectivity with the adjoining O/R District, to encourage patronage of village businesses; and assist in providing long-term economic sustainability for the village.
3. *Cluster development*—Consider using the cluster development option where a portion of a tract in single-family residential zoning districts can be developed in order to preserve the remaining area.
4. *Farmland preservation*—Continue to encourage complementary use of the township’s farmland preservation ordinance and the Bucks County Agricultural Land Preservation Program, as appropriate. The enrollment of the Wright-Kimmel farm along Yardley–Newtown Road into the county’s program is consistent with this recommendation. Applications to the program from other farms within the agricultural security district are encouraged. Township open space bond monies may also be used to preserve farmland.

The farmland preservation ordinance (Section 200-17 of the zoning ordinance) applies to the R-1 low-density residential district. To promote use of the ordinance, change farmland preservation from a conditional use to a permitted use.

Local agriculture plays a role in maintaining a sound and diversified economy. To support farming, periodically review uses and standards in affected residential and nonresidential districts to ensure continued, adequate provisions for farm stands, farmers’ markets, or other agriculture-related activities.



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## COMMUNITY FACILITIES AND SERVICES

A primary goal of the master plan is to anticipate the need for community services and facilities. One of the goals embodied in the Vision for the Future says that the township should:

*“Provide a full range of public facilities and services to meet the existing and projected needs of the township’s residents in a cost effective and equitable manner.”*

The following sections of the plan deal with the services provided by or for the township; anticipated future needs; and recommendations for future actions for:

- police protection and emergency management
- fire protection
- school facilities
- water supply
- sewage facilities
- stormwater management
- emergency services
- township administration
- township public works
- solid waste management (including recycling)
- library services
- hazard mitigation

The township has established a township complex on Edgewood Road. Many of these facilities have their headquarters at the township complex, and this master plan endorses the concept of having township facilities located in a central area in order to provide more efficient management and maintenance. Map 7 shows community facilities in the township.

### POLICE PROTECTION AND EMERGENCY MANAGEMENT

The Lower Makefield Police Department is housed in the township building on Edgewood Road. The department has 40 sworn officers which includes the captain and a lieutenant. There are also two part-time and three full-time clerical persons. The department lies below the township offices with a separate entrance on the lower level.

The facilities include a clerical area, chief’s office, squad room, conference room, a storage area used for stolen property and evidence, a records room, a storage area for old records and a firearms training facility. The department has occupied its current quarters since the late 1970s. Over the last several years, the department was evaluated for accreditation by the Pennsylvania Chiefs of Police. Upgrading of the physical facilities was necessary for the department to achieve full accreditation. The police department is now a State Accredited Law Enforcement Agency.

Following a feasibility study in 2001, the department expanded and renovated its facilities in keeping with state and federal mandates that carry requirements that affect staff, recordkeeping, and facilities. These include:

- separate female and male locker/bathroom areas

- secure evidence storage area with video monitors
- criminal evidence processing area
- armory to secure weapons and gear
- private conference and interview rooms
- renovation of the firearms training facility

The police department has initiated the following various programs to provide additional services and enhance public safety:

- *Lifesaving* – The police department has been at the forefront of promoting the opiate reversal drug Naloxone (“Narcan”). In 2015, the department was the first police department in the county to begin administering the drug. All of the progressive police agencies in Bucks County are now administering the reversal drug.
- *“Citizens Take Aim At Crime” program* – Initiated in 2015, the “Citizens Take Aim At Crime” program (CTAAC) encourages all residents to register private home video cameras, such as the Ring system, surveillance systems, and security cameras, with the police department to be used only to aid in major investigations and for the safety of township citizens.
- *Public notifications* – The department uses the “Crime Watch” website to notify residents of crime patterns, wanted persons, traffic safety issues, current events, etc. Local television, social media, and print media are regular partners of the police department and follow both Crime Watch and Twitter.
- *Civilian/Police partnerships* – The department has formed relationships with citizens groups and private corporations that support public safety initiatives such as the Police Canine Unit, Neighborhood Watch, Emergency Management, etc. The Lower Makefield Township Police Department currently has two bomb and one drug K9 teams.

Recent events have underscored the need to prepare for large-scale emergencies resulting from man-made or natural disasters. The police chief coordinates the township’s nine-member interdisciplinary emergency management committee. The committee includes representatives from the police department, a police captain, fire company, emergency medical services squad, and civilians with special expertise.

Locations and facilities vulnerable to disaster emergencies have been assessed. The committee has produced an emergency management operations plan that has been accepted by the Bucks County Emergency Management Agency. It prescribes actions to be taken by government, first responders and others to protect lives and property and minimize damage.

## **Future Needs and Recommendations for Action**

### **POLICE PROTECTION**

1. *Staff*—The department reassesses its staffing needs quarterly in accord with procedures developed by the International Association of Chiefs of Police. These procedures help provide a “ballpark” figure for police staffing by using the number of complaints or incidents received by a department each year as a basis for determining the need for patrol officers. This approach takes into account the actual demands made upon a police department, not merely the size of the

township population, thus reflecting local conditions. It is projected that the staffing levels of sworn officers, over the next five years, should be increased to 41 officers to include the rank of a patrol Lieutenant.

## EMERGENCY MANAGEMENT

1. *Training for first responders*—It is a priority to provide emergency management training to police, fire, medical and other personnel who are designated to be first on the scene in case of disaster. Refresher courses and specialized training should be offered as necessary to maintain preparedness. Emergency planning should be periodically reviewed and updated. A partnership was formed with the Pennsbury School District as well as with local parochial and private schools to provide security for students and staff and to meet their security concerns. Safety assessments are conducted for all schools in Lower Makefield Township.
2. *Township building*—The township building and other important municipal facilities should be made as secure as possible. Building improvements may be necessary. Safety and security should be prime considerations in any rehabilitation or construction projects. The police oversee video surveillance systems at the township building and many township facilities.
3. *Information sharing*—Technology (computer hardware, software, telephone networks and other communications systems) and staffing should be obtained to increase information sharing by public safety agencies and provide back-up capacity in emergency management operations.

## FIRE PROTECTION

Under the Second-class township code, the local government is responsible for providing fire protection to the township. Fire protection is provided by volunteer fire companies but the township has a responsibility under state law to give financial support and to pay workers' compensation for volunteer firefighters.

The Yardley–Makefield Fire Company provides primary service. The Morrisville Fire Company covers a small portion of the township near Morrisville. Mutual aid agreements with seven neighboring fire companies provide additional service that helps to assure adequate protection in all parts of the township.

Yardley–Makefield Fire Company has two stations that house its nine pieces of equipment and three boats: a station in Yardley Borough at College Avenue and Main Street and a station in Lower Makefield on Stony Hill and Heacock roads. Renovations to the Yardley Borough station were completed in 2009. Currently, the fire company is undertaking a complete renovation of the station on Stony Hill and Heacock roads to meet current standards.

The fire company has 49 volunteer firefighters. Fire company functions include emergency rescue and response, as well as firefighting and fire prevention.

Firefighter training is provided at the Bucks County Fire School and is paid for by the individual fire companies. Firefighters may also need to take advanced training courses or periodic refresher courses to upgrade and maintain specialized skills and certifications.

Township support for the fire companies is provided through a fire tax of three mills, which is used to assist in fire company operations and for the purchase and maintenance of fire equipment for the

company. Personnel needs for fire protection are provided by the fire company volunteers, as are supplemental funding and equipment. Public donations provide some additional financial support.

### CURRENT PLANNING AND FACILITIES POLICIES

*Review of plans by township fire consultant*—The township must be assured that the building that occurs can be adequately protected against fires. For this reason, all applications for development are reviewed by the township fire consultant, who makes recommendations regarding the fire protection needs of proposed developments. These recommendations address issues such as street layout, hydrant locations, and water line dimensions.

*Building code requirements*—The township’s building codes require fire detection devices in new buildings and new residences.

*Financial support*—The township fire tax of three mills is used to support the fire company. (A mill equals \$1 tax on every \$1,000 of assessed property value.) In addition, the township has paid for and owns some of the fire company equipment.

### FUTURE NEEDS

The largest single challenge to the perpetuation of the volunteer fire fighting system is maintaining an adequate corps of volunteers. When the volunteer system evolved, people lived and worked in the same community, which enabled firefighters to be available during the work day for emergencies. With fewer people living and working in the same place, many volunteer fire companies have encountered manpower shortages.

Different types of development also affect the firefighting needs of the township. There is an increased vulnerability in multi-family units where residences adjoin each other. Similarly, large office buildings and stores require different types of fire protection than the typical single-family suburban residence. Both of these types of development require adequate building code standards so that fire controls are placed in buildings to prevent rapid spread of fires if they occur.

The Bucks County Community Facilities Plan: Emergency Services examines the location of fire stations located throughout the county. Using the standards set by the Insurance Service Office, the national insurance industry service group which provides rating schedules, the report identifies areas which fall outside of the recommended service areas. The Insurance Service Office recommends that suburban areas be within a 2.5-mile radius of a fire station with a first-response engine. With the exception of a small area in the northern portion of the township, most areas within Lower Makefield fall within the recommended distance from a fire station. This section receives coverage through a mutual assistance arrangement, which should be monitored to ensure continuing adequacy.

### RECOMMENDATIONS FOR ACTION

1. *Fire company staffing*—The township should partner with the fire company to educate the community about the importance and need for volunteer firefighters. The fire company’s volunteers perform various duties which include reports, hazardous materials inventories, recordkeeping, grant-writing, and investigations. These duties, many of which are necessary to stay compliant with various agencies, have increased in volume complexity as the township has grown, regulatory requirements have increased, and buildings and infrastructure have begun to age.

The township retains a paid consultant to review building plans for fire safety compliance and has two part-time fire inspectors to inspect commercial properties in the township. But most of the operations and administrative duties continue to be performed by fire company volunteers. It has become difficult for volunteers to keep up with the demand for services and reports, to carry out preventive inspections, and to impose and collect fines for violations.

The township may need to consider adding paid staff to assist with operations and administrative duties in the fire company. Such staff could also supplement the number of volunteers available for daytime calls.

2. *Service Area*—Monitor fire protection service in the northern portion of the township to ensure adequate fire protection service is provided to accommodate present and future development that may occur in this area.

## SCHOOL FACILITIES

The township is part of the Pennsbury School District, along with Falls Township, Yardley Borough, and Tullytown Borough. In making mid- and long-range facilities plans, the school district takes into account school enrollment trends as well as building and educational needs. Total enrollment peaked at 11,429 in 1999, and has generally declined since then.

The school district bases its future enrollment projections on a variety of factors including pupil counts in housing of different types and development activity. During past decades, the district has seen the number of pupils per household drop. In the 1960s and 1970s, the average number of students per dwelling unit was as high as 0.86; this number had declined to 0.51 students per housing unit by 2015.

Diminished development activity also acts to stem growth in the student population. The district’s feeder municipalities are at or approaching buildout. Age-restricted senior housing has been a primary development type in recent years. Most recently, there have been smaller, newly constructed townhouse developments. There has been increased turnover of older homes throughout the district.

Birth rates have fluctuated over the last seven years, but overall, have trended upward since 2011. Birth rates within the four municipalities served by the Pennsbury School District are shown in Table 18.

**Table 18**  
**Birth Rates, Pennsbury School District, 2011-2017**

Municipality	2011	2012	2013	2014	2015	2016	2017
Lower Makefield Township	166	150	234	283	207	283	299
Falls Township	281	254	312	370	330	316	321
Tullytown Borough	13	15	12	21	19	21	13
Yardley Borough	19	20	19	22	24	30	22
<b>District Total</b>	<b>479</b>	<b>439</b>	<b>577</b>	<b>696</b>	<b>580</b>	<b>650</b>	<b>655</b>

*Source: Pennsylvania Department of Health, via Pennsbury School District*

Student enrollment at all grade levels is expected to slowly increase through 2027. Enrollment projections for the school district from 2018-2019 through 2026-27 are shown in Table 19, and show an overall increase of 6.7 percent by the 2026-2027 school year.

**Table 19**  
**Projected Enrollment by Grade, Pennsbury School District, 2018-2026**

Year	K to 5	6 to 8	9 to 12	Total	Number	Percent
2018-19	4,544	2,442	3,067	10,053		
2019-20	4,565	2,505	2,987	10,057	4	0.04%
2020-21	4,629	2,528	2,950	10,107	50	0.50%
2021-22	4,724	2,500	2,962	10,186	79	0.78%
2022-23	4,808	2,483	2,984	10,275	89	0.87%
2023-24	4,945	2,454	3,004	10,403	128	1.25%
2024-25	5,099	2,409	3,028	10,536	133	1.28%
2025-26	5,155	2,452	3,019	10,626	90	0.85%
2026-27	5,212	2,557	2,959	10,728	102	0.96%
<b>Cumulative Change 2018-2026 =</b>					<b>675</b>	<b>6.7%</b>

*Source: Pennsbury School District*

The school district employs the “campus concept” for its middle schools in a central location at Makefield, Big Oak, and Derbyshire Roads to bring together students from all parts of the district and to allow for shared facilities, such as athletic fields. Similarly, Pennsbury High School occupies a consolidated high school campus in Falls Township comprising Pennsbury High East Campus and Pennsbury High West Campus.

The district began the 2012-2013 school year with one high school, three middle schools and eleven elementary schools. Due to declining enrollment, the district formed two committees to evaluate future enrollments and building use. The Village Park Elementary School in the Fairless Hills section of Falls Township was closed in September 2013, based on the plan drafted by an elementary school redistricting committee composed of equal numbers of parents and school administrators. The plan entailed redistricting a total of 650 students into the remaining 10 elementary schools.

Most of the elementary schools have been renovated since 2003, with improvements to the HVAC system and/or addition of classroom and library space. The exception is Edgewood Elementary, which will be evaluated for improvement needs. School officials will also evaluate the Charles Boehm Middle School for renovation needs. Pennwood Middle School completed a major renovation during the 2017-2018 school year.

#### **FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION**

School officials will continue to monitor building conditions, and implement improvements as warranted by physical condition and educational capacity. The middle school redistricting committee will review enrollment data and issue recommendations regarding potential middle school changes, as needed.

The township should continue to maintain communication with the school board and district administration regarding the recommendations of the building space committee, and on future needs for new facilities, renovations, and other specific district plans. Periodic meetings should be held between the board of supervisors and school board representatives to discuss enrollment patterns, development applications, and future needs.



## WATER SUPPLY

Most of the residents and businesses in Lower Makefield have access to public water. The Pennsylvania-American Water Company (PAWC) holds the franchise rights to most of Lower Makefield, excluding a small section near Morrisville, which is served by the Morrisville Water Authority.

Historically, there was a period of time when it was envisioned that public water would not be extended beyond I-295 (to the north and west), as part of the township’s effort to control/manage growth by limiting the extension of public services. The 1981 comprehensive plan recommended that public water be contained within the bounds of I-295 until the year 2000, but the water lines were extended beyond this area during the 1990s. The 2003 comprehensive plan stated: “The township should coordinate its long-range planning with the long-range planning of PAWC to make sure that water can be provided to the entire township through all stages of development of the township. The PAWC may wish to revise its usage projections to reflect revisions to the township’s “build-out scenario.”

Previous comprehensive plans reported a trend toward greater reliance on surface water than on groundwater, and groundwater wells have become less reliable as the township moves toward maximum build-out. Historically, groundwater supplies have not been adequately recharged because water runs off impervious surfaces rather than infiltrating back into the ground. Water taken out of the ground for use is not returned to the ground, but is transported out of the area by sewage treatment systems.

Water supplies come from a combination of surface water from the Delaware River and five wells. Three wells are located on West College Avenue, and two are on Highland Drive. Storage is provided by four standpipes and one elevated tank, with a capacity of 3.5 million gallons.

Table 20 summarizes water usage and sources, based on annual data for 2019.

**Table 20**  
**Water Supply and Water Usage in Lower Makefield, 2019\***  
**(Area served by Pennsylvania-American Water Company)**

Water Supply and Water Usage	
Domestic users	11,931
Commercial users (includes tenant/landlord accounts)	630
Total average water use for domestic customers	1,664,200 gallons per day
Average water use per person	49.1 gallons per day
Total average water use for all customers	2,256,179 gallons per day
Water supplied by wells per day	1,120,415 gallons per day
Water supplied from the Delaware River	2,552,548 gallons per day

*\*Figures also include customers in Yardley and Falls, numbering about 20 percent of the total in PAWC’s Yardley service area.*

*Source: PAWC*

Average per capita water usage varies greatly from one water company to another within Bucks County. A small part of Lower Makefield next to Morrisville Borough is provided with water by the Morrisville Water Authority. Morrisville withdraws all its water from the Delaware River, and average residential use per day is about 30 gallons per person for the entire service area. The water authority’s service area includes Morrisville Borough and portions of Falls and Lower Makefield.

The water suppliers are regulated by the Delaware River Basin Commission and the Public Utility Commission. The Delaware River Basin Commission has endorsed and promotes the concept of conjunctive use, which means relying on surface water and groundwater in combination so that in times of low flow, water will continue to be available from wells.

### FUTURE NEEDS

Future water needs can be expected to decline slightly due primarily to a continuation of historic trends of declining household size, and increased use of low flow plumbing fixtures. These calculations performed by the PAWC and shown in Table 22 assume a reduced water usage of 48 gallons per day per person, which is a reduction of 4 percent compared to current usage in PAWC’s Yardley service area which is composed largely of customers in Lower Makefield. The information in Table 21 was provided by PAWC in 2014.

**Table 21**  
**Projected Demand for Water in Lower Makefield, 2015-2025\***

Projected Demand for Water	2015	2020	2025
Residential	2,064,000	1,996,000	1,891,000
Commercial	424,000	427,000	431,000
Average daily total**	3,350,000	3,280,000	3,170,000

*\*Includes customers from other municipalities within PAWC’s Yardley service area.*

*\*\*Includes usage for other than residential or commercial purposes.*

*Source: PAWC*

The Delaware River Basin Commission, which deals with withdrawals of groundwater and surface water, has given the Pennsylvania-American Water Company the right to withdraw up to 6 million gallons per day from the Delaware River. The projected usage for the township by 2025 is estimated at about 3.17 million gallons per day.

### RECOMMENDATIONS FOR ACTION

The township, because it is served by a private water company rather than a municipal service or authority, has minimal control over the water supply system. It is nonetheless important for the township to be cognizant of the importance of a safe and reliable water supply to the community. Adequate drinking water is a primary resource that deserves the attention of township officials, even though water is provided by an independent utility.

1. *Groundwater*—The township should be attentive to the conservation of groundwater supplies. If the current policy of conjunctive use is to succeed, then groundwater resources need to be available in the future.

It is recommended that the township attempt to safeguard its groundwater supplies and preserve existing well sites as a contingency for future use. The township should take groundwater recharge into account in devising its regulations regarding stormwater management, impervious surface limits, and the preservation of open areas.

2. *Wellhead protection*—Wellhead protection is a comprehensive program to protect public groundwater supply sources from contamination. The township should evaluate the need to adopt wellhead protection standards to ensure that its water suppliers and the township (through

land use planning and zoning) are protecting source water quality and supply in accord with the requirements of the federal and state Drinking Water Acts.

3. *Water conservation*—The Delaware River Basin Commission recommends that various water conservation measures be implemented at the municipal level. These measures require water-saving fixtures, such as low-flow shower heads and low-flow toilets, in new construction. The township building code requires water-saving fixtures. The township, through its code enforcement office, should assure that water conservation aspects of the building code remain up-to-date. Township residents should be made aware of conservation measures and building codes that support water conservation.
4. *Coordination with water company*—The township should coordinate its long-range planning with the long-range planning of PAWC to make sure that water can be provided to the entire township through all stages of development of the township. The PAWC may wish to revise its usage projections to reflect revisions to the township’s build-out scenario. It is recommended that the board of supervisors hold annual meetings with representatives of the water company to discuss their activities and long-term plans

## SEWAGE FACILITIES

The Lower Makefield Municipal Sewer Authority (LMMSA) owns and maintains the sanitary sewer collection and conveyance system which extends throughout most of the township’s boundary. Smaller portions of the township are served by the conveyance facilities of other municipalities or authorities.

While there are no wastewater treatment plants within the township, the township’s wastewater collection and conveyance system (portions of which date back to 1966) has been expanded over the past three decades by extensions constructed by developers or through municipally sponsored sewer extension projects. LMMSA’s wastewater system is now composed of approximately 160 miles of gravity sewers, 14 pumping stations, 12 miles of force mains, several low pressure sanitary sewer systems, and seven wastewater flow metering stations.

Both the Morrisville Municipal Sewer Authority Wastewater Treatment Plant (WWTP) and Philadelphia’s Northeast Wastewater Treatment Plant provide treatment of sewage collected from Lower Makefield. Sewage is conveyed to the Philadelphia Northeast plant via conveyance lines owned by both the Bucks County Water and Sewer Authority and Falls Township. Lower Makefield has made a commitment to provide public sewerage service to most areas of the township by requiring developers to tie into the township’s existing collection and conveyance systems. The township has also worked with developers to provide service to nearby existing property owners that are currently utilizing on-lot sewage disposal systems.

The township is divided into six service areas, as listed, based on agreements with other municipalities or authorities for wastewater conveyance and/or treatment:

- Morrisville Municipal Sewer Authority service area (collection/conveyance by LMMSA, treatment at Morrisville wastewater facility);
- Yardley Borough service area (collection/conveyance by LMMSA, treatment at Morrisville wastewater facility);

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- Falls Township service area (collection/conveyance by Township of Falls Authority, treatment at Philadelphia Northeast wastewater facility);
- Falls Township contract area (collection/conveyance by Township of Falls Authority, treatment at Philadelphia Northeast WWTP);
- Core Creek service area (collection/conveyance by Bucks County Water and Sewer Authority, treatment at Philadelphia Northeast wastewater facility); and
- Middletown Township service area (collection/conveyance by Bucks County Water and Sewer Authority, treatment at Philadelphia Northeast WWTP)

The Pennsylvania Department of Environmental Protection (PaDEP) requires that Lower Makefield Township maintain a current Act 537 Sewage Facilities Plan. The purpose of the Act 537 Plan is to identify the means and methods for providing wastewater treatment and disposal for every property in Lower Makefield Township. The methods of providing wastewater treatment in Lower Makefield Township include individual on-lot systems and the connection to the public sanitary sewer system. The Act 537 Plan is recommended to be updated every ten years to identify any new or changing wastewater needs in the township. The Act 537 Plan is also a planning tool for the LMMSA as well as the other Authorities that provide service to Lower Makefield Township. The Act 537 Plan provides flow projections for the next twenty years. This allows for the long-term planning for improvements and upgrades to the existing collection, conveyance, and treatment facilities by the Authorities that provide public sanitary sewer service to the residents of Lower Makefield Township. The Act 537 Plan identifies any projected capacity issues that need to be addressed and the time frame for which they need to be addressed so that the improvements and upgrades are in place by the time that they are required.

The township has recently had two Act 537 Plans adopted and approved by the PaDEP and is working on a third Act 537 Plan Update.

The first is the Yardley Borough Service Area Act 537 Plan. The Yardley Borough Act 537 Plan addresses the conveyance of wastewater generated in Lower Makefield Township through Yardley Borough's conveyance system for ultimate treatment at the Morrisville Municipal Authority WWTP. The Act 537 Plan implements an inter-municipal agreement that was executed on November 20, 2015, and the Agreement outlines Lower Makefield Township flows into Yardley Borough at 1.764 million gallons per day (mgd).

Per the Yardley Borough Act 537 Plan, anticipated development projects for both Yardley Borough and Lower Makefield Township project that approximately 550 additional EDUs will be connected to the Yardley Borough Sewer Authority (YBSA) system by 2020, and a total of 822 EDUs will be connected within the next 20 years. At this time, certain conveyance sewers are operating at or near maximum capacity during peak flow events. In order to accommodate the planned connections, capacity in these sewers is proposed to be increased. Therefore, Yardley Borough prepared an Act 537 Plan to resolve the issue through the construction of bypass relief sewers.

Bypass relief sewers will be constructed parallel to existing conveyance sewers at Buck Creek Interceptor and Longshore Sewer. Existing conveyance sewers at the Brock Creek Interceptor will be reconstructed in place with larger diameter sewers. The additional capacity gained from this alternative is expected to be adequate for the 20-year planning period. All of the proposed upgrades and construction will occur in Yardley Borough.

Lower Makefield Township adopted the Yardley Borough Act 537 Plan by Resolution No. 2359 in February of 2018. The PaDEP then approved the Yardley Borough Act 537 in the spring of 2018, which formally incorporated it as part of Lower Makefield Township's Act 537 Plan.

The township has recently updated its February 1999 approved Act 537 Sewage Facilities Plan for the Neshaminy Interceptor service area. This is the portion of Lower Makefield Township that conveys its wastewater to the Neshaminy Interceptor. The Neshaminy Interceptor is owned and operated by the Bucks County Water and Sewer Authority (BCWSA). The Neshaminy Interceptor conveys the wastewater flows to the Totem Road Pump Station. The Totem Road Pump Station conveys the wastewater to the City of Philadelphia Water Department's Northeast Wastewater Treatment Plant. In connection with same, the township is also in the process of updating its Capacity Agreements with BCWSA.

As part of the Act 537 Plan for the Neshaminy Interceptor, Lower Makefield Township has worked with the PaDEP to create a Corrective Action Plan (CAP) that will address any capacity issues through the identification and removal of inflow and infiltration (I/I). The PaDEP has approved Lower Makefield Township's CAP and the LMMSA is currently implementing this plan. The CAP provides for a systematic method of metering the wastewater flows to identify the location of any sources of I/I. The LMMSA will then have the sources of I/I removed through the repair of the sanitary sewers in that area. This is accomplished through various methods that include cured-in-place pipelines, grouting of manholes, raising of manhole frame and covers, and potentially the replacement of existing sanitary sewer lines.

Lower Makefield Township adopted the Neshaminy Interceptor Act 537 Plan by Resolution No. 2374 in September of 2018. The PaDEP then approved the Neshaminy Interceptor Act 537 Plan in November of 2018, which formally incorporated it as part of Lower Makefield Township's Act 537 Plan.

The third Act 537 Plan that Lower Makefield Township needs to update is the Morrisville Municipal Authority Service Area. The Morrisville Municipal Authority owns a wastewater treatment plant (WWTP) that is near the end of its useful life and a major upgrade or replacement of the WWTP is required. Lower Makefield Township is currently evaluating all of the options for the long-term treatment and disposal of wastewater that is currently being conveyed to the Morrisville Municipal Authority. The Act 537 Plan will document all of the options and provide an analysis of each option. The Act 537 Plan will ultimately select a long-term alternative for meeting the wastewater needs of this portion of the township for the next twenty years.

The LMMSA is required to complete and submit to the Authorities that provide wastewater treatment a Chapter 94 Report that summarizes the previous year's wastewater flows and provides flow projections for the next five years. This report is then submitted to the PaDEP for review and approval. This is an annual report that is submitted every year. The Chapter 94 Report will evaluate the available capacity of the collection system, interceptors, and pump stations. The report identifies any projected capacity issues. The capacity issues will then need to be resolved prior to any additional connections that could cause an overload to the wastewater system.

### **CURRENT PLANNING AND ZONING POLICIES**

Detailed information on previous sewage facilities planning for the township is in its Act 537 Sewage Facilities Plan Update, adopted in February 1999 and currently being updated. Northwestern portions of the township, generally above Quarry Road and I-295, have experienced residential development over the past few decades that has brought sewer service to areas that previously had been expected to remain

unsewered. Township policy requires public sewerage for large-scale developments and tie-ins to public services where service lines are within a reasonable distance from a new development.

Sewerage facilities in the northern section of the township are relatively new and in good condition. The south and central portions of the township are more densely developed, with older sewage collection and conveyance facilities. As the system ages, maintenance and repair costs to the township can be expected to rise. The township should continue with an active preventive maintenance program to reduce infiltration and inflow in the sanitary sewer system. A pumping station has been installed on Derbyshire Road to provide system reinforcement to the Milford Manor section of the township.

The significance of private on-lot disposal systems (OLDS) has diminished in the township as the policy and practice of connecting development to public sewers has moved forward. However, remaining OLDS should be managed via a township-run OLDS management program.

### **FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION**

1. *Septic system failures*—Of concern to the community is the protection of public health by correcting failing septic systems. One objective of the system improvements financed through the 1991 bond issue was to provide sewerage to areas with failing on-site septic systems where poor drainage and soil conditions cause regular malfunctioning.

Public sewerage service has been extended to the area of Hillside and Spring lanes and to River Road/Robinson Place. In 2012, public sewerage service was provided to all properties within the Edgewood Village historic district. Other potential sewer installations under the current sewage facilities plan include Delaware Rim Drive and Sunnyside Lane, and West Afton Avenue and Yardley-Newtown Road near Cultipacker Road. The township expects to extend sewerage to these other unsewered areas during the 10-year term of this master plan.

2. *Public sewerage*—This comprehensive plan reaffirms the current township policy now in effect of requiring that all major new development be served by public sewers.
3. *Township Sewage Facilities Plan*—The township’s Act 537 Sewage Facilities Plan was revised in 1999, partially updated in 2018, and the remainder is currently being updated.
4. *Capacity agreements*—The township should continue long-range sewage disposal capacity agreements and ensure consistency between the Act 537 Plan and applicable agreements or amendments.
5. *OLDS Management*—Until or unless the public sewer system can be extended to connect individual on-lot disposal systems (OLDS), consideration should be given to establishing OLDS maintenance requirements, as well as an educational program to encourage regular and proper maintenance of on-lot systems.
6. *Capital facilities planning*—Continue to prepare, update and implement a capital improvement plan for sewer facilities.

### **STORMWATER MANAGEMENT**

Rainwater that moves over the ground during and immediately following a rainfall event is known as stormwater runoff. Stormwater runoff increases from the amount of impervious land created by

development and the accompanying reduction of natural grassy or wooded areas that would allow runoff to soak into the ground (or infiltrate).

Increases in impervious surfaces result in increased amounts (volume) and speeds (rate) of runoff that are responsible for some of the localized flooding, drainage problems, greater stream channel erosion, siltation and sedimentation, and a reduction in groundwater recharge. Such impacts require both site-specific and watershed-wide management approaches for preventing and remediating problems from development.

Managing stormwater stems from regulations and planning at the federal, state, county, municipal, and watershed levels. Because watershed boundaries mostly do not follow political boundaries, planning for and implementation of stormwater management is challenging and requires many varied stakeholders to work together cooperatively. Ultimately, municipal regulations are necessary to manage stormwater comprehensively and thus promote the health, safety and welfare of the residents by minimizing damages caused by stormwater runoff.

### **PENNSYLVANIA STORMWATER MANAGEMENT ACT**

As is the case in all of Bucks County's 54 municipalities, stormwater runoff regulations in Lower Makefield Township are based on watershed-based stormwater management plans developed by Bucks County. The plans are required by the Pennsylvania Stormwater Management Act of 1978 (Act 167), enacted to address the growing problems caused by stormwater runoff within the state. Act 167 requires the Pennsylvania Department of Environmental Protection (DEP) to designate watersheds and establish guidelines for the preparation of stormwater management plans for those watersheds. Counties are responsible for preparing the plans and developing model ordinance language for municipalities to use when enacting their own stormwater ordinances.

Lower Makefield Township is located within two DEP-designated watersheds. Most of the township, generally the eastern portion, is located in the Delaware River South watershed. The western portion of the township is located in the Neshaminy Creek watershed. Both watersheds have DEP-approved Act 167 stormwater management plans. Both the Delaware River South Stormwater Management Plan (2004) and the Neshaminy Creek Watershed Stormwater Management Plan (2010) contain requirements for volume and peak rate control of stormwater runoff. The Neshaminy plan also requires the use of Best Management Practices (BMPs) (e.g., stormwater detention and treatment facilities) necessary to capture and treat stormwater runoff for both peak rate control and water quality purposes.

### **STORMWATER MANAGEMENT ORDINANCE**

In 2011, the township adopted Ordinances #388 and #389, which contain the criteria and standards consistent with both the Neshaminy and Delaware River South watershed plans, to comply with the DEP's new water quality rules for construction.

The criteria and standards require that anticipated increases in runoff volumes will not degrade water quality, nor increase peak flow rates throughout the watershed, and that runoff control from new development will reflect the natural hydrologic cycle. All post-construction stormwater management facilities are required to: control the volume and peak rate discharge of runoff flows; control streambank erosion on a site-by-site basis; and manage runoff from impervious surfaces, earth disturbances, and other disruptions to the natural condition. This can be accomplished through the use of various best management practices (BMPs), including capture and reuse, infiltration, evapotranspiration, and other volume and peak rate-reducing BMPs.

Volume control criteria requirements promote groundwater recharge and protect water quality. Runoff peak rate flows must not increase from pre-development flows to post-development peak rate flow and in some cases must be below the pre-development rates for certain sized rain storms depending on the sub-watershed location.

In addition to the above controls, the township requires design criteria for stormwater BMPs. Design criteria are provided for detention/retention basins, wet ponds, wetlands, bio-retention structure, pervious pavement, rain gardens, and for specifics on landscaping in and around BMPs.

Low Impact Development (LID) standards were incorporated into both the township's zoning and subdivision and land development ordinances in 2006 (Ordinance #363 and #364). This effort received a Best in Class national recognition award, sponsored by the U.S. Environmental Protection Agency and the Low Impact Development Center. LID standards incorporated into the subdivision and land development ordinance require the use of low impact development techniques such as identifying a site's natural resources and evaluating their values and functional importance to minimize the impact of stormwater generated from land development. The intent is to encourage conservation of natural resources and to utilize such resources as part of the overall stormwater management solution for a site.

Adoption of LID standards followed one of the township's previous endeavors to minimize impacts associated with traditional stormwater management basins. As Lower Makefield began to experience significant development from the mid- through the end of the twentieth century, the number of stormwater detention basins to regulate stormwater runoff from new construction increased throughout the township. Since most detention basins were seeded with grass and required mowing, township officials realized the benefit of developing a landscape design for detention basins that would require minimum maintenance once the plantings became established. Developed by the Morris Arboretum in 1980, "A Landscape Strategy for Detention Basins" provided landscape design recommendations for typical detention basins which would be aesthetically pleasing and compatible with surrounding land use, would reduce maintenance time and cost, and which would not have a negative effect on the hydrological function of the basin. Through regulations in the subdivision and land development ordinance, detention basins for new developments were required to be landscaped in accordance with suggested plantings. In addition, selected trees and shrubs were recommended within the basins to add visual interest, shade, wildlife habitat and screening. Thus, the township had implemented a proactive approach to protect water quality.

The instrument of stormwater conveyance must include provisions suitable to the township to assure the perpetual maintenance and use of the stormwater facilities for that purpose. The entity responsible for ownership and maintenance of the stormwater facilities must have the financial ability to meet its obligations for perpetual ownership and maintenance.

The township also requires all proposed stormwater facilities to have an operation and maintenance (O&M) plan to establish ongoing operation and maintenance responsibilities. All property owners of record shall sign an O&M agreement with the municipality covering all stormwater facilities and BMPs that are to be privately owned. The O&M agreement is transferred with transfer of ownership.

The municipality inspects all phases of the installation of the best management practices (BMPs) and/or stormwater management (SWM) facilities as deemed appropriate by the municipality. According to section 178-94 of the subdivision and land development ordinance, where the township agrees to accept



dedication and conveyance of stormwater facilities, the township receives a deed of dedication from the developer and the developer pays a fee to the township to maintain the land and stormwater facilities.

### **NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM COMPLIANCE**

The National Pollutant Discharge Elimination System (NPDES) is a two-phased federal program that seeks to establish local regulations resulting in a nationwide reduction of pollutants in waterways. Phase I of NPDES targets medium to large communities; Phase II is aimed at smaller urban communities. Lower Makefield Township is classified as a smaller urban community and, therefore, has developed a stormwater management program that meets state requirements, correlates with a stormwater management plan, and meets the standards of the permit's six minimum control measures. These measures are education, public involvement, illicit discharge detection and elimination, and construction site and post-construction runoff control, and pollution prevention.

As part of the latest permit cycle for coverage under the NPDES Municipal Separate Storm Sewer System (MS4) program, the township is required to implement Pollutant Reduction Plans (PRP) for those watersheds that discharge to certain impaired waters. A PRP is a planning document prepared by the permittee which guides the selection and implementation of specific BMPs to reduce pollutant loading to surface waters. The objective of a PRP is to improve the condition of surface waters such that the waters eventually attain water quality standards and its designated and existing uses in accordance with 25 Pa. Code Chapter 93. The pollutant reducing BMPs are to be completed within five years of DEP's permit approval. The township submitted draft watershed PRP plans to PaDEP for approval in 2017 for Core Creek and Lake Luxembourg, Mill Creek and Queen Ann Creek, and Martins Creek and Rock Run.

The Lower Makefield Township Public Works Department expends a substantial effort on the repair and replacement of drainage catch basins and storm sewers. Catch basins are cleaned on an "as needed" basis and repairs and maintenance are performed on detention basin facilities. Detention basin mowing is performed by municipal public works staff and the township does inspect these facilities. The township should continue inspections of stormwater facilities and ensure that a regularly scheduled maintenance protocol for township-owned facilities is followed. The township should ensure new private stormwater facilities are installed correctly and that such facilities are inspected following major rainstorm events.

As of 2013, Lower Makefield owned 150 municipal stormwater basins and open space areas that are being maintained by the township. In October 2007, the Lower Makefield Township Environmental Advisory Council (EAC) began an environmental and economic analysis on the benefits of reducing mowing practices and allowing drainage basins to return to nature. Ten basins were selected with results presented to the Board of Supervisors. The EAC also conducted an inventory, and developed recommendations for naturalization of many basins. To date 90 basins have been naturalized.

Efforts should continue in locating illicit discharges and stopping those responsible for discharging pollutants into the streams within township boundaries. Further efforts could be made in detecting stormwater problem areas by prioritizing all stormwater problems including reoccurring pollution problems, obstructions, and drainage problems. A tracking database can be utilized to track those problem areas either found by township officials or reported by the public. If feasible, the obstruction and drainage problems should be evaluated for remediation. Solutions to these problems should be recommended and incorporated into the annual municipal budget or maintenance budget.

Other preventive measures taken to protect water quality are sweeping streets, maintaining trees, and removing debris, trash, and accumulated sediment from culverts and swales. On-going maintenance of the township fleet takes place to ensure the vehicles are not contributing to water pollution.

## EDUCATION

The township addresses the educational component of the NPDES requirements in a number of different ways. Stormwater management information is provided on the township website as well as on the local cable TV station. The township's EAC provides information to the public through a newsletter, web page, and printed material available to the public located on a publication rack in the administration building. In addition, the EAC hosts a continuous Environmental Lecture Series. Topics of discussion have included rain gardens, composting, lawns without chemicals, and green building.

## RECOMMENDATIONS FOR ACTION

To further its efforts on comprehensively managing stormwater the township should consider the following recommendations:

1. *Inspections and maintenance of facilities*—The township should continue inspections of stormwater facilities and ensure that a regularly scheduled maintenance protocol for township-owned facilities is followed. The township should ensure new private stormwater facilities are installed correctly and that such facilities are inspected following major rainstorm events.
2. *Evaluate problematic areas*—The township should continue to evaluate problematic BMPs and other drainage problems for remediation and improvement.
3. *Continued education*—Consideration may be given to targeting younger audiences with stormwater management educational efforts, i.e. partnering with public schools to participate in stormwater educational activities.
4. *Identify and prioritize*—The township should continue its efforts to locate illicit discharges and should further its efforts by detecting and prioritizing stormwater problem areas within the township, including obstructions and drainage to implement the water quality goals of the Pollution Reduction Plan.

## EMERGENCY SERVICES

The Yardley–Makefield Emergency and Medical Services Unit, provides emergency or ambulance service. The unit has its headquarters in a township-owned building next to the township administration building on Edgewood Road. It provides service to Lower Makefield, Yardley Borough, and sections of Upper Makefield and Middletown townships. Other areas may be served when needed, under mutual assistance arrangements.

The unit is certified to provide both basic life support service and advanced life support services. Unit staffing consists of 18 employees which includes 6 full-time, 12 part-time, and 14 volunteers. State laws require that all squads providing advanced life support services have round-the-clock staffing at headquarters.

A community-based board was formed in 2002 to manage the unit's business affairs after financial problems threatened to force a shutdown of emergency services. The board instituted a series of actions to restore the unit's financial footing.

The emergency services unit receives funding from Lower Makefield and Yardley. The township levies an ambulance tax of 0.50 mill, and Yardley levies 2 mills. Other sources of support include donations and public-sector grants. The unit also generates income by doing medical billing for other agencies and by providing stand-by emergency service at special events.

In 2002 the township adopted a revised Emergency Operations Plan, as required by Pennsylvania Emergency Management Services Code, which addresses the protection of persons and property in the event of a natural or human-caused emergency or disaster. This plan establishes procedures for alerting the public and providing necessary services and coordination of municipal and volunteer staff. As an adjunct to this, the township has intermunicipal agreements with surrounding communities to provide back-up services. The township has named its police chief the emergency services coordinator, who has oversight responsibilities in the event of an emergency in the township.

Emergency Alert messages are available for residents who sign up for the ReadyNotifyPA program. Residents get automatic notices on their handheld digital devices or personal computers. This service provides customized messages that address a specific threat to a small area such as a neighborhood or countywide. This service is available only if residents have subscribed.

### **AMBULANCE SERVICES**

The emergency services unit has consolidated its operations at the Edgewood Road headquarters, which was built in 1999. The building was acquired by the township and is now leased to the unit, as one of the steps taken to stabilize its finances.

The unit must supplement its volunteer staff with paid personnel in order to have trained workers there at all times, and to provide adequate and timely response to calls. No additional state funds have been provided to help communities meet this requirement.

In 1990 the Bucks County Commissioners adopted a report on emergency services as part of the county's comprehensive plan. This document shows all of Lower Makefield within the recommended four-mile radius of the advanced life support services offered by the Yardley– Makefield unit.

Under state and county guidelines, ambulances are expected to initiate response to a call within 3 minutes, and to reach their destination within 10 minutes. Ambulance response to locations within Lower Makefield Township falls within the required standards. The county's 911 emergency telephone system is used to dispatch all emergency services.

### **FUTURE NEEDS**

The Federal Communications Commission is requiring that local emergency services agencies start to use new frequencies for communications. This bandwidth change requires new radios. The department must order upgraded equipment through the county Emergency Communications Department.

During the coming decade, several factors may put additional pressures on the ambulance service and its staff:

- population growth

- an increase in the elderly population
- new development, particularly large-scale nonresidential development
- difficulty in recruiting volunteer staff
- need to upgrade, maintain or replace equipment and vehicles
- federal and other government mandates dealing with areas such as staffing, documentation requirements, and Medicare and insurance company reimbursement procedures.

### RECOMMENDATIONS FOR ACTION AMBULANCE SERVICES

1. *Coordination with emergency services unit*—The emergency services unit and the township continue to work together in monitoring financial stability and determining any need for expanded staffing, facilities, or new equipment.
2. *Support from participating municipalities*—Increased cost-sharing arrangements should be negotiated with neighboring municipalities that rely on the Yardley–Makefield unit to respond to calls in part or all of their territory.

### TOWNSHIP ADMINISTRATION

The township administrative staff is housed in the township building on Edgewood Road and the recently constructed Community Center on Oxford Valley Road. Within the three-level township building are the following offices: township manager; finance; planning, zoning, and code enforcement; sewer department; and police department. There is a public meeting room that can be divided into two smaller meeting rooms for boards, commissions, and community groups.

Township administrative services gained additional space with the relocation of the branch library from the township building to its own building in 1990. The tax office and the parks and recreation department moved into space formerly occupied by the library, and the area on the building's main floor devoted to planning, zoning and code enforcement was enlarged. The lower level was redesigned and now accommodates offices for records storage, tax collector, a meeting room and a lounge/lunchroom area. The parks and recreation department recently moved into new offices in the Community Center building. The police department occupies its own quarters on the other side of the building, on the lower level.

The accounting and finance operations are located on the upper level of the building. This area contains staff offices, records storage, and data processing.

Building inspections are carried out by an independent professional inspection firm that is capable of handling the necessary specialized building inspections.

### FUTURE NEEDS

The past expansion of township staff and the administration building has come as the result of growth in the township, expansion of services, and requirements for new programs, such as those mandated by state or county government. The multilevel township building was built in stages, to accommodate a smaller community and in some cases, different uses.

The staff and space allocated for township administration should be periodically reassessed to determine their adequacy to current and future needs. As the township nears full development, population growth stabilizes, and the elderly population increases, demand for services may taper, or shift. Given current

budget constraints and level of services, construction of a new township building is unlikely in the near future, as is any increase in municipal staff.

Of particular concern is the accessibility and convenience of the building's layout. As the population ages, and with the enactment of the Americans with Disabilities Act and other accessibility legislation, the reduction or elimination of architectural barriers to use of public facilities has become increasingly important. Efforts should continue to reconfigure space to meet changing needs, to add storage space if necessary, and to make and maintain all areas of the building accessible to those with disabilities.

### RECOMMENDATIONS FOR ACTION

1. *Space*—Prepare a facilities master plan to evaluate the need for reconfiguration, expansion, consolidation or new construction of municipal administrative facilities. Space and facilities planning should be coordinated for all township agencies, and particularly for those that share the same building, such as municipal administration and the police department. Space and facilities planning should also be coordinated with staffing and finance planning.
2. *Staffing and departmental organization*—Monitor changes in use of and demand for certain programs and facilities and employ technologies that enhance administrative capacity, where practicable, in considering potential departmental consolidation, restructuring, or other ways to achieve cost savings and operational efficiencies.
3. *Long-range financial planning*—Continue long-range financial planning as a regular function of government. The Citizens' Budget Commission has been appointed to examine sources of revenues, expenditure patterns, and long-term financial requirements. The commission is preparing a long-range capital improvement and operating plan. Once adopted, the plan should be updated to reflect current conditions, and revised periodically as necessary.

### TOWNSHIP PUBLIC WORKS

The township Public Works Department is responsible for the following tasks:

1. *Road repair and maintenance*—The highway department personnel inspect roads and repair damage and pot holes; maintain roadside drainage systems; sweep streets; maintain detention basins; install and replace road signs; and work with the police department on highway safety matters.
2. *Leaf pick-up*—Two pick-ups are provided for all residents in the fall. Road crews have increased using temporary employees during the fall to accomplish the leaf pick-up responsibilities. This is financed through a leaf pick-up fee charged to residents.
3. *Ice and snow removal*—Township trucks are equipped to spread salt and chemical materials and to plow snow. Temporary personnel are used during snow emergencies. In addition to the 140 miles of township roads, a portion of the approximately 37 miles of state road are plowed under a contract arrangement with the Pennsylvania Department of Transportation. The township in 2013 purchased a brine applicator that allows roads to be pre-treated before other chemicals are applied. This minimizes the use of salt and reduces damage to vehicles and roadways over the long term.

4. *Mowing*—Mowing is done by public works employees at the township complex, at detention basins and open space in residential developments, and along township roads.
5. *Vehicle maintenance*—All police and highway department vehicles are maintained and repaired by the public works department mechanics. State inspections are performed by department mechanics.
6. *Resident requests*—Residents' requests regarding road maintenance, street lighting, and removal of debris from public roads are handled by personnel in the public works department office.

## FUTURE NEEDS

The public works needs in the future will increase in proportion with the increase in the length of roads in the township that need to be maintained, plowed, swept, and repaired; with increasing road repair needs stemming from growing traffic volume and age; and with the increase in public lands that require maintenance.

The current length of township roads is about 140 miles. New developments will also contribute to mileage by an undetermined amount.

New development also adds to public works responsibilities if basins are dedicated to the township. The township requirements for planting in and around detention basins help the department to minimize maintenance and mowing responsibilities.

## RECOMMENDATIONS FOR ACTION

1. *Road maintenance needs*—Continue to give consideration to future maintenance needs when evaluating street standards and street layouts in new developments. The township should consider a reduction in cartway widths on roads where on-street parking is not permitted. This may reduce maintenance demands and help to calm traffic.
2. *Preventive maintenance*—Continue the practice of maintaining a road condition database and reviewing it annually each spring, to determine and prioritize maintenance and repair needs. Coordinate maintenance and budgeting.
3. *Outsourcing*—Continue to outsource public works services, when it is efficient and cost-effective to do so. The township now supplements its public works staff with contractors or temporary help for certain tasks, such as snowplowing, paving, and leaf removal, and has rented specialized equipment on occasion. In evaluating in-house service vs. contract services or private services, the township should consider a number of factors, including but not limited to:
  - cost
  - ability of contractors to provide the needed service within the time-frame needed
  - access of contractor to needed equipment
  - reliability of contractor's equipment and manpower
  - need for specialized equipment or specially skilled employees not available to the township
  - liability of the township and liability protection of the contractor
4. *Intradepartmental cooperation*—The parks and recreation department has assumed mowing and other maintenance duties at township parks and recreational facilities that were formerly

performed by the public works department. In times of peak demand, or in cases in which special skills are needed, the two departments assist each other. The departments also share equipment when necessary. This practice should be continued.

## **SOLID WASTE MANAGEMENT**

The township has been assigned increasing responsibility for the management of solid waste over the past years. The townships in Bucks County are responsible for: assuring the proper storage, collection, and transportation of municipal waste and for implementing recycling programs. These responsibilities are accomplished through municipal programs or through the regulation of private collectors to collect and transport municipal solid waste and recyclables. In addition, Lower Makefield passed Ordinance #237, adopted February 27, 1998, to ensure commercial and residential recycling, proper waste collection, and the elimination of improper methods of disposal (illegal dumping and burning).

The township participates in recycling programs, provides curbside leaf pick-up, and controls the activities of private trash haulers operating in the township. It has one of the oldest and largest recycling programs in Bucks County. Materials picked up at curbside for recycling include newspaper, other waste paper, glass, metal cans, and certain types of plastic bottles.

Residents and business owners in Lower Makefield Township contract directly with private haulers for solid waste collection and recycling services. Haulers deliver the collected waste for disposal at a landfill or waste-to-energy facility, while the recyclable components are delivered to one of several recycling facilities in the region. Residents may take yard waste to a central location at the township complex several days per year, where it is mulched. The mulch is distributed free to residents, and the township pays to have the excess hauled away. The township accepts used motor oil, which is used to heat the public works shop.

Although the management of the waste stream has little direct effect on traditional planning decisions, it does have an impact on Lower Makefield's vision for the future, which includes a reliance on recycling and the effective management of solid waste.

## **FUTURE NEEDS**

The Municipal Waste Planning, Recycling, and Waste Reduction Act (Act 101) authorizes counties to prepare and periodically update a 10-year plan to guide the management of municipal solid waste. The 2018 Bucks County Municipal Waste Management Plan was adopted by the Bucks County Commissioners and subsequently approved by the Pennsylvania Department of Environmental Protection in 2018. The plan was ratified by Lower Makefield Township in 2018. The revised plan provides continued guidance for solid waste management throughout the county to the year 2028. Act 101 also requires that mandated municipalities, such as Lower Makefield Township, establish a curbside program that collects a minimum of three types of source separated recyclables, plus yard waste. These requirements must be accomplished through municipal programs, ordinances, or through the regulation of private firms that collect and haul municipal waste.

The leaf collection and disposal program is an on-going responsibility of the township that will be continued in the future. Pennsylvania state law, Act 101 of 1988, prohibits the disposal of "truckloads composed primarily of yard waste." The township is currently disposing of leaves on one township farm.

## RECOMMENDATIONS FOR ACTION

1. *Leaf composting*—Act 101 requires monthly curbside leaf waste collection or bi-annual curbside leaf waste collection along with a drop-off location. Leaf disposal should continue to take place within the township as long as this is reasonable. Currently a leaf pick-up fee for each household covers the cost of labor and equipment to pick up and spread the leaves and the necessary soil treatments to break down the leaves. Examining alternatives to the current drop-off site is highly recommended. Several composting facilities are located close enough to be a viable option.
2. *Recycling*—Efforts to increase recycling must continue in order to reduce the needs for less desirable methods of disposal. The township should continue to encourage the public to recycle, using informational programs and enforcement efforts. In an effort to expand the amount of material that is currently recycled, an alternative, such as contract collection, should be considered.
3. *Special recycling programs*—Continue to cooperate with the county on special programs, such as the disposal of household hazardous wastes and computer recycling.
4. *Education*—Act 101 requires bi-annual education of all residents and commercial establishments. It is recommended that the township website be revised to reflect the current program, and that cable television and other public education measures be employed to additionally inform residents and businesses about recycling and other environmentally preferred waste disposal options for electronics and household hazardous waste.

## LIBRARY SERVICES

The Yardley–Makefield Branch of the Bucks County Free Library is located at the township complex on Edgewood Road. This building, completed in 1990, now houses library materials that used to be located in the present township building.

The library is built on land owned by Lower Makefield Township. The township retains control over the land.

The Yardley-Makefield Branch of the Bucks County Free Library is funded by Bucks County general fund tax dollars and Commonwealth of Pennsylvania library aid. Continuing operations and improvements are contingent on funding levels from these sources. The Bucks County Free Library system is governed by a fiduciary board that oversees operations and is responsible for establishing strategic goals and plans for the library. The library system’s strategic plan with detailed goals and objectives for the Yardley Makefield Branch is available on its website at [www.buckslib.org](http://www.buckslib.org).

While geographically located in Lower Makefield, as a county branch this library serves the following communities: Lower Makefield, Upper Makefield, Falls, Newtown, and Middletown townships. In planning for branch services, the Bucks County Free Library considers the service needs of these communities.

The library expects to continue supporting circulation of traditional materials in the coming few years while phasing in new formats, as well as continuing to serve in its role as technology access center, public facility, and destination for children and their caregivers. Needs for facility expansion and acquisition of technology and new media will be considered as the library conducts its strategic planning.



The library system has recently upgraded the public restrooms to meet ADA standards, installed new energy efficient windows throughout the building, mobilized all collection shelving and renovated the children’s section to include an interactive learning experience at the Yardley-Makefield Branch. In the coming years the library system plans to provide additional furniture, funding permitted.

The library plans to continue offering programs to children and their families as a primary activity, including story times for babies and preschoolers and summer reading for elementary-school-age children and teens. Total youth programs offered in 2018 at Yardley-Makefield Branch was 587. This is up from 375 the previous year.

In technology, the library provides 12 public access PCs for general use and has begun to provide tablets to the public for access to magazines, newspapers, and early learning apps. In 2018, public use sessions at public PCs totaled 18,264. Wireless service has been upgraded to accommodate the growing number of users who use their own devices. This also includes wireless printing. In addition to staying current with the latest technologies, the library has added two “Smart Block” study booths and the “One Button Studio”. The Smart Block booths provide meeting space for business workers who need to conduct their meetings with speed, efficiency, and privacy. Each booth contains a TV with HDMI/VGA connections, controlled lighting, and overhead speakers. The One Button Studio is a simplified video recording setup that can be used without any previous video production experience. The design of the studio allows for the creation of high-quality and polished video projects without prior lighting or camera experience.

Circulation of physical items at the Yardley-Makefield branch has been dropping in the past several years from 332,857 in 2017 to 309,037 in 2018. The beginning of 2019 has shown a slight upward increase of the physical collection. More readers have been moving to e-book downloads to fulfill reading interests and to downloads or streaming to fulfill viewing and listening interests. Checkouts of e-book downloads from the Bucks County Free Library collection have been dramatically trending upward each year, totaling 550,560 in 2018 from 471,875 in 2017 across the county. If considered as a branch, the e-book lending library would rank as second highest in circulations of eight Bucks County Free Library branches.

The physical collection size at the Yardley-Makefield Branch is expected to decrease in the coming years as publishers and readers move to electronic formats. The library evaluates annually as part of budget planning how much to invest in traditional versus non-traditional formats and monitors the publishing marketplace continuously for new developments and opportunities. Board games, toys, and tools are three of the newer non-traditional items purchased and circulated in the branches. Currently the Bucks County Free Library houses 70,132 items at the Yardley-Makefield Branch. These materials are available for countywide checkout as are all items in the county system.

#### **FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION**

1. *Changing uses*—Library and township representatives will jointly explore ways in which library facilities can be expanded and made multi-purpose, in order to address diverse patron needs and technological change.
2. *Interior renovations*—The Bucks County Free Library plans to install interior improvements to the Yardley-Makefield branch facility, as funding permits.
3. *Technology*—The library system expects to phase in tablets or other devices for expanded Internet access, as funding permits, and to continue its role as technology access center.
4. *Support of Friends of the Library*—The township should continue to support the activities of the library and the Friends of the Library.

## HAZARD MITIGATION

Hazard mitigation planning is of great importance to the community as it addresses both natural and human-made hazards. Since 1955 there have been 49 Presidential Disaster and Emergency Declarations in Pennsylvania, 26 of which affected Bucks County, especially Lower Makefield Township. Of the 26, 17 were related to flooding, hurricanes and tropical storms. Each of the 17 were significant to Lower Makefield as it borders the Delaware River. Since 1978, there have been at least 202 National Flood Insurance Program (NFIP) claims that valued more than 4.7 million dollars.

Hazard mitigation describes sustained actions taken to prevent or minimize the long-term risks to life and property from hazards. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the disaster cycle of damage, reconstruction, and repeated damage. With careful selection, pre-planned mitigation actions can be cost-effective means of reducing the risk of loss.

The most significant piece of legislation related to hazard mitigation is the Disaster Mitigation Act of 2000 that requires local governments (i.e., counties and municipalities), as a condition of receiving federal disaster mitigation funds, to have an official mitigation plan that identifies hazards, creates a risk assessment and vulnerability analysis, identifies and prioritizes mitigation strategies, and establishes an implementation schedule for the county and each of its municipalities.

### HAZARD MITIGATION PLANNING

The 2011 Bucks County Hazard Mitigation Plan (BCHMP) underwent a formal update in 2016. The updated BCHMP is a pre-disaster, multi-hazard mitigation plan that not only guides the county towards greater disaster resistance, but also respects the character and needs of communities. The plan provides a blueprint for reducing property damage and saving lives from the effects of future natural and man-made disasters and improving community resiliency following a disaster event. Moreover, the plan qualifies the county and its municipalities for pre-disaster and post-disaster grant funding.

The BCHMP and the township identified the following hazards as being prevalent throughout or in parts of Bucks County:

**Table 22**  
**Prevalent Bucks County Hazards**

Natural Hazards	Man-Made Hazards
Drought	Dam Failure
Earthquake	Environmental Hazards
Extreme Temperature	Structure Collapse (Infrastructure)
Flood, Flash Flood, Ice Jam	Terrorism*
Hailstorm	Transportation Accident
Hurricane, Tropical Storm, Nor'easter	Urban Fire and Explosion
Landslide	Utility Interruption
Lightning Strike	
Pandemic*	
Radon Exposure*	
Subsidence, Sinkhole	
Tornado, Windstorm	
Wildfire	
Winter Storm	

*\*Added as new hazards in 2016 Update*

*Sources: BCHMP, Lower Makefield Township Planning Commission*

Of the listed Natural Hazards, Lower Makefield Township is most likely to be affected by weather-related events, particularly winter storms, nor'easters, hurricanes, tropical storms, lightning strikes, and wind storms. Flooding from these events will cause the majority of the damage and disruption of services. To that end, Lower Makefield has passed Ordinances 173 and 174 to better define substantial damage and repetitive loss from floods and high winds. To a lesser extent, the township is always potentially vulnerable to the listed Man-Made Hazards. It should be noted that a Transcontinental Gas pipeline runs through the northern portion of the township.

In Lower Makefield Township flooding from all source events (i.e., Dam Failure, Tropical Storm, Nor'easter, Hurricane, and Ice Dams) may be considered together, although the mitigation steps that the township undertakes may be targeted at reducing the threat from one specific type of event.

Part of the hazard mitigation process involves identifying critical infrastructure and facilities. The loss of these assets would either increase the likelihood of greater damage or slow the recovery process. The township also has twenty-six facilities deemed as critical infrastructure according to the Federal Emergency Management Agency and the Pennsylvania Emergency Management Agency, several of which are in the floodplain. Taking steps to keep these facilities operational during a crisis is a primary concern. These include fire and police stations as well as other structures necessary for evacuation, providing basic infrastructure and rebuilding.

## **HAZARD MITIGATION REGULATIONS**

There are numerous existing planning and regulatory mechanisms in place at the state, county, and municipal level of government that support hazard mitigation planning efforts. Such tools relevant to Lower Makefield include: Pennsylvania Municipalities Planning Code, Bucks County Comprehensive Plan, Commonwealth of Pennsylvania Standard All-Hazard Mitigation Plan, Bucks County Hazard Mitigation Plan, Bucks County Hazard Vulnerability Analysis, and Lower Makefield's own floodplain management ordinance, zoning ordinance, subdivision and land development ordinance, and comprehensive plan. Furthermore, incorporating hazard mitigation language into this Comprehensive Plan update results in a greater and more permanent "institutionalization" of hazard mitigation into the township's development processes, practices, and pattern.

Lower Makefield Township's Emergency Operation Plan is a guidebook on how to respond to emergency events. It defines the point when outside assistance is needed and the interaction between local fire, police, utilities, and public works personnel.

The township's zoning ordinance currently regulates development in floodplains as well as in areas containing steep slopes. These standards should be reviewed periodically to ensure they adequately address hazard mitigation purposes related to flooding, erosion areas, steep slopes, and other specifically identified potential hazard areas. Using building codes in conjunction with the township's zoning regulations can be effective in reducing or eliminating damage caused by certain types of hazards.

## **HAZARD MITIGATION ACTIONS**

Hazard mitigation actions should include prevention, property protection, public education and awareness, natural resource protection, structural project implementation, and emergency services. Through the planning process of the Bucks County Hazard Mitigation Plan (2016), Lower Makefield Township has committed to take the following specific actions within the next ten years.

## EVALUATE

One of the identified weaknesses in the Bucks County Hazard Mitigation Plan has been the lack of an adequate detailed database on the properties within a given threat area. Regarding flooding, the National Flood Insurance Program (of which Lower Makefield Township is a member) requires collecting detailed information on properties using Pennsylvania's All-Hazard Mitigation Tool (PA Tool). This would include identifying structures with basements, exact first floor elevations for better flood modeling, and elevations of roadways most likely to be impassable in a flood event.

As part of the process to better assess the risks in flood-prone areas, select communities, including Lower Makefield Township, are collecting detailed information on critical facilities and conducting a cost-benefit analysis of adding additional protection to repetitive-loss assets.

In addition, the adequacy of emergency evacuation routes or exits for all areas/neighborhoods in the township should be assessed. Areas that may become isolated or cut-off faster due to flooding, etc., should be identified for emergency planning purposes.

## IMPLEMENT

In order to be eligible for federal assistance, every community must have a method to evaluate and implement mitigation projects not yet identified in other planning mechanisms, including acquisition, elevation, and other mitigation methods.

Acquisition, elevation, and buy-out of flood-prone properties can greatly reduce the number of severe repetitive loss properties. This is important as flood insurance rates rise and federal assistance falls. In 2012, the township made its first acquisition of a parcel which had suffered "severe repetitive loss." The 1.3-acre parcel, located along River Road, north of Woodside Road, may be used for passive recreation.

## EDUCATE

One of the best defenses against an emergency situation is a well-educated community. Having people aware of the closest evacuation shelter, where to tune the radio for information updates, and other important tips (e.g., don't drive through flooded roadways) can all minimize danger and assist a community in recovering.

Educational outreach activities that the township has volunteered to undertake within the Bucks County Hazard Mitigation Plan include:

- Identify residents with the highest relative vulnerability to the effects of severe weather and prepare an implementation plan. The Lower Makefield Township Disabled Persons Advisory Board has been working with the township police department to update the emergency services database in an effort to identify where disabled residents live so they can be better served by first-responders during emergencies.
- Host community workshops to discuss the costs of acquiring flood prone properties and the benefits of flood insurance.
- Evaluate, at the township level, the suitability of the Community Rating System (CRS) for insurance premium reduction (and flood damage reduction).
- If warranted, implement additional storm shelters and warning systems near vulnerable communities.

## RECOMMENDATIONS FOR ACTION

The township should continue to follow the specific hazard mitigation implementation strategies it has volunteered to undertake as recommended in the Bucks County Hazard Mitigation Plan. Those strategies include the following:

1. *Information on repetitive loss properties*—When feasible, revise the hazard mitigation plan to conduct a cost-benefit analysis of adding additional protection to repetitive-loss assets, and collect detailed information on all properties.
2. *Mitigation projects*—Evaluate and implement the most effective mitigation projects (e.g., acquisition, elevation, and buy-out of flood-prone properties) when financial assistance becomes available.
3. *Outreach efforts*—Continue hazard mitigation education outreach efforts (e.g., presentations, courses, and fact sheets) to increase public awareness of actions to be taken during an emergency and opportunities for mitigation.
4. *Residents with special needs*—To the extent possible, identify residents with the highest relative vulnerability (e.g., elderly or special needs) and seek to address the needs of this population in event of severe weather or other emergencies. Such a list or database should be updated annually.
5. *Emergency evacuation routes*—Assess the emergency evacuation routes or exits for all areas/neighborhoods in the township to adequately plan for emergency evacuations, and post and disseminate this information to residents, as widely as possible.
6. *Identification of hazardous materials locations*—Identify public storage of hazardous materials in floodplains (including non-addressable structures, such as propane tanks).
7. *Stormwater management*—Build on existing Stormwater Management Planning and encourage implementation of small stormwater mitigation projects on private property (i.e. rain gardens, rain barrels, natural basins).
8. *Evaluate needs in vulnerable neighborhoods*—Investigate whether additional storm shelters and warning systems should be implemented.
9. *Warning signs*—Secure flood-specific signage that warns travelers when barricades are present, to prevent them from traveling into floodwater.



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## **PARK AND RECREATION PLANNING**

### **IMPORTANCE OF TOWNSHIP RECREATION AND PARKS**

The provision of recreational facilities is recognized as a function of local government. Because most people spend a large portion of their leisure time in the area where they live or work, the opportunity for recreation within the local community becomes important.

Park and recreation planning to meet the needs of residents continues to be an important role for the township. For the 2003 Master Plan Update, residents were asked about their recreation preferences in a public participation survey. The five most popular activities, in descending order, were hiking, bicycling, exercise, concerts, and the arts, followed by senior programs, jogging, gardening, tennis, and teen activities.

Since completion of the last master plan in 2003, major additions to the township's park and recreational facilities and land include the Makefield Highlands Golf Course, the Lower Makefield Township Dog Park, and Phase 1 of Memorial Park which features the Garden of Reflection memorial and various playgrounds, athletic, and recreation facilities. The township has also expanded and enhanced park and recreational programs and opportunities that are offered to the community which include hosting various summer camps and selling discounted tickets to amusement parks and zoos. The Lower Makefield Township Park and Recreation Department is headed by a full-time director who is assisted by a staff of three full-time employees who maintain the parks and facilities, supplemented by a seasonal staff at the community pool. The Department Director coordinates programs and oversees use of the township facilities.

Complementing township actions to provide facilities and programs are active athletic associations that operate programs for area residents. Some of the primary organizations are Yardley–Makefield Soccer, Pennsbury Athletic Association, Pennsbury Regional Basketball League, and Lower Makefield Football Association.

### **BACKGROUND**

In 1988, a "Pool and Park Facilities Plan" was prepared to help the township identify future recreation needs and to establish guidelines for meeting future needs. The plan focused on large-scale community facilities for active recreation rather than small-scale neighborhood parks and open space for conservation or passive recreation. This study contained a detailed inventory of open space and recreational facilities and described each area in terms of the size, use, access, natural features, recreational use, recreational potential, and maintenance responsibilities.

A second study was completed in 1990 and became known as Volume 2 of the Park Plan. It was prepared largely in response to the changes in the Pennsylvania Municipalities Planning Code, but it also updated the list of township facilities and revised the statement of need for new land and facilities to meet community recreation needs.

The township amended its Subdivision/Land Development Ordinance following the completion of Volume 2 of the Park Plan. This amendment set these requirements for dedication of recreation land:

1. Land in the amount of 2,200 square feet per dwelling unit must be set aside for recreational use as part of any new residential development. This land must meet location and site requirements so that it is suitable for its intended recreational purpose.
2. If the township and the developer agree, a fee in lieu of recreational land can be substituted for the dedication of land.

The township has been divided into three recreation fee districts—northern, central, and southern. The intent is to use fees collected within a district to meet the recreational needs of the residents of that district. Both the northern district and the southern district overlap to some degree with the central district so that some portion of fees can also be used for centralized facilities if needed.

The Park Plan has been periodically updated by means of Park and Recreation Action Plans; one was prepared in 1995, and the most recent in 1997. The 1995 and 1997 Park and Recreation Action Plans inventoried facilities and addressed in detail projected need for land and facilities, possible directions for future park and recreation programs and administration, and fee requirements for new developments.

In 2018, Lower Makefield conducted an inventory and needs assessment of the existing recreation facilities owned and operated by the township. The Lower Makefield Township Recreation Inventory and Needs Assessment analyzed demographic trends in the township, compared the current township school district facility inventory to the standards of the National Recreation and Park Association (NRPA), and administered a user matrix to gather details from user groups including participation rates, township participants, total hours of use per field, and the extent of scheduling issues for in-demand fields.

## **PARK AND RECREATION FACILITIES**

Lower Makefield's park and recreation system consists mostly of township-owned facilities which serve residents from the township and surrounding area. Table 23 provides an overview of municipal park and recreation sites in the township.

Approximately 176 acres of County-owned land within Lower Makefield between the canal and the river is intended to be developed with township-owned land for the Falls of the Delaware River Park. State-owned park land includes a portion of the Delaware Canal State Park which crosses through the township parallel to the Delaware River. Important as a recreational amenity as well as for its historical and cultural significance, the canal state park occupies 38 acres within the township. Also, a boat ramp, owned by the Pennsylvania Fish and Boat Commission, provides access to the Delaware River from River Road in the township.



**Table 23**  
**Lower Makefield Park and Recreation Sites\***

Park and Recreation Sites	Facilities	Acreage
Community Park (includes Stoddart Fields)	Pool, tennis courts, basketball court, softball fields, baseball fields, volleyball court, Kids Kingdom Playground, picnic area, natural trail, batting facility	30.7
Veteran's Square Park	Tot lot, picnic area, benches	2.8
Makefield Glen	Dog park	3.7
Heacock Meadows	Tot lot, tennis courts, volleyball court	4.5
Macclesfield Park	Baseball fields, soccer fields, multi-purpose fields, playground, volleyball courts, bike path & exercise trail, picnic area	94.7
Fred Allan Softball Complex	Softball fields, bocce court, play pieces, picnic area, batting facility	22.75
Revere Road Tennis Facilities	Tennis courts	1.5
Schuyler Road Tennis Facilities	Tennis courts	1.5
Memorial Park	Garden of Reflection memorial, volleyball courts, basketball courts, tennis courts, community gardening, softball field, inclusive playground, walking trails, arboretum	63.5
Peak Farm (along Twig Lane)	Pocket park containing tot lot playground	1.7
Snipes Tract	Currently undeveloped. Future development considerations include fields for football, lacrosse, soccer, as well as covered pavilions, a tot play area, and installation of skate park pieces	36.2
Greg Caiola Baseball Complex/Community Center (Samost Tract)	Currently includes baseball fields and related structures, batting facility, a community center	26
Toll Brother Regency age-restricted Community (former Matrix site)	Land that will contain a picnic pavilion	2
Five Mile Woods Nature Preserve	Nature trails, environmental programs, nature center	298
Makefield Highlands Golf Course	18-hole municipal golf course with practice facility and a clubhouse	168
<b>Total</b>		<b>757.55</b>

\*The Snipes tract is currently an undeveloped municipally-owned tract. Park and recreation improvements, as noted on page 81 of this chapter, are planned for this tract.

Map 7 shows the location of the larger park and recreation resources within Lower Makefield Township.

## **WALKING AND BIKE PATH SYSTEM**

Walking and bike paths are important recreational facilities which provide residents of all ages with the opportunity to enjoy the outdoors while exercising. Recognizing the benefits of a walking and bike path system, municipal officials formed a township Bikeway and Greenway Committee in the mid-1990's to help plan for a walkable community in Lower Makefield. The Committee developed a trail and greenway concept plan and mapped a township-wide trail system. Adopted in 1997 as part of the township's official map, the Bike Way Map indicated existing and proposed locations of bicycle paths, lanes, and routes. Construction of the bike path and walking path system began to take shape as development occurred in the township. Without cost to the township, developers completed links as developments along proposed routes were constructed.

Today, the township's bike and walking path system is a well-used amenity which links many neighborhoods, schools, and public facilities. The township has had a goal to provide bike path connections to recreational facilities and shopping centers. According to information in the Lower Makefield Township Park and Recreation Road Tour (July 2013), there are approximately 25 miles of existing bikepaths/walkways throughout the township. Existing paths connect nearby neighborhoods with park and recreation facilities such as Memorial Park, Schuyler Road tennis facilities, Heacock Meadows facilities, and Community Park, which includes the pool complex. However, due to the difficulty in obtaining area to construct bike paths along already developed lots, there are areas throughout the township with existing gaps in the bikepath system. Map 8 shows the township's walkway/bikeway network.

## **BUCKS COUNTY BICYCLE MASTER PLAN**

The Bucks County Bicycle Master Plan, was adopted by the County Commissioners in early 2012. The Plan identifies a network of major spines which provide connections between transit centers, activity centers, tourist destinations, central business districts, recreation destinations, and municipalities.

The plan maps two primary onroad connections within Lower Makefield Township. One primary onroad connection, identified as State Route 0332, crosses through the center of the township along Langhorne-Yardley Road from Middletown to Yardley before connecting with the towpath along the Delaware Canal and further to Delaware Avenue (River Road). A separate primary onroad connection, identified as State Route 0532, crosses through the northwestern corner of the township along Washington Crossing Road (Route 532) between Newtown and Upper Makefield. Both of these routes connect with the Delaware and Lehigh National Heritage Corridor as well as other bike routes along the Route 413 corridor.

According to the township's Walkway System Map, a walkway & bicycle path are planned and do exist along much of Yardley-Langhorne Road, however, the township map does not show any planned or existing bike/pedestrian facility along Route 532. Given the location of the planned routes, the potential exists to provide linkages between the township bikeway/walkway system and the planned county bike path system.

## **GREENWAYS AND TRAIL PLANNING**

A greenway is a linear open space area established along either a natural corridor, such as a riverfront, stream valley or ridgeline; or along an abandoned railroad right-of-way, a canal, scenic road, or other route. In addition to preserving natural resources, greenways may also provide safe, nonmotorized transportation routes to schools, commercial centers, neighborhoods, and recreational areas.

By linking parks and other open space areas together with existing sidewalks, greenway trails can create a connected pedestrian system throughout a municipality and even beyond its borders. A good pedestrian network provides the opportunity for walking and biking versus driving to destinations which not only encourages a healthy lifestyle but also helps the environment by reducing carbon emissions.

The Bucks County Open Space and Greenways Plan (2011) was adopted by the County Commissioners in June of 2011. The primary purpose of the Plan is to guide decision making and provide recommendations related to protecting and creating linkages between the county's natural resource areas, open space and farmland, recreational facilities and historical and cultural resources. The Plan identifies potential greenway corridors that could host trails for public recreation, wildlife viewing, lessons in history, and alternative transportation.

The Plan identifies four greenways that cross through Lower Makefield Township: the Delaware River Water Trail Greenway; Delaware & Lehigh National Heritage Corridor Greenway Middle Delaware (Morrisville to New Hope); Brock Creek Greenway; and the Mill-Neshaminy-Core-Dyers Creeks (Cross County) Greenway.

The Delaware River Water Trail Greenway, categorized as a recreational greenway, extends along the township's entire border with the Delaware River and includes the river's surrounding riparian zone. Coinciding with the Delaware River Water Trail Greenway within the township is the Delaware & Lehigh National Heritage Corridor Greenway Middle Delaware, which extends from Morrisville to New Hope. These identified greenways are part of the Delaware River Conservation Landscape that has been identified in the Bucks County, Pennsylvania Natural Areas Inventory Update (2011).

The Brock Creek Greenway connects Core Creek Park in Middletown Township to the Delaware River at Yardley Borough, primarily following Brock Creek within the township and Yardley Borough. The Mill-Neshaminy-Core-Dyers Creeks Greenway, also known as the Cross County Greenway, extends from the county line in Upper Southampton Township and runs along four different streams to ultimately reach the Delaware River, via Dyers Creek, in the northern portion of the township. A path is proposed for this greenway.

Within and nearby Lower Makefield Township, the county greenways plan identifies Macclesfield Park, Memorial Park/Garden of Reflection, Morrisville Borough, and Yardley Borough as Nodes, which are larger outdoor recreation areas (typically over 40 acres) and places having natural, cultural and historic interest. Nodes are places of destination and are significant elements that should be connected within greenway networks.

According to the Lower Makefield Township Open Space Plan Update (2009), township policy is to provide and support linkages that connect open space and park facilities, to connect open space along stream corridors to create greenways, and to connect the township with neighboring Yardley Borough by way of bike paths or parkland.

## **GOALS FOR PARK AND RECREATION PLANNING**

Future park and recreation plans are guided by the following goals outlined in the 1997 action plan. Specific programs and activities are subject to the financial capability of the township.

1. Provide adequate parkland to meet the needs of the township based on complete build-out of the community.

2. Protect treasured natural resources.
3. Provide a balance of active and passive recreation facilities to meet the needs of citizens of all ages and interests.
4. Offer recreation programs and services that enrich the lives of citizens.

## CURRENT PLANNING PRIORITIES

1. *Addressing changing needs*—The township should continue to be open to new suggestions and ideas in planning for recreational programs and facilities. New ideas should be considered based on the needs and wishes of township residents.
2. *Natural resource protection*—A variety of measures may be undertaken to coordinate natural resource protection with recreation planning. They include preparation of a site and management plan for Five Mile Woods; acquisition of greenway land and land with natural resources located next to parks; adherence to natural resource protection ordinances; and coordination of township planning with related regional planning.

The possibility for coordination and enhancement of park and recreation land along the canal and the river exists through the proposal for the Falls of the Delaware Park. Located to the south of Yardley Borough, this regional park will provide river access from the Delaware Canal State Park. The county has acquired 176 acres for this park; the township owns 38 acres.

3. *Facility needs*—The township should pay particular attention to the needs of organized sports groups as recreation facilities are designed, and continue its efforts to complete the pathway/trail system.
4. *Year-round recreation opportunities*—The township’s 1997 Park and Recreation Action Plan Update recommends exploration of ways to expand year-round recreation programming. This would require the use of gyms and other indoor space. The township completed construction on the community center in 2017, and started programming of the facility.
5. *Facilities maintenance*—Growth in facilities brings increased maintenance responsibilities. Outsourcing of selected maintenance work and preparation of maintenance impact statements for new facilities or improvements are among the methods of providing and budgeting for ongoing maintenance.
6. *“Pocket parks”*—Encourage provision of recreation land in residential developments that are not close to existing parks.

## FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION

1. *Locations for future recreation lands*—As the township approaches full development it is even more essential that the township update its planning to identify any gaps in facilities and opportunities for desired acquisitions. Consideration should be given not only to major site acquisitions, but also to the possibility of recreation facilities at nonresidential developments.

- a. *Available land*—Although the pace of residential development has slowed as the community approaches build-out, there are developable parcels located both above and below I-295, although the bulk of vacant land remains in the northern sector.

Based upon calculations made for this master plan, it is estimated that about 514 dwelling units could be accommodated on currently uncommitted vacant lands.<sup>10</sup> Under current standards, this level of development would result in the mandatory dedication of a total of approximately 26 acres of land (2,200 square feet per dwelling unit).

Each individual development would be responsible to meet its recreational needs, so this 26-acres will not necessarily be located in one place but will be distributed at various locales within the township in each new development. If fees are collected in lieu of land, then this acreage will be reduced but the fee can be used for land or development of recreational facilities elsewhere.

- b. *Criteria for land selection*—Land to be set aside for recreational use should meet the standards set forth in the township Subdivision/Land Development Ordinance for recreational suitability. It is recommended that land be acquired through the development process where feasible and where it meets township park goals. Other guidelines to consider in selecting recreation land are:

- suitable topography for recreational use
- access by way of a main road
- site size adequate to meet the needs of the area
- proximity to other open space areas or potential for combination with areas of open space.

The Park and Recreation Board has been reviewing and commenting on all subdivision and land development plans to evaluate recreational use and site design.

- c. *Methods of acquisition*—The options for acquisition of land include the use of the mandatory dedication provisions of the subdivision/land development ordinance; combining land dedication with fees collected in lieu of dedication; or use of lands already preserved for open space for recreation use. Land can also be purchased by the township. Second-class townships, including Lower Makefield, are permitted to use eminent domain or condemnation to acquire land for recreation or open space, although this is sometimes an expensive approach. Recent editions of the Parks and Recreation Action Plan Update encourage creative acquisition strategies.

2. *Bicycle/walking path*—The plan and the implementing ordinance are in the process of being reviewed to determine: where the missing links are in the path; if there are problems with the general alignment suggested by the township ordinance that need to be revised; and how the completion of the bike/walking path can be implemented. The bike/walking path should be linked to the towpath along the Delaware Canal to establish a township trail system. Where applicable, bikeway connections as indicated in the Bucks County Bicycle Master Plan should be considered for inclusion in the township's plan.

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<sup>10</sup> See Appendix C for methodology used to calculate the number of potential additional dwelling units.

Moving forward, an important aspect that needs to be considered is maintaining the condition of the existing bike/walking path system.

3. *Recommendations regarding specialized recreation facilities*—The township’s park and recreation plans have stated the need for specific types of recreational facilities, based upon the needs of the township population and the use of and demand for present facilities. This list of community recreation facilities serves as the basis for recreation planning and, more importantly, for the requirements of developers for mandatory dedication of land or recreational fees.

Township residents or groups have made requests for specialized recreation facilities. Examples include a senior citizens center, a community center, gymnasium space and athletic fields for community sports leagues, and pickle ball courts. It is recommended that the township consider these requests to determine how they help to meet overall specialized facility recreational needs of the community.

Specialized recreational facilities should be financed through user fees or through other methods independent of township funding. Long-range planning for recreational facilities and financing of recreational improvements has been based upon a recommended list of general facilities to meet overall community needs. Resources (either land or money) allocated to specialized facilities would take away from the resources available for overall community needs, resulting in the need to identify other funding sources.

4. *Changing preferences and needs*—The township should be attentive to changing recreational preferences and needs and to the needs of all population groups. Current needs may change as the population of the township ages. The national aging trend has begun to touch Lower Makefield’s population and will affect facility and program needs. There are signs of increasing demand for “lifetime” sports facilities, senior activities, fitness activities, and leisure time activities, and this may be coupled with lessening needs for facilities such as playing fields. The township should consider the potential for developing multipurpose recreational buildings and space-sharing arrangements that can serve different user groups or accommodate changes in use over time.
  - a. *Community Center*—The township has built a community center on a portion of the Samost Tract fronting along Oxford Valley Road. The center is designed to provide meeting space for all members of the community, including the local senior citizens group.
  - b. *Arts and culture*—The plans for recreation programs should recognize the recreational preference of those residents interested in the arts, cultural activities, and educational trips. The township has supported the Bucks County Performing Arts Center, previously known as the Lower Makefield Society for the Performing Arts. Established in 1978, the Performing Arts Center held concerts and visual arts displays in the municipal building before moving to the Yardley Community Center about 10 years ago. The township’s recreation program should continue to support arts and culture as part of a well-rounded community program such as the Artists of Yardley currently located on a portion of the Patterson Farm.
5. *Planning for new recreation areas*—The township, advised by its Park and Recreation Board, should continue to move forward with concept plans and plan implementation for major recreation areas that have been identified and acquired since the last master plan was adopted.

Recreation facilities planning should take into account site topography, access, environmental characteristics, funding, and proximity of other recreational facilities in the area. The recreation areas are:

- a. *Samost Tract*—A 26-acre tract at Oxford Valley and Edgewood roads, next to the Roelofs Road Park and across from the township complex. Land development plans were prepared and two baseball fields and related facilities have been completed. The site also houses the township’s newly completed community center.
- b. *Snipes Tract*—A 36.2-acre tract at Quarry and Dolington roads in the northern section of the township. Planned park and recreation improvements for the site include athletic fields, a tot play area, a skate park, covered pavilions, and bikepath connections along Quarry and Dolington roads.
- c. *Memorial Park*—A tract of 63.5 acres on Woodside Road in the northern section of the township. This park has been envisioned to be a community-oriented park that embodies the past, present, and future. Intended to become a gathering place for all members of the community, the park will contain facilities for both active and passive recreation, as well as elements intended to contribute to community spirit and pride.

Phase 1 of the park has been constructed and contains walking trails, athletic courts, community gardens, and the Garden of Reflection memorial to Bucks County residents lost in the September 11, 2001 attack on the World Trade Center. Phase 2 of the park will contain various athletic fields and courts, tennis courts, naturalistic ponds, picnic areas with pavilions, an arboretum, a walking/running track, additional trails and parking facilities. An all-inclusive playground, which is part of Phase 2 of the park, has been constructed.

6. *Pool facilities*—The township in 2001 completed a feasibility study for rehabbing and improving the community pool, which is more than 20 years old and heavily used. The feasibility study included Americans with Disabilities Act (ADA) modifications, which are necessary to make the pool and its adjunct facilities accessible to the disabled. Since that study, the township has completed recommended ADA modifications to the pool and has made other improvements such as the installation of WIFI, and the completion of various maintenance recommendations. Any remaining recommendations from the feasibility study should continue to be carried out in stages as proposed.
7. *Plan revisions*—Update the action plan and other key planning documents to reflect current population, development, program conditions, and recent major parkland acquisitions.
8. *Recreational programs*—Determination of recreational programs should be made by the Park and Recreation Board in response to citizen requests, past program success, and park and recreation board assessment of needs. Programs refer to activities planned by the township, including trips, educational programs, arts and crafts classes, or special recreational events.

The organization and operation of programs will be dependent on the availability of manpower (either volunteers or township personnel). Fees should be charged for most programs in order to cover the actual cost of the publicity, staff, materials, and township staff time.

9. *Gift and concession policies*—Gifts of land, services, equipment, etc. and revenue from concession operations can help support recreation programs. Establish policies and terms for accepting gifts and granting concessions.



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## OPEN SPACE AND CONSERVATION PLANNING

Open space resources will continue to be an important part of Lower Makefield’s identity. Open space, which includes farmland, contributes to the township’s character, helps to preserve the area’s natural ecosystems, and aids in establishing greenways throughout the township. According to the *Lower Makefield Township Open Space Plan Update* (August 2009), the township owns over 1,200 acres of open space land.

While the township experienced considerable development in the 1980s and 1990s, officials realized the importance of planning ahead to preserve lands for future public good. The township’s 1981 master plan contained a Recreation and Conservation Element that combined the issue of active recreation needs with the concern for protection of sensitive environmental areas. The plan recommended that: active recreation sites be located for the convenience of the residents; that recreational facilities be contained within an open space network which would contain all environmentally sensitive lands and all active recreation sites; and that the township provide developer incentives to help provide land and facilities for recreation.

As township planning and zoning have evolved since the 1981 master plan and subsequent updates in 1992 and 2003, the issue of recreation has been addressed in detail as discussed in a separate chapter, and the issue of environmental protection has been treated through the net site density provisions and other natural resource protection requirements of the zoning ordinance.

The township’s first open space plan, produced in 1998, evaluated potential open space properties in five categories—historic, scenic, environmental, agricultural and recreational—to determine the most suitable areas for preservation. The plan identified and ranked properties according to their potential for fulfilling open space goals. In 2009, the township officials adopted The Lower Makefield Township Open Space Plan Update (August, 2009), which reaffirmed the stated open space goals established in the 1998 plan. The 2009 update contains an inventory of potential open space lands that was developed by the township’s Environmental Advisory Council (EAC). The inventory prioritizes potential open space lands based on a range of criteria which includes: site size; the presence of environmental characteristics; ecological diversity; watershed protection contribution; proximity to other open space areas; site accessibility; greenway/wildlife corridor potential; and the presence of cultural/historic resources.

Diminishing farmland acreage due to development in the 1980s prompted the formation of the township’s Farmland Preservation Corporation, which was formed in 1985 to preserve, protect, and manage farmland. The corporation holds title to and administers farmland set aside in residential developments under the provisions of the farmland preservation ordinance. Its five-member board of directors is appointed by the township board of supervisors.

### FUNDING FOR OPEN SPACE PRESERVATION

Over the last twenty years, Lower Makefield voters have approved two separate local bond referendums authorizing township officials to borrow money for open space use. In 1999, voters approved the borrowing of \$7.5 million to fund the cost for open space and land preservation. Since 2000, open space monies from the 1999 bond were used to purchase conservation easements and open space, including Elm Lowne (sold to a private owner in 2011), the Samost tract, Snipes Farm, Prospect Farm, Gates Moontide farm, Ruth Wright farm, and the Banko tract (connected to Five Mile Woods Nature Preserve). In 2008, voters approved borrowing an additional \$15 million to be spent on preserving environmentally

sensitive areas and open space for active and passive recreational purposes over the next 10 years. To date, this money has not been spent. The township's EAC is actively working on open space planning issues and will be focused on efforts to continue purchasing conservation easements and open space in the next few years.

In November of 2007, Bucks County voters renewed the Bucks County Open Space program by approving an \$87 million bond issue for preserving open space. Funding for the program included \$25 million for Farmland Preservation, \$26 million for Municipal Open Space, and \$11 million for Natural Areas. Of the \$26 million in county funding allocated for the Municipal Open Space Program, Lower Makefield Township was allocated \$824,605 (with a 25 percent municipal match). To date, the township has used \$386,250 of its allotment for the purchase of a 7-acre parcel along Ferry and Big Oak roads. The site currently contains a mowed detention basin which Environmental Advisory Council officials plan to naturalize. The remaining county funds were used for the purchase of a 10-acre parcel at the intersection of Big Oak Road and Stony Hill Road.

A new component of the county program provides funding specifically for open space projects along the Delaware River. The Delaware River component is a competitive grant program available to all Delaware River communities. All projects must be related to natural resource preservation and recreation purposes. To date, Lower Makefield has not applied for funding under this component.

## **CURRENT PLANNING AND ZONING POLICIES**

The township currently has the following policies to address open space preservation, as distinct from its recreation policies:

1. Environmental protection standards and net site density calculations require the preservation of lands with natural resources as open space.
2. Open lands are defined as resource-protected lands, including farmland which is part of a farmland preservation conditional use development or common open space.
3. Land proposed to be set aside as open space needs to meet the recommended standards for suitability of use of the park and recreation board, the planning commission, and the board of supervisors.
4. The township will use its current open space plan which includes an open space inventory as a guide to prioritizing properties to be protected through acquisition, conservation easement, or other means.
5. Open space areas may be dedicated to the township; conveyed to a conservancy, condominium, or association; or preserved through restrictive covenants or easements held by the township, a conservancy, or other corporation. Land dedicated to the township or other entities must have an endowment to support future maintenance needs.
6. Open space in the form of farmland is encouraged to be set aside and conveyed to the Farmland Preservation Corporation for agriculture or other open space uses.

## **AGRICULTURAL AREAS**

Soils that are good for agriculture continue to play a role in planning decisions because good farming areas are viewed not as holding zones for future development, but as important natural resources to be protected. Pennsylvania court decisions have affirmed the validity of farmland preservation zoning as a land use planning tool. Amendments to the Pennsylvania Municipalities Planning Code in 2000 require municipalities to preserve agriculture.

The township has embraced the concept of preserving land for future farming and other open space uses through its Farmland Preservation Corporation, which owns about 334 acres of farmland in the northern part of the township, consisting of parcels located within eight housing developments. The farmland, preserved in perpetuity, is leased to local farmers who grow corn, wheat, soybeans, and other types of crops.

In addition, as noted in the 2009 Lower Makefield Township Open Space Plan Update, the township has endorsed the formation of an agricultural security district that includes about 838 acres of land in 20 properties. The district has been formed under the guidelines of Pennsylvania Act 43, which allows for the formation of voluntary farmland districts at the request of local landowners. Properties can be added to the security district by following certain procedures in Act 43.

The provisions of Act 43 do not restrict or regulate development in farm areas, which can be converted to other uses. However, the act does protect farmers from various nuisance complaints (against noise or odors associated with farming) and makes participating landowners eligible for state and county funding for the purchase of development rights.

The 838 acres in the township's agricultural security district include the 334 acres within residential developments owned by the Farmland Preservation Corporation. These lands cannot be used for development. The remaining acres are privately owned and can be developed under the terms of the security district.

The township has preserved additional farmland as part of its open space program. Using funds from its 1998 open space bond issue, supplemented by county open space monies, the township acquired the 200-plus-acre Patterson farm, which will remain in agricultural use. The farm is located between Yardley-Newtown Road and I-295.

The township's farmland preservation program is a notable success in agricultural preservation. The program was set up by combining zoning ordinance provisions—the farmland preservation development performance standards—with the creation of Lower Makefield Township Farmland Preservation, Inc., which owns the properties and safeguards their future use. The ordinance requires that 51 percent of a tract be saved as open space to be used for farming or other open space uses. Lot sizes must average at least 22,000 square feet, and the density on the buildable area cannot exceed two units per acre. The total number of housing units permitted cannot exceed that which could be achieved under the R-1 zoning provisions. Land dedicated to Farmland Preservation, Inc. must meet standards dealing with soil type, configuration, size, location, and feasibility for farming.

## **OPEN SPACE RESOURCES: NATURAL AND CULTURAL RESOURCES**

Preserving open areas within the township has been a stated policy for the past 40 years. The purposes of open space preservation are the protection or increase of property values, the preservation of aspects

of the natural landscape for future generations to enjoy, the enhancement of the community, and the protection of public health and safety by restricting development on environmentally sensitive lands. The township planning commission recommends that open space not be sold. However, if that happens, proceeds from the sale should go back to township funds intended for open space preservation.

This section of the plan makes a distinction between lands used primarily for active recreation, which are discussed in the Park and Recreation Planning section, and lands which have value because of their natural, cultural, or environmental features. Map 7 shows both park and recreation lands and open space/resource protection lands. It contains a list of the township's preserved open space and depicts public facilities as well.

The township's major open space resources, described below, include both lands that have been permanently preserved and lands that may be privately owned and deed-restricted for open space uses. It should be noted that different open space parcels have different levels of restrictions based on how they were purchased and what funding/program may have been used to purchase easements and/or land.

1. *Five Mile Woods*—This is a nature preserve located on Big Oak Road that contains approximately 298 acres and 5 miles of nature trails. In 2004, the township purchased easements on two additional properties adjacent to the preserve (known as the Banko properties). The township board of supervisors manages the preserve and a part-time naturalist is employed to oversee all programs and uses of the preserve. The Friends of Five Mile Woods provide nature education programs. The land has special environmental features due to the geologic fall line running through it, which separates Piedmont areas from the Coastal Plain. The preserve has been set aside for nature study and environmental protection because of the valued woodlands and several endangered plant species. Future uses should continue to be restricted to activities that will not threaten the plant or animal life.
2. *Delaware Canal*—The Delaware Canal and the Delaware Canal State Park extend the entire length of the township from Mt. Eyre Road at the Upper Makefield line to Yardley Borough and from Yardley Borough to Morrisville Borough. The Commonwealth of Pennsylvania owns land along the canal as part of the state park system. The canal is approximately four miles long in Lower Makefield.
3. *Areas close to or associated with the canal*—There are several areas that are adjacent to or related to the canal or the Delaware River. These include the Manor Gate Natural Area, the Parktown Natural Area, the Black Rock Picnic Area, and the Delaware River Boat Access, which is operated by the Fish and Game Commission.

In addition to areas specifically designated as open space, there are natural areas along the canal and the river with limited development potential due to sensitive land features, such as wetlands and forests. In particular, the land along the canal between the Yardley Railroad Bridge and Ferry Road has been identified as land with significant resources worthy of protection.

4. *Farmland Preservation Lands*—The 334 acres owned by the Farmland Preservation Corporation are preserved under the bylaws of the corporation and restricted in use. These lands protect a portion of what was a major agricultural area in the early development of Bucks County.

5. *Patterson Farm*—The Patterson Farm, acquired in 1998 with municipal bond and county open space funding, serves multiple purposes as centrally located scenic and agricultural open space. Approximately three acres of the farm are leased to a private company for year-round greenhouse operations to grow local produce for area grocery stores. In 2011, approximately 5.14 acres were subdivided off of the larger tract.
6. *Wright Farm*—In 2004, the 82.3-acre Wright-Kimmel farm along Route 332 and Lindenhurst Road was preserved with an agricultural easement under the Bucks County Agricultural Land Preservation Program. This is the first and only property in Lower Makefield preserved under the county’s program.
7. *Township greenbelt*—16 acres of land between Schuyler and Sandy Run Roads preserve natural features; no access except from Yardley Hunt open space.
8. *Stream corridors*—Greenway corridors of the township streams—Core Creek, Brock Creek, Silver Lake, Rock Run, and Buck Creek—have been described earlier as areas with open space values due to floodplains and vegetation. Also, as discussed in the chapter on Parks and Recreation Planning, these stream corridors provide greenway opportunities to host trails for public recreation and to provide connections to open space areas, park facilities, and neighboring communities.
9. *Makefield Highlands Golf Course*—The municipal golf course opened in 2004 on a tract of land formerly known as Pleasant Valley Estate Farm. Situated in the northern portion of the township, this 18-hole golf course is located on 168 acres along Woodside Road and includes a practice facility and a clubhouse.
10. *Guzikowski Farm*—In 2017, the 44.6-acre Guzikowski Farm along Big Oak Road was preserved by the township with an agricultural conservation easement.

## **FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION**

1. *Farmland preservation*—The township should continue to encourage future developers to make use of the farmland preservation development options for properties, which meet the criteria for farmland development. The open space that is protected will benefit the community in the long run by providing land for farming or other open space uses.
2. *Canal enhancement*—The Delaware Canal Master Plan was completed in the late 1980s and endorsed the concept of municipal canal enhancement ordinances. A model ordinance, entitled “Generalized Suggested Zoning Provisions to Protect and Enhance the Delaware Canal Corridor” was prepared for the 18 municipalities along the canal as part of the canal master plan. Each municipality was asked to consider the generalized suggestions and adopt those provisions that seemed applicable to it. The standards are designed to protect the visual character of lands along the canal in support of the publicly owned lands that are controlled by the state.

The specific zoning standards already in place in Lower Makefield provide the control of uses, setbacks, signs, and environmental features that the model canal enhancement ordinance promotes.

3. *Open space management*—Open space ownership has been determined on a case-by-case basis as development plans are reviewed. Most municipalities follow this approach; few have hard and fast rules on ownership and maintenance. Some guidelines that should be considered when making a determination on township ownership vs. private ownership are listed below.
  - *Access*—Lands that are to be maintained by the township should be easily accessible to maintenance equipment and personnel.
  - *Land management*—The type of land management required for open space lands should be determined by a site inspection prior to making a decision on ownership. The township will continue to assess the type of equipment needed, the proper maintenance required, the likelihood that nearby residents will complain if maintenance does not meet with their approval, and the availability of manpower to provide regular maintenance. Both the Park and Recreation Board and the public works director should be consulted in establishing a maintenance program for open space lands that is both manageable from the township’s point of view and environmentally sensible.
  - *Need to protect lands from disturbance*—Properties that include wetlands, floodplains, slopes, or woodlands should be allowed to remain in their natural state. Inevitably, lands included within the lot areas of residences as deed-restricted open space become part of back yards and may not be protected from damaging mowing and clearing. The township will continue to monitor whether “lotted out” open space is being effectively protected.
  - Open space that is lotted off along all stream corridors should include provisions for public access easements. Walking paths along streams are popular forms for recreation; if provisions are made during the development process, it makes it easier to complete the trail system at a later time.
4. *Open space planning*—Continue to update the municipal Open Space Plan as needed to keep it current.

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## ENERGY CONSERVATION

Energy, mostly from non-renewable fossil fuels, is used for heating, cooling, and powering vehicles, appliances, and other equipment, and thus sustains a community's standard of living. However, energy use has the negative side-effect of greenhouse gas production. From a sustainability perspective, continued reliance on nonrenewable sources of energy may not provide adequate energy availability for future generations of township residents.

Therefore, energy planning is an essential part of moving toward a sustainable community. The nation as a whole, and individual communities such as Lower Makefield, should be moving toward a reduced-carbon economy which will require the utilization of alternate energy resources such as wind, solar, and biomass. Moving toward sustainability, communities need to: change their approach to the ways buildings are designed and constructed; require that land be developed with more nature-friendly techniques; reduce the solid waste stream/increase recycling/recover energy from waste; and, implement alternative approaches to the current transportation system. Energy conservation and alternative energy initiatives are part of the solution and should be implemented at the local level by municipal government, businesses, institutions, and residents as soon as possible.

### BUILDINGS

Sustainable building methods such as LEED (Leaders in Energy and Environmental Design) should be part of a green building incentive program that rewards applicants with a reduction in permit fees and/or an expedited approval process. Consistency with the Pennsylvania Uniform Construction Code (UCC) and the Pennsylvania Municipalities Planning Code (MPC) will be necessary. The township has both a Green Building Code Ordinance and a Low Impact Development Ordinance in place.

Green building technologies can even be applied to historic structures. Design guidelines for green building technology could encourage the careful placement of energy-efficient systems while ensuring that the historic integrity of the structure remains intact. Recommendations and specifications for location, size, or bulk thresholds for green building construction, as well as the required kind of green devices permitted (e.g., building-integrated devices, solar roof shingles, small unobtrusive wind devices) should be implemented through ordinance requirements.

### LANDSCAPING/WATER CONSERVATION

With regard to landscaping, EPA's GreenScapes program provides cost-efficient and environmentally-friendly solutions for landscaping. Designed to help save energy, preserve natural resources, and prevent waste and pollution, GreenScapes encourages holistic decisions regarding waste generation and disposal and the associated impacts on land, water, air, and energy use. For example, locationally-appropriate landscaping can moderate climate, improve air quality, and conserve water. Planting trees in the proper locations and maintaining the canopy will provide shade that can reduce energy usage and summer cooling costs. Modifying lawn mowing practices can reduce the amount of energy needed to maintain open areas. An integrated pest management (IPM) program can provide environmentally friendly alternatives to pesticides and fertilizers. Collectively, the implementation of water conservation techniques including rain barrels, rain gardens, and water-saving faucets and low-flow toilets can have a significant impact on water infiltration and usage and reduce energy costs. The township has begun a stormwater basin naturalization program which is intended to reduce maintenance and energy costs. When practices such as those listed above are implemented on public areas such as parks and

governmental buildings, opportunities arise to educate residents and visitors on how these practices can be implemented on individual properties.

## **TRANSPORTATION**

Transportation conservation alternatives may include the use of hybrid and/or alternative-fueled municipal vehicles (e.g., compressed natural gas, hybrid engines) and the use of bicycles or electric motorcycles by police for patrolling the community. Providing facilities such as public recharging stations for electric vehicles and bicycle racks will also help to reduce emissions. With the onset of alternative-fuel vehicles, the township may want to consider the merits of installing electric auto charging stations at municipal facilities as well as encouraging private businesses in the township to install such stations.

The planning and implementation of a regional trail network, and promoting the use of public transportation and carpooling can help reduce reliance on the automobile and vehicle miles traveled. A park and ride lot, located within the township at Woodside and Taylorsville roads just north of Interstate 295, provides a convenient meeting spot for township residents wishing to carpool.

## **TOWNSHIP ACCOMPLISHMENTS**

Lower Makefield Township has demonstrated a commitment to environmental awareness and planning for a sustainable future. Through efforts by the township's Environmental Advisory Council (EAC), the township has put into place a number of programs and initiatives designed to reduce energy usage and reliance on nonrenewable energy sources. Over the last eight years, such accomplishments include the following:

- 2006 – Lower Makefield became the first community in southeastern Pennsylvania to join the Pennsylvania Clean Energy Communities Campaign by committing to use 20 percent alternative energy by the year 2010
- 2006 – adoption of the Low-Impact Development Ordinance which is designed to minimize impacts to natural systems and reduce the footprint of development
- 2007 – a resolution endorsing the U.S. Mayors Climate Protection Agreement and the Sierra Club's Cool Cities Program which encourage initiatives to reduce a municipality's carbon footprint was passed
- 2007 – adoption of a Native Plant Ordinance
- 2007 – a local farmers market started up to enable residents to buy and sell local goods
- 2008 – the Cool Cities Greenhouse Gas Inventory was conducted to calculate the township's carbon footprint
- 2009 – adoption of a Green Building Code
- 2011 – adoption of the Lower Makefield Township Sustainability Action Plan
- 2014 – adoption of the pervious pavement credit zoning ordinance amendment (pending adoption)
- 2014 – adoption of amended and enhanced tree replacement ordinance.



With adoption of the Lower Makefield Township Sustainability Action Plan in 2011, the township continues to encourage the appropriate implementation of new methods and technologies to provide energy solutions for the future. The plan, prepared by the Cool Cities Committee of the EAC, contains various “Action Plan Measures” for buildings, transportation, land use, lighting, waste and recycling, agriculture and food, community outreach and education, and procurement practices. Within each category, the proposed actions are provided for four different end user groups: residential; commercial; municipal (local government); and educational institutions. Township officials and representatives should continue to promote implementation of the Sustainability Plan’s recommended actions. The Sustainability Action Plan is available at: [http://www.lmt.org/lmt\\_wp/wp-content/uploads/2013/08/CCActnPln-sept-11-ver-3.pdf](http://www.lmt.org/lmt_wp/wp-content/uploads/2013/08/CCActnPln-sept-11-ver-3.pdf).

Lower Makefield Township has been proactive in promoting the various aspects of energy sustainability through its Environmental Advisory Council (EAC). Using its web page, [http://www.lmt.org/lmt\\_wp/index.php/boardscommissions/environmental-advisory-council/](http://www.lmt.org/lmt_wp/index.php/boardscommissions/environmental-advisory-council/), the EAC keeps residents updated on its planning projects and activities and makes available educational material on topics ranging from climate change to geothermal home heating to environmental stewardship. In addition, the township EAC periodically holds conferences and information sessions on issues such as global warming and energy conservation.

As a result of the EAC’s efforts, many residents as well as public and private entities have already begun to institute a host of energy conservation practices which contribute to reduction of the township’s carbon footprint (e.g., turning off lights and computers, installation of adjustable/programmable thermostats, and the use of energy efficient LED signs, traffic signals, street lights, and compact fluorescent light bulbs).

## **FUTURE NEEDS AND RECOMMENDATIONS FOR ACTION**

### **ENERGY CONSERVATION**

1. *Implementation of Sustainability Action Plan proposed actions*—Continue to promote implementation of the proposed actions identified in the Lower Makefield Township Sustainability Action Plan (2011).
2. *Alternative-fuel vehicles*—Consider installing electric auto charging stations at municipal facilities and encouraging private business to install such stations.
3. *Public Outreach*—Continue to promote energy conservation and efficiency practices to residents and businesses through the use of educational material, social media and planned information sessions.
4. *Landscaping*—Encourage residents and businesses to research EPA’s GreenScapes landscaping program and low-impact development practices and seize opportunities to implement cost-efficient and environmentally friendly solutions for landscaping.



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## HISTORIC RESOURCES OF THE TOWNSHIP

Historic sites, buildings and neighborhoods can be integral to the fabric and character of a community. These resources can be a source of pride and prestige. Often they were, and continue to be, important in establishing the character and identity of a township. They provide continuity to the geographical and temporal sense of place and serve as reminders of what a community has been, is, and hopes to be. The preservation of historic areas can also provide economic benefits to a community, either as points of interest, gathering places, or resources that maintain the property values of neighboring sites.

### CURRENT PLANNING AND ZONING POLICIES

Lower Makefield Township has long demonstrated its commitment to recognize and preserve its historic resources. The township Historical Commission has compiled a list of landmarks and structures built prior to the 20th century. In 1998, it published *A Guide to Lower Makefield's Historic Landmarks* to highlight landmarks both in Edgewood Village and throughout the entire township. The buildings fall into three broad groups: those built before 1798; those built between 1798 and the Civil War; and those built after the Civil War and before 1900, with each group containing roughly equal numbers of buildings. The handbook contains maps and outlines a self-guided tour comprising 49 historic structures situated throughout the township, the Delaware Canal, and 19 buildings in Edgewood Village.

A total of 26 buildings in Lower Makefield are listed on the National Register of Historic Places, according to the current listings on the CRGIS database maintained by the Pennsylvania Historical and Museum Commission (PHMC). That database includes 23 properties listed as part of the Edgewood Village Historic District, although some of these are known to have been demolished or destroyed by fire since the district was nominated to the register. The state's database also lists numerous resources that, while not eligible for the National Register, may be of local historic significance.

Buildings listed on the National Register but located outside the Edgewood Village Historic District are:

- John and Phineas Hough House (Twin Arches)—Moyer Road
- Benjamin Taylor Homestead (Dolington Manor)—Washington Crossing Road
- Amos Palmer House—Township Line Road

Two other Lower Makefield historic resources other than buildings are listed on the register. The Slate Hill Cemetery is on Yardley-Morrisville Road and the Delaware River Railroad Bridge is located south of Yardley Borough and the Pennsylvania Division of the Delaware Canal, which passes through the township on its course from Easton to Bristol, as a designated National Historic Landmark, holds the classification of highest historical significance.

The CRGIS database details 10 other resources as eligible, or potentially eligible, for National Register listing. The registered, eligible or potentially eligible properties are detailed in Appendix D.

The National Register of Historic Places is part of a nationwide program to coordinate and support public and private efforts to identify and protect resources of significance in American history, architecture, engineering and culture. Nominations are administered through the PHMC. Once listed, a resource, building, or district will be protected from alterations to the extent that any federal or federally funded, assisted or licensed project will be reviewed if the project might have an effect on it. Register listing places

no restrictions on the actions of private landowners or developers, but has the effect of alerting landowners to the significance of a resource.

A historic survey, or inventory, is the first, basic step toward resource protection. Resource surveys may include not only properties of National Register-level significance, but those of importance to community history. Various inventories of Lower Makefield's historic properties exist, and the properties are sometimes listed under different names in different inventories. The township last updated its historic survey in 2006. Discrepancies exist between local listings and that assembled by the PHMC. A township-wide survey should be undertaken by a qualified professional, to document changes that have occurred and update and reconcile the multiple databases.

The township has achieved Certified Local Government (CLG) status from the PHMC. This status makes the community eligible for matching grants for a variety of preservation projects, such as resource protection planning, inventories and historic markers. The Lower Makefield Historical Society is a nonprofit organization that sponsors educational events, conducts outreach and research, and maintains a local history collection.

A report on preservation and management strategies for township-owned historic resources was drafted by the Heritage Conservancy in 2006. One of the resources, Elm Lowne, was sold to a private owner in 2011. The report includes historic evaluations and strategic plans for the properties and recommendations for restoration and further studies.

Appendix E contains a summary of state laws that support historic preservation in the commonwealth. Map 9 identifies historic resources in the township.

## **EDGEWOOD VILLAGE**

Since completion of the last comprehensive plan update in 2003, the township has undertaken planning and zoning activities to promote the historically compatible infill redevelopment of Edgewood Village.

A traditional neighborhood development overlay zoning district has been adopted for the village. An overlay district creates a second, mapped zone superimposed over the underlying zoning district, while leaving intact provisions of the underlying zone.

Following the recommendations of an initial planning study in 1999, the township has prepared design guidelines applying to new construction, rebuilding, alterations, and landscaping and streetscape improvements in the village. An emerging issue that may affect redevelopment of the village is the implementation of sustainable and cost-effective development practices, which incorporate newer technologies and planning techniques designed to conserve energy and spare natural resources. The use of these materials and devices in the historic district may entail trade-offs between historicity and sustainability for the benefit of better energy efficiency and durability, as well as cost savings.

Officials and agencies involved in regulating the historic district must balance the advantages of restoration or replacement of original materials, as compared to their visual replication. They must also evaluate whether sustainability advantages resulting from the use of green technologies would justify detectable structural modifications to historic buildings, and if so, to what extent.

Edgewood Village is a designated historic district listed on the National Register. Proposed changes must be evaluated by the Historical Architectural Review Board (HARB).

Land development plans have been submitted for most of the parcels that form the village, and infill redevelopment is under way. Several small businesses have opened in new or restored structures at the northeast corner of Stony Hill and Yardley-Langhorne roads. Other components of the redevelopment envisioned in the 1999 study and conceptual plan, including housing, landscaping, and streetscape improvements, remain to be completed. Township officials should monitor redevelopment implementation, and consider adjustments to zoning and design guidelines should they become warranted, in order to ensure the continuing appropriateness of development activity. Of particular concern is the loss and deterioration, actual and potential, of individual resources that contribute to the village's status as a listed historic district.

## **FUTURE NEEDS: HISTORIC PRESERVATION**

The township and property owners have faced significant challenges as they move forward with infill development designed to respect and enhance the character of Edgewood Village. Despite the concentration of historic structures in Edgewood Village, it is also important not to ignore other resources throughout the township that merit attention and protection.

As noted in previous comprehensive plans, historic buildings are vulnerable not only to physical deterioration and alteration, but to changes in the overall setting that erode historic context. Among the threats posed to historic resources are outright demolition, neglect, or inappropriate alteration or re-use that ignores their internal integrity or their place in the surrounding landscape. "Tear-downs," in which modestly sized structures, usually homes, are razed and replaced with larger and taller ones, may become prevalent in desirable historic neighborhoods during thriving real estate markets. Three early and charming residential subdivisions in Lower Makefield—Arborlea, Edgehill Gardens and Westover—may be vulnerable to inappropriate alterations and should be evaluated for potential historic district designation.

Consideration should also be afforded to protecting the many dispersed historic resources located throughout the township. A historic overlay zoning district may be useful in protecting interspersed historic resources, as well as Edgewood Village. An approach that has been used in Bucks and Chester counties to protect and encourage use of historic structures is to expand the uses that are available to specifically identified historic buildings. Buildings that have been identified and are designated by the municipality as historic resources are given additional use opportunities under the zoning ordinance. Typical uses are bed-and-breakfast, museums, or even low-impact offices. Provisions for expanded use may operate within a historic overlay district or independently.

Aside from methods of protection that involve zoning and land use regulation, the township could explore economic incentives, primarily through its taxing authority, to make historic preservation and rehabilitation economically feasible for the owners of historic properties.

Outside financial resources can also be employed to fund the restoration or maintenance of historic properties. The programs and designations that the township has already pursued make Lower Makefield eligible for some programs. As a CLG, it obtained state grant assistance for the preparation of design guidelines. Lower Makefield should continue to seek historic preservation funding from governmental and private sources.

All these legal and financial efforts must stem from a desire by the community to preserve its history. Such efforts can only supplement the work of residents and community leaders to publicize and utilize the

historic assets of the township. The township should look for ways to enhance the visibility and demonstrate the value of local history to all its residents.

## RECOMMENDATIONS FOR ACTION

### EDGEWOOD VILLAGE

1. *Implementation of TND zoning*—Continue to monitor and implement TND zoning within Edgewood Village, making adjustments if future conditions warrant.
2. *Implementation of design guidelines*—Continue to implement design guidelines to regulate changes to existing structures and new construction in Edgewood Village. The guidelines provide for reasonable property use and rehabilitation, while maintaining exterior architectural style. Monitor implementation for usability of guidelines and their ability to achieve desired results. Have the HARB periodically review and updates guidelines and related regulations to apply the most suitable standards for materials and products to be used in rehabilitation, replacement, additions, and infill construction, considering both sustainability and historic accuracy.
3. *Act 167 District consideration*—Township officials should consider evaluating historic district and TND provisions of its zoning ordinance to determine whether a stand-alone historic district under Act 167 ordinance might be more appropriate and afford greater protection to the Edgewood Village historic district. This is especially important because National Register-listed resources within the district are being lost to demolition and potentially to demolition by neglect. Any changes may involve a redefinition of the respective duties of the HARB and the Historical Commission, or their consolidation.
4. *Public education*—A design guideline manual has been prepared and distributed to Edgewood Village property owners. Continue this program of public education and technical assistance in preservation. This effort could involve: orientation to village history; introduction to township goals and regulations for historic preservation; and instruction on design guidelines and permit procedures.

Public outreach to raise the profile of the village and explain its historic significance would be useful. The historic marker program run by the PHMC is a good way to publicly identify resources.

5. *Property maintenance*—The township should use available tools to encourage property maintenance and historically appropriate renovations in the village. The HARB and Historic Preservation Commission should explore and publicize sources of financial incentives for historic preservation, such as the state and federal income tax credit programs for restoration of income-producing properties. Property maintenance codes should be enforced where necessary.

### GENERAL HISTORIC PRESERVATION

1. *Historic resources inventory and register listing*—Conduct an updated historic survey to identify resources throughout the township, consolidate and update various inventories, and to establish any loss of resources or changes in physical conditions. Complete National Register nominations for properties determined to be eligible. Three early 20th-century subdivisions, Arborlea, Edgehill Gardens and Westover, should be evaluated for potential historic district designation. Grants-in-aid for this purpose may be available through the state CLG program or other sources.

2. *Ordinance amendments*—The township zoning ordinance may be amended in a number of areas to better protect historic resources, and to encourage property owners to use and maintain large historic properties. Potential areas for amendment include a township-wide historic overlay, preservation incentives, use modifications, and a delay of demolition ordinance.

Preservation incentives and use modifications should be limited to buildings listed on the National Register and/or the historic resource inventory. (Incentives and use modifications in the TND overlay or in a second historic overlay district would be governed by the special regulations that apply to that district.)

Granting use modifications as special exceptions or conditional uses allows better oversight of atypical uses. The use should be determined to be necessary to preserve the historic resource; no resource should be expanded beyond what is necessary to accommodate the use; and additional standards should be imposed to preserve the historic features, qualities, appearance and integrity of the building.

- a. *Preservation incentives*

- Allow a density bonus of one additional dwelling unit as part of a new development if an existing historic structure is preserved and serves as the additional unit.
- Use a lot-averaging approach to preserve the setting of a historic home. The approach would allow a larger lot for the historic building and slightly smaller lots for new development. Preservation incentives in nonresidential districts might include bonus provisions for building coverage or impervious surface coverage when historic resources are incorporated into a development.

- b. *Use modifications*

- Permit condominium conversion or other residential re-use of very large historic structures.
- Permit nonresidential uses like antique shops, professional offices, cultural facilities, bed-and-breakfasts, as appropriate to the zoning district.

- c. *Delay of demolition ordinance*—Consider enacting an ordinance requiring delay of demolition for historically significant buildings. This type of ordinance provides a waiting period—typically 60 to 90 days—before issuing a demolition permit for a historic building, so that means of saving the building can be sought. It could also provide for removal of historically significant features and documentation, in cases where a structure cannot be saved. It is recommended that delay of demolition ordinances regulate demolition by neglect in the same way as ordinary demolition permitting.

3. *Historic resource management*—Take into account the recommendations of the Heritage Conservancy study in decision-making related to the remaining township-owned historic resources.

4. *Historical Society*—The township historical society conducts research, promotes public awareness, and has assembled a collection of artifacts illustrating the township’s history, a number of which are on display in the township building. A permanent home should be sought for this important collection.



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## TRANSPORTATION PLANNING

### CURRENT POLICIES

This element of the master plan is intended to provide the framework for an efficient and effective transportation system in Lower Makefield Township. The transportation network includes pedestrian facilities, bikeways, roads, public transportation, and railroads.

The objective of this element is to achieve a balanced system that develops and uses each of these types of transportation. This network provides access from the township to other municipalities for the movement of people and goods.

The development of Lower Makefield has been determined in part by the transportation system encompassing streets, highways, and other facilities that serve the township and extend beyond its borders to connect it with the rest of Bucks County and the surrounding region. In the past, a primary focus of Lower Makefield's transportation planning has involved the construction, maintenance and improvement of its road and highway network. That is likely to remain the case, and the township should continue to improve, and where necessary, expand its road network, as well as to enhance capacity and traffic flow.

At the same time, the township has taken steps to complement its road system with a comprehensive system of pedestrian/bicycle pathways, and has promoted use of public transit links in nearby municipalities. Such alternatives may not only slow the rate of increase in vehicular traffic, but also enhance the community and its neighborhoods in ways that automobile use cannot.

### ELEMENTS OF THE TRANSPORTATION NETWORK

#### STREET SYSTEM

The Lower Makefield roadway system consists largely of two-lane, undivided roadways. Local roads provide access to major highways including U.S. Route 1, the Route 332 Bypass, and Interstate 295. Major regional access to the township is provided via Interstate 295, which has interchanges at Taylorsville Road and Yardley-Newtown Road. Access to U.S. Route 1 is provided through an interchange at Oxford Valley Road along the Lower Makefield Township/Falls Township border.

Most roadways in the township are local collector roads that provide access to existing residential and commercial developments. However, several roads within the township serve a more regional access function as arterial routes. The arterial roadways within the township include Yardley-Newtown Road, Yardley-Langhorne Road, Taylorsville/Yardley-Morrisville Road/Pine Grove Road, Stony Hill Road, and River Road. The functional classification of each road is defined in the township zoning ordinance. Map 10 shows the township's existing street classification.

In order to preserve the bucolic and open space character of Lower Makefield, as well as its quality of life for residents, the highest priority should be keeping the heavy commercial traffic (truck traffic other than for local delivery) on the interstate and major highways and off the collector roads and residential streets of the township.

## **PUBLIC TRANSPORTATION**

In addition to the street network in the township, one bus route and two railroads operate near the township. The Southeastern Pennsylvania Transportation Authority (SEPTA) operates one bus route along West Trenton Avenue in Morrisville Borough/Falls Township with the service connecting with the Oxford Valley Mall in Middletown Township and West Trenton, New Jersey.

SEPTA also operates the West Trenton Regional Rail Line, which provides service to Philadelphia and West Trenton, New Jersey. The two closest SEPTA train stations are located along Reading Avenue in Yardley Borough and Woodbourne Road in Middletown Township. In addition, township residents have relatively easy access to Amtrak's Northeast Corridor service in Trenton, New Jersey.

## **AIR SERVICE**

Domestic and international air service is available to the township from the following airports: the Trenton-Mercer Airport, located in Ewing Township, New Jersey, across the Delaware River to the northeast; the Northeast Philadelphia Airport, located to the southwest; and the Philadelphia International Airport, less than an hour to the southwest via Interstate 295.

## **FUTURE NEEDS**

### **FURTHERING THE LAND USE/TRANSPORTATION LINK**

The relationship between land use and transportation is fundamental. Land use patterns and intensity influence the roadway network. Likewise, the roadway network can influence the land uses in a particular area.

Just as new or expanded transportation systems create new access opportunities that attract new development, new development patterns create a need for additional transportation facilities. Land use and transportation patterns are linked in a continuing cycle, in which transportation opportunities create a climate for development that triggers additional transportation needs, and so on.

This cycle has been the traditional route by which most suburban areas have developed. To break this trend, the primary relationship between land use and transportation must be recognized, understood and used to create conditions under which new growth and new transportation systems and/or improvements can proceed together in a logical and planned manner.

Linking land use and transportation can provide numerous benefits for the community:

- Incorporating land use considerations into transportation planning can influence future development patterns and ensure that transportation facilities have adequate capacity to meet demand.
- Land use patterns matched to the transportation system can help relieve congestion and traffic on existing roads, which in turn reduces the need for new transportation facilities.
- Improved site design and incorporation of public transportation services into development can attract tenants and/or buyers.
- The incorporation of transportation improvements and/or mass transportation will ease employee commuting, which will decrease employee lateness and increase productivity.

- Linking land use and transportation will reduce congestion, improve mobility, improve air quality and preserve additional open space, all of which will help to create a more attractive and livable community.

Improving the connection between land use and transportation planning is essential for the future of the township.

The importance of linking land use and transportation is illustrated currently by development proposals in the Big Oak/Oxford Valley Road area and the Stony Hill/Township Line/Route 332 Bypass area. Careful consideration must be given to development proposals which would exacerbate existing issues with traffic flow, safety, and congestion. The need for road improvements must play an important role in township review of any new development.

Inappropriate land uses coupled with inadequate transportation services create congestion and traffic impacts on both highways and local roads. They also worsen air quality, decrease highway safety, and reduce community access. They can hamper economic growth and productivity, as well.

Past actions by Lower Makefield have established a link between anticipated future land uses and their traffic impacts, but this bond should be strengthened by an emphasis on measures—like pedestrian and bike paths, mass transit, and demand management—that complement the road system and help moderate vehicular traffic (see Appendix F-Lower Makefield Township Traffic Counts).

The township has the ability to influence the future by continuing to take a pro-active stance towards integrating planning for land use and transportation facilities. The township must carefully consider the transportation implications of its decisions and coordinate these decisions with county, state, and regional governments.

### **TRANSPORTATION IMPACT FEE ORDINANCE**

Pennsylvania Act 209, the transportation impact fee legislation, was signed into law effective December 19, 1990. Act 209 amends the Pennsylvania Municipalities Planning Code to allow municipalities to charge transportation impact fees on new development within their boundaries, provided they have adopted a transportation impact fee ordinance in accordance with the procedures set forth in the act. Act 209 requires that a relationship be demonstrated between the development and the need for transportation improvements.

Impact fees may be used to fund improvements that are attributable to new development. This includes acquisition of land and right-of-way; engineering, legal, and planning costs; and all other costs directly related to road improvements in the designated improvement area. Lower Makefield Township has adopted a transportation impact fee ordinance.

Act 209 requires the completion of a roadway sufficiency analysis and a transportation capital improvements plan in order for an impact fee ordinance to be adopted. The roadway sufficiency analysis evaluates existing road conditions and determines what improvements are currently needed, and what will be needed in the future because of new development.

Traffic increases are divided into those caused by traffic passing through the study area and by new development within the study area. Impact fees must be based upon the share of future traffic volume

resulting from new development in the study area. The sufficiency analysis also generates the improvements that can be included in the transportation capital improvements plan.

The transportation capital improvement plan identifies the following: necessary road improvement projects and their estimated costs; to what extent the need for road improvements is due to existing traffic, future pass-through traffic (i.e., traffic that has neither an origin or destination within the municipality), and/or new local development for each project; funding sources for each project; and a schedule for when improvements will be made.

Lower Makefield completed a roadway sufficiency analysis and transportation capital improvements plan in 1991. The roadway sufficiency analysis identified 14 potential improvements for the township.

### **SCUDDER FALLS BRIDGE**

Lower Makefield Township is located across the Delaware River from the State of New Jersey. Currently, one bridge directly connects Lower Makefield with New Jersey. It is the Scudder Falls Bridge spanning the river, on which Interstate 295 is served.

The bridge is constructed as a steel plate girder. The main bridge section provides two lanes of travel for each direction, separated by a concrete median. Other cross-section features include narrow emergency sidewalks, no breakdown lanes, and no shoulders.

The bridge has been in service since 1961 with no changes in lane capacity. The Pennsylvania interchanges 10B and 10A provides northbound and southbound access from and to Taylorsville Road. Access to the bridge from Taylorsville Road is difficult during times of peak traffic.

The Delaware River Joint Toll Bridge Commission is currently constructing the I-295/Scudder Falls Bridge Improvement Project. The project includes a completely new, larger Scudder Falls Bridge with all-electronic tolling gantry and related infrastructure for highway-speed toll collection using E-ZPass tag readers and high-speed cameras for license-plate billing in 2019; tolls will be collected in the Pennsylvania-bound direction only. Other project elements include the reconfiguration of the Taylorsville Road Interchange and the reconstruction and reconfiguration of the Route 29 interchange in New Jersey through the use of roundabouts.

The project also includes an inside widening of Interstate 295 in Pennsylvania from the bridge to the Route 332 interchange and widening/improvements to Woodside Road. A pedestrian/bicycle path, which will link canal paths along both sides of the Delaware River, will be built as part of the construction of the Scudder Falls Bridge. The Delaware River Joint Toll Bridge Commission also purchased land from Lower Makefield Township to construct its new headquarters adjacent to the park and ride facility at the intersection of Taylorsville Road and Woodside Road.

The project is anticipated to be completed in the second half of 2021.

### **TRANSPORTATION DEMAND MANAGEMENT**

Because everyone is affected by traffic congestion, it has been realized that a cooperative effort is the most effective means to combat the problem. Several communities in Bucks County have established cooperative efforts between municipal government and business to reduce traffic congestion.

Transportation demand management strategies include: increasing facilities and incentives for carpooling; flexible work hours; adding needed bus routes; site planning taking into account bus stops and other public transit. The need to meet federal clean air requirements will increase the need to reduce vehicle trips.

Carpooling increases per-vehicle occupancy rates and decreases the number of vehicles on the road. Park and ride facilities promote the use of carpooling by providing both a place to park cars and a place to meet. Fortunately for township residents, the Delaware River Joint Toll Bridge Commission maintains a park and ride lot just north of Interstate 295 along Taylorsville Road at Woodside Road. The township can promote carpooling by encouraging employers to provide priority parking for carpoolers.

Flexible work hours is a scheduling arrangement that permits variations in an employee's starting and departure times, but does not change the total number of hours worked in a week. Flexible work hours permit employees to work the hours that best meet their needs and allows for better distribution of the traffic at peak rush hour times in the morning and evening.

Flexible work hours can reduce peak hour roadway volumes, thereby reducing congestion on the roadways during these critical times. The township should work with employers and the Transportation Management Association of Bucks County to encourage and coordinate flexible work hour usage for businesses in the township.

The township may also bolster the effectiveness of public transit by ensuring that developers incorporate transportation improvements and/or public transportation into land development projects by providing the following:

- Designing office complexes with bus pull-off areas and transit shelters to encourage public transit use;
- Reducing the distance from the main road to the building entrance so employees will have a shorter walk from the street to the building;
- Encouraging companies to provide amenities such as sidewalks, bus shelters, and bike racks.

## **BICYCLE AND PEDESTRIAN MOBILITY**

For those members of the community who do not drive, walking and riding a bicycle are two of the limited mobility alternatives. Automobile-oriented development in Lower Makefield is often disconnected from nearby residential neighborhoods, which forces people to drive.

Sidewalks are in place along the streets of most residential neighborhoods. The subdivision and land development ordinance requires sidewalks on both sides of all frontage streets within a new subdivision or land development.

Bicycle travel occurs throughout the township thanks in part to an aggressive bicycle path construction plan supported by the township. All new subdivisions and land developments are required to establish bike paths in accordance with the township's Official Map. The subdivision and land development ordinance also spells out requirements for bike path construction. There is a need to continue to make connecting segments of bike/pedestrian paths in the township a high priority.

## ACCESS MANAGEMENT

Lower Makefield has several arterial roadways that are designed for large volumes of high-speed traffic, with access to abutting properties restricted. Controlling access to these roadways will allow them to perform their intended function.

When access is not controlled, the number of conflict points with roadway traffic increases. This places serious demands on the roadway capacity and makes conditions unsafe for vehicles entering or exiting the highway.

Access management includes such techniques as shared driveways, access to secondary roadways, driveway spacing, planted median strips, protected left-turn lanes, and other measures. Access management is both a land use and traffic issue. It calls for land use controls and incentives keyed to the development policies of the community and the capabilities of the transportation system.

## QUIET ZONES

The township installed supplemental safety measures to create “quiet zones” around the Edgewood Road, Stony Hill Road, and Heacock Road rail crossings near residential neighborhoods, in order to buffer those neighborhoods from noise generated by frequent commuter and freight rail traffic. The project was approved by the Federal Railway Administration and partially funded by PennDOT.

## TRAFFIC CALMING

Traffic calming measures are mainly used to address speeding and high cut-through traffic volumes on neighborhood streets. By addressing high speeds and cut-through volumes, traffic calming can increase both the real and perceived safety of pedestrians and bicyclists, and improve the quality of life within neighborhoods.

Some potential traffic calming measures include speed humps; speed tables; chicanes; planted medians; roundabouts; and curb extensions. Such measures can be useful in certain situations and should be considered when warranted.

In December 2015 the Lower Makefield Township Board of Supervisors approved Traffic Calming Guidelines to: (a) enable residents to bring traffic safety concerns to the attention of the Township via a formal procedure, and (b) enable the township to determine whether Traffic Calming measures are warranted to ensure public safety. When warranted, the township should install traffic calming measures.

The township should conduct a review of speed limits in areas frequented by children—such as schools and parks—and evaluate whether the speed limits are appropriate to ensure safety. The township will coordinate efforts with PennDOT when state roadways are involved.

## RECOMMENDATIONS FOR ACTION

1. *Correlate land use and transportation planning*—Incorporate land use considerations into transportation planning and ensure that transportation facilities have adequate capacity to meet demand.
2. *Correlate transportation planning with development and design*—Ensure that developers encourage transportation improvements and/or integration of public transportation into land development projects by providing the following:

- Office complexes with bus pull-off areas and transit shelters to encourage public transit use.
  - Reduced distance from main roads to building entrances so employees will have a shorter walk from the street to the building.
  - Priority parking areas for carpoolers as an incentive to use carpools.
3. *Monitor major transportation projects that affect the township*—Monitor the proposed improvements to the Scudder Falls Bridge, Interstate 295, the Route 1 corridor, and support projects that promise to benefit the township.
    - Upon completion of the Scudder Falls Improvement Project, initiate an “after study” to evaluate the effect of the project on roadways within Lower Makefield Township and take corrective measures, as necessary.
    - Ensure that proposals to impose route and length restrictions on certain roadways do not result in heavy commercial truck traffic being diverted onto collector and residential roads in the township.
  4. *Encourage use of public transit*
    - a. Ensure that municipal projects incorporate the potential use of public transportation services.
    - b. Ensure that public transportation remains a viable option for township residents.
    - c. Encourage provision of future bus connections.
  5. *Transportation management*—Work with the Transportation Management Association of Bucks County to promote flexible work hours, carpooling, shuttle transit from rail stations, and other means of reducing vehicle trips.
  6. *Alternatives to vehicles*—Continue to provide pedestrian/bicycling facilities as an alternative to automobile use.
  7. *Develop a comprehensive Lower Makefield Township Transportation Improvement Plan (LMTTIP)*—Include a list of capital projects to improve the safety and quality of life for the residents and businesses in the township. These projects may include pedestrian, multi-modal and traffic improvements. The plan will include a project name, a scope of work, estimated costs and right-of-way considerations. The plan will be a guide for the township Board of Supervisors and staff as a budgeting and implementation tool.





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## PLANNING AND ZONING IN SURROUNDING MUNICIPALITIES

Planning and zoning policies of surrounding municipalities need to be considered in making recommendations for Lower Makefield. The municipalities that adjoin Lower Makefield are the townships of Falls, Middletown, Newtown, and Upper Makefield and the boroughs of Yardley and Morrisville. The Pennsylvania Municipalities Planning Code requires that comprehensive plans take into account the planning in surrounding areas, the county, and the region. The MPC encourages municipalities to formulate joint plans and implementation agreements.

The purpose of this discussion is to ensure that policies developed in Lower Makefield do not create conflicts with adjoining lands and to encourage a regional approach to problems that are intermunicipal. In reviewing the adjoining planning and zoning, the municipalities seem to have compatible zoning or have adjoining districts where conflicts have been minimized. The planning and zoning policies in effect in surrounding areas are listed below, along with a brief description of issues of shared concern.

### UPPER MAKEFIELD TOWNSHIP

Upper Makefield Township lies to the northwest of Lower Makefield and shares a border along Mount Eyre Road and portions of Dolington and Stoopville roads. Upper Makefield is part of the Newtown Area Joint Planning Commission, which has a zoning ordinance and comprehensive plan for Newtown, Wrightstown, and Upper Makefield townships.

The zoning districts that abut Lower Makefield are the Village Residential 1 District in the village of Dolington, the Conservation Management district, and the Country Residential 1 District. The village district encompasses the existing village and allows for residences on lots of 15,000 square feet. The Conservation Management District is a low-density district (0.33 housing unit per acre) intended to protect critical environmental resources. In keeping with the low-density, rural nature of the area, the Washington Crossing National Cemetery opened in 2009 on 205 acres in Upper Makefield's CM District, just north of the Lower Makefield border.

A small area along Mount Eyre Road is zoned Country Residential 1, which allows for residences on 1-acre lots, and encompasses an existing low-density subdivision with on-lot sewage disposal. All of these districts are compatible with Lower Makefield's present R-1 and R-RP zoning and with this plan, which recommends a continuation of the low-density residential zoning and farmland preservation along Mount Eyre and Dolington roads.

Issues of shared concern with Upper Makefield focus on preserving the agricultural and historic nature of much of the border area. Historic preservation in Dolington Village, a designated historic district under Act 167, is of special concern.

### NEWTOWN TOWNSHIP

The two zoning districts in Newtown that abut Lower Makefield are the Conservation Management District and the Office Research District. The low-density Conservation Management District is adjacent to Lower Makefield's R-1 District and is compatible with the recommendations of this plan.

Newtown's office research area abuts the Lower Makefield Office Research District for most of its length, although the Newtown Office Research District extends north of Yardley-Newtown Road while Lower

Makefield's stops at Yardley-Newtown Road. The Wright-Kimmel farm in Lower Makefield, located at the municipal border near Route 332 and Lindenhurst Road, has been preserved with an agricultural easement under the county's agricultural land preservation program ensuring it will remain as open lands.

In 2006, a new loop ramp from Yardley-Newtown Road to I-295 was constructed by PaDOT. Both Lower Makefield and Newtown townships worked together in planning for the loop ramp which is designed to improve traffic flow and access to the office/commercial complex in Newtown Township at the intersection of Yardley-Newtown and Lindenhurst roads. Traffic and circulation issues in this area along Yardley-Newtown Road (the Newtown Bypass) and I-295 are of continued mutual concern.

## **MIDDLETOWN TOWNSHIP**

The common border with Middletown Township extends from Newtown Township just north of Township Line Road, along Township Line and Big Oak roads, to Route 1. North of the railroad tracks that cross the municipal border, Lower Makefield zoning includes Office Research and High-Density Residential districts. Along this border, the Middletown zoning map shows an area zoned for open space, and several residential districts with provisions for residences on lots ranging in size from 10,000 square feet to 1 acre.

In Middletown, much of the land in the vicinity of the I-295/Route 1 interchange is zoned for medium intensity multi-family residential use which is consistent with the portion of the Matrix development currently under construction in Middletown. The Matrix development, an age-restricted residential/commercial/office development proposed for this area, spans the Middletown/Lower Makefield border. Middletown also has small pockets zoned for open space/recreation, and commercial and manufacturing uses abutting Lower Makefield.

Traffic and road access issues related to the Route 1 interchange and Oxford Valley Road have been issues of shared concern among the municipalities.

## **FALLS TOWNSHIP**

Falls Township lies to the south of Lower Makefield, with their common border just below Big Oak Road. There are also several properties between Morrisville Borough and Lower Makefield that are in Falls Township. The section of Falls Township adjoining Lower Makefield is somewhat separated from the rest of Falls due to the railroad line and Route 1.

Lower Makefield owns 47 acres of land in Falls Township. This land is part of Five Mile Woods.

The portion of Falls Township between Stony Hill Road, Route 1, and the Lower Makefield Township border is zoned low-density residential with the intent of preserving some open space in this area and allowing for single-family residences on 29,000-square-foot lots. On the other side of Route 1 are areas designated for light industry and offices. The area of Falls bounded roughly by Stony Hill Road, West Trenton Avenue and the Lower Makefield Township border is zoned largely for neighborhood conservation in recognition of existing developed neighborhoods. The area of Falls along West Trenton Avenue between Lower Makefield Township and Morrisville Borough is zoned neighborhood conservation, high-density residential, and neighborhood commercial. This area is primarily developed and contains existing residential neighborhoods including several apartment complexes, and commercial businesses consisting mostly of retail and service uses.

As with Middletown Township, an issue of shared concern between the two communities has been highway access and circulation. The southbound on/off ramps to Route 1 lie in Lower Makefield; the northbound on/off ramps are located in Falls Township, thus necessitating a cooperative effort to improve traffic flow. Since 2003, improvements have been made to the Route 1 ramps which include roadway realignment and additional turning lanes.

Another issue involving the two municipalities concerns drainage and water quality in the Rock Run/Martins Creek subwatershed.

## **MORRISVILLE BOROUGH**

A short border with Morrisville exists between Yardley-Morrisville Road and the Delaware River. Morrisville is an older, more densely developed borough and as such has zoning districts that allow for higher densities. While the lot sizes in Morrisville are smaller than those in much of Lower Makefield, this serves a useful purpose in the region by accommodating different types of development in proximity to borough facilities.

Borough zoning districts that abut Lower Makefield are the R-1, CS-1, and CS-2 districts. Morrisville's R-1 District is a single-family detached residential district that borders Lower Makefield's R-2 Medium Density District. The Borough's CS-1 and CS-2 districts surround the canal and extend to the Delaware River. These districts are intended to provide for community services and protect and preserve natural resource areas.

## **YARDLEY BOROUGH**

Yardley is surrounded by Lower Makefield. Although the borough is a separate municipality, it provides a focal point and commercial center for Lower Makefield residents. The area abutting Lower Makefield in Yardley is zoned for residential uses at a variety of densities. While there are some differences in permitted densities at the municipal border, the existing zoning and land uses along the municipal boundary are mainly consistent.

The longest common boundary is along the Yardley Country Club, which is zoned for residential/recreational uses. Other adjoining borough districts include the R-1, R-1A, and R-3A residential districts. The area zoned R-3A is the former U.S. Magnet site which has been approved for 63 townhouse units and almost 14.5 acres of open space. At the southern end of the borough, the R-3 District allows for multi-family residential development and contains the Yardley Commons condominium development. The areas in Lower Makefield that adjoin the R-3 District are an existing neighborhood, the Macclesfield Park, and the R-4 Multiple-Family High-Density District.

Lower Makefield also abuts sections of the R-2 Medium-Density Residential District in Yardley. The district allows for twin and single-family houses on lots of 5,500 to 7,000 square feet. The portion of the R-2 District bordering Lower Makefield runs along the Delaware Canal.

Yardley lies downstream from Buck, Brock, and Silver creeks, which flow through Lower Makefield and Yardley to the Delaware River. Brock Creek experiences high flows during storms and floods, with much of the impact occurring in Yardley Borough. Watershed management to minimize flooding is an issue of mutual concern to the two municipalities.

## **BUCKS COUNTY COMPREHENSIVE PLAN**

The Bucks County Comprehensive Plan (2011) seeks to coordinate and assist the county's municipalities, agencies, and general public in the planning, development, and management of its natural and built environment. The Plan places a strong emphasis on sustainability and smart growth development strategies.

On the Future Land Use Map in the County Plan, the township falls within four different categories. The Plan designates Lower Makefield primarily as an Emerging Suburban Center, which has experienced significant development in the last 20 years and is intended to accommodate future development. The northwest corner of the township is designated as a Rural Resource Area, which is generally not meant for significant development due to the presence of farms and significant agricultural soils. Portions of the township along the Falls and Middletown township borders are identified as Employment Areas, where primarily nonresidential growth has and will continue to occur. Areas bordering the canal and river, the Brock and Core Creek corridors, Five Mile Woods, Patterson Farm, and the Makefield Highlands Golf Course are designated as Natural Resource/Conservation Areas. Natural Resource/Conservation Areas include greenway corridors, recreation areas, and significant natural resource areas and are largely undeveloped due to the presence of natural resources.

The county plan identifies various strategies and actions for each category. For Emerging Suburban Areas, the Plan recommends that new development should be compact and built where existing infrastructure is adequate and development should be constructed to accommodate pedestrians. For areas identified as Rural Resource Areas, efforts should be made to preserve the rural character of such areas, such as through farmland preservation initiatives. Within Employment Areas, mixed use developments are encouraged to better link jobs and housing and emphasis on access control, streetscape appearance, pedestrian travel and safety is encouraged. Recommendations for Natural Resource/Conservation Areas stress the importance of preserving greenway corridors, recreation areas, and conservation lands.

Most of the suggested strategies and actions have been put into action by township officials. Likewise, this Plan, through its goals, objectives, and recommendations, is consistent with many of the recommended strategies and actions of the county's comprehensive plan.

## **DVRPC CONNECTIONS 2040: PLAN FOR GREATER PHILADELPHIA**

In 2013, the Delaware Valley Regional Planning Commission (DVRPC) developed Connections 2040: Plan for Greater Philadelphia (adopted July 2013) as an update to Connections 2035: The Regional Plan for a Sustainable Future. Connections is a long-range plan that outlines a vision for the future growth and development of the Greater Philadelphia region. Four core principles are established in the plan:

1. Manage Growth and Protect Resources
2. Develop Livable Communities
3. Build an Energy Efficient Economy
4. Establish a Modern, Multimodal Transportation System

The Plan designates Lower Makefield Township as a Developed Community where new growth will be concentrated primarily as infill and redevelopment. The long-range planning policies established for

Developed Communities include rehabilitation and maintenance of infrastructure systems and the housing stock, revitalizing communities through local economic and community development efforts, and improving the pedestrian environment. Lower Makefield's masterplan is consistent with the land use element of Connections 2040: Plan for Greater Philadelphia.

In addition, Connections 2040: Plan for Greater Philadelphia promotes the development of greenspace networks as a form of public infrastructure that benefits the health, function and sustainability of communities. The 2040 Greenspace Network shown in Connections identifies the eastern edge of the township as part of the Delaware River Greenspace Corridor which is part of the overall regional greenspace network. The document also identifies the Cross County Greenway Corridor in the southwestern portion of the township. These corridors are shown with minor connecting greenspace corridors that extend to Yardley and Middletown. DVRPC's recommendations regarding conservation lands and the regional greenspace network are consistent with stated objectives in this Plan to protect important natural resources and provide linear and connecting open space areas for present and future residents to enjoy.



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## IMPLEMENTATION

Successful implementation of this plan requires that specific measures, actions, programs, or techniques be undertaken. The following pages are a compilation of specific tasks recommended to be completed in order to carry out the Plan's vision. While individual Plan chapters contain policy recommendations as well as recommendations to continue with many current actions, this chapter primarily focuses on new actions. Recommendations are organized by section topic. Noted next to each section heading is the page number in the plan where a detailed discussion begins.

### RECOMMENDATIONS FOR ACTION

#### NATURAL FEATURES (PAGE 23)

1. Keep up to date with changes in federal and state law regarding wetlands and make sure that the most stringent wetland restrictions apply to township wetlands. While future changes in the federal government definitions of wetlands may affect what is deemed to be a wetland by its standards, township ordinances should abide by the most restrictive wetlands definition to ensure adequate protection for these areas.
2. Pursue efforts to develop intermunicipal watershed plans for Brock Creek and Rock Run.
3. Pursue additional opportunities for acquiring or elevating flood-prone repetitive loss properties and support the recommendations of the Delaware River Flood Task Force (2010).

#### HOUSING PLAN (PAGE 37)

1. Consider appropriate housing proposals of varied types to ensure continued housing diversity.

#### LAND USE PLAN (PAGE 44)

1. Review permitted uses and standards in the O/R Office Research District to identify and incorporate additional uses, taking into account also the nature of pending or approved development within the district, and in adjoining Edgewood Village.
2. Consider ways to maximize pedestrian connectivity between the O/R District and the Historic Commercial District when addressing development proposals in either district.
3. Consider and support existing commercial and office areas going forward, paying particular attention to ways to renew or redevelop older nonresidential development, and to marketing and promotion initiatives.
4. Evaluate the adequacy of commercial zoning and related land use regulations given the recent construction of a large age-qualified housing community within one of the commercial districts, and its potential to drive added demand for goods and services.

#### POLICE PROTECTION AND EMERGENCY MANAGEMENT (PAGE 48)

1. Provide training and support to first-responders.
2. Institute and upgrade computer and communications systems to ensure public safety information sharing.

### **FIRE PROTECTION (PAGE 50)**

1. Assess the adequacy of fire protection coverage and identify needs to meet full-time coverage requirements during the next 10 years.
2. Evaluate ways to ensure that fire protection service is provided within the recommended 2.5- mile distance to all areas of the township.
3. The township should partner with the fire company to develop an ongoing plan to acquire new volunteer firefighters.

### **SCHOOL FACILITIES (PAGE 52)**

1. Coordinate with the Pennsbury School District to evaluate enrollment trends and future facilities needs.

### **WATER SUPPLY (PAGE 54)**

1. Coordinate with the Pennsylvania-American Water Company to evaluate the need to enact wellhead protection standards to protect water supply and water quality.
2. Coordinate township long-range planning with the long-range planning of the Pennsylvania-American Water Company.

### **SEWAGE FACILITIES (PAGE 58)**

1. Ensure consistency between the township's Act 537 Sewage Facilities Plan, the Comprehensive Master Plan Update, and applicable agreements and amendments.
2. Update the township's Act 537 Sewage Facilities Plan to be consistent with the comprehensive master plan update and new agreements and amendments.
3. Consider establishing an on-lot disposal system (OLDS) management program and an OLDS maintenance educational program.

### **STORMWATER MANAGEMENT (PAGE 62)**

1. Prioritize township stormwater problem areas including locations where obstructions and drainage issues exist for remediation.

### **EMERGENCY AND AMBULANCE SERVICES (PAGE 64)**

1. The township and the rescue squad should work together in anticipating needs for facilities and equipment.
2. Negotiate increased cost-sharing arrangements with neighboring municipalities that rely on the Yardley-Makefield ambulance unit.

### **TOWNSHIP ADMINISTRATION (PAGE 65)**

1. Prepare a facilities master plan to assess future needs for space, and rehabilitation, consolidation and construction or acquisition of buildings.



2. Review township structure and departmental organization to achieve the best possible operational efficiencies.

### **SOLID WASTE MANAGEMENT (PAGE 67)**

1. Examine alternatives to the current location for leaf waste drop-off composting.
2. In an effort to expand the amount of material that is currently recycled, evaluate other options such as contract collection.
3. Provide information as updated as possible on the township website and cable television regarding hazardous waste, electronic and other recycling programs, and inform residents and businesses about existing recycling options.

### **LIBRARY SERVICES (PAGE 69)**

1. Coordinate with the Bucks County Free Library to explore ways to make multi-purpose use of the library, resulting from the addition of new technology and potential expansion of the library building.

### **HAZARD MITIGATION (PAGE 73)**

1. Continue to implement the township's hazardous mitigation plan. To the extent feasible, conduct a cost-benefit analysis of adding additional protection to repetitive-loss assets, and collect detailed information on all properties.
2. Evaluate and implement the most effective mitigation projects (e.g., acquisition, elevation, and buy-out of flood-prone properties) when financial assistance becomes available.
3. To the extent possible, attempt to address needs of vulnerable community members (e.g., elderly or people with special needs) in event of severe weather and prepare an implementation plan to enhance response capabilities and foster mitigation measures. Such a list or database should be updated annually.
4. Assess and mark the emergency evacuation routes or exits for all areas/neighborhoods in the township to adequately plan for emergency evacuations, and post and communicate this information to residents to the greatest extent possible.
5. Identify storage under public auspices of hazardous materials in floodplains (including non-addressable structures, such as propane tanks).
6. Build on existing stormwater management planning and encourage implantation of small stormwater mitigation projects on private property (i.e. rain gardens, rain barrels, natural basins).
7. Investigate whether additional storm shelters and warning systems should be implemented.
8. Consider establishing an arrangement with local ham radio operators to supplement communication throughout the township in the event of an emergency.

### **PARKS AND RECREATION (PAGE 80)**

1. Explore new recreational ideas based on the needs of all population groups.
2. Assess needs for additional recreation lands and facilities and identify any potential gaps in facilities and opportunities for desired park and recreational acquisitions.
3. Maintain the condition of the existing bike/walking path system to ensure paths are kept in good repair and navigable for all citizens.
4. Review recommendations from the feasibility study for rehabbing and improving the community pool.
5. Evaluate the possibility of a regional recreation consortium involving the school district.
6. Update the township's Park and Recreation Action Plan.

### **OPEN SPACE (PAGE 89)**

1. Encourage future developers to make use of the farmland preservation development options for properties, which meet the criteria for farmland development.
2. Establish a maintenance program for open space lands that is both manageable from the township's point of view and environmentally sensitive.
3. Monitor "lotted out" open space to ensure it is being effectively protected.
4. Update the municipal Open Space Plan as needed.

### **ENERGY CONSERVATION (PAGE 93)**

1. Promote implementation of the proposed actions identified in the Lower Makefield Township Sustainability Action Plan (2011).
2. Consider installing electric auto charging stations at municipal facilities and encourage installation of such stations at private business locations.

### **HISTORIC PRESERVATION (PAGE 98)**

1. Update historic survey, complete National Register nominations, and evaluate potential additional historic district designations.
2. Consider enacting a delay of demolition ordinance, a township-wide historic overlay district, and preservation incentives such as density bonuses or added adaptive reuse opportunities.
3. Have the Historical Architectural Review Board periodically review and update design guidelines and related regulations to apply the most suitable standards for materials and products to be used in rehabilitation, replacement, additions, and infill construction, considering both sustainability and historic accuracy.

4. Establish a permanent home for the township's historic society collection of artifacts illustrating the township's history.

### TRANSPORTATION AND TRAFFIC CIRCULATION (PAGE 106)

1. Incorporate land use considerations into transportation planning and ensure that transportation facilities have adequate capacity to meet demand.
2. Ensure that developers encourage transportation improvements and/or public transportation into land development projects by providing the following:
  - office complexes with bus pull-off areas and transit shelters to encourage public transit use
  - reduced distance from main roads to building entrances so employees will have a shorter walk from the street to the building
  - priority parking areas for carpoolers as an incentive to use carpools.
3. Monitor the proposed improvements to the Scudder Falls Bridge, Route 1 Corridor, and Interstate 295.
4. Encourage use of public transportation by:
  - ensuring that municipal projects incorporate the potential use of public transportation services;
  - helping to develop marketing programs aimed at increasing ridership; and providing public transit information, such as bus and train schedules, on the township's website;
  - providing good pedestrian access to the Yardley/Lower Makefield border to help facilitate pedestrian access to the station;
  - supporting the future addition of bus connections.
5. Work with the Transportation Management Association of Bucks County to promote flexible work hours, carpooling, shuttle transit from rail stations, and other means of reducing vehicle trips.
6. Continue to provide pedestrian/bicycling facilities as an alternative to automobile use.
7. Develop a comprehensive Transportation Improvement Plan to be used as a budgeting and implementation tool.



## **APPENDIX A: BUCKS COUNTY LAND USE CLASSIFICATION DEFINITIONS**

**Single-Family Residential**—Consists of properties with single-family detached, one- or two-unit attached dwellings on lots less than 5 acres. This category also includes mobile home parks.

**Multifamily Residential**—Includes properties with 3 or more attached dwelling units. This category includes independent living units.

**Rural Residential**—The same as “Single-Family Residential” except dwellings are on lots that are 5 acres or more (but do not qualify as “Agricultural”).

**Agricultural**—Based upon an analysis of 2010 orthographic aerial photos, consists of land that is 20 acres or greater where at least one-third of the parcel exhibits agricultural or farm-related characteristics such as stables, orchards, and active or fallow fields. This category may also include residential dwelling units and farm related structures on the same lot.

**Mining and Manufacturing**—Consists of heavy manufacturing industries, and painting and advertising industries, as well as building and landscaping material extraction.

**Government and Institutional**—Includes all Federal, State, County, and Municipal buildings and facilities, except those that are park and recreation related. All private, parochial and public schools are included as well as, churches, cemeteries, emergency service facilities, and fraternal organizations. This category includes medium- to long-term housing accommodations, such as retirement complexes, assisted living facilities, continuing care retirement communities, and nursing homes.

**Commercial**—Includes (but is not limited to), wholesale and retail trade establishments, finance and insurance, real estate, and hotels.

**Parks, Recreation, and Protected Open Space**—Consists of Municipal, County, and State parks, State Game Lands, County preserved land and flood control sites, golf courses, scout camps, and campgrounds. Includes land preserved by conservation organizations and deed-restricted land or common open space areas associated with residential developments.

**Transportation and Utilities**—Consists primarily of utility installations and right-of-ways, terminal facilities, automobile parking, and stormwater management basins. Calculations for roadway acreage are also included.

**Vacant**—Includes parcels without dwelling units or buildings containing nonresidential uses but may include structures such as barns, stables, sheds, etc.



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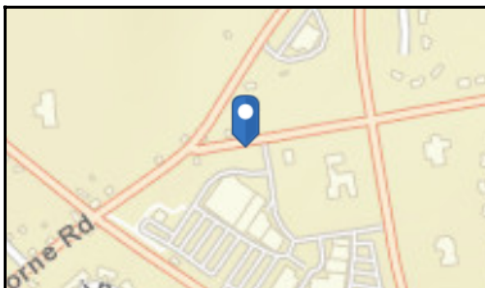
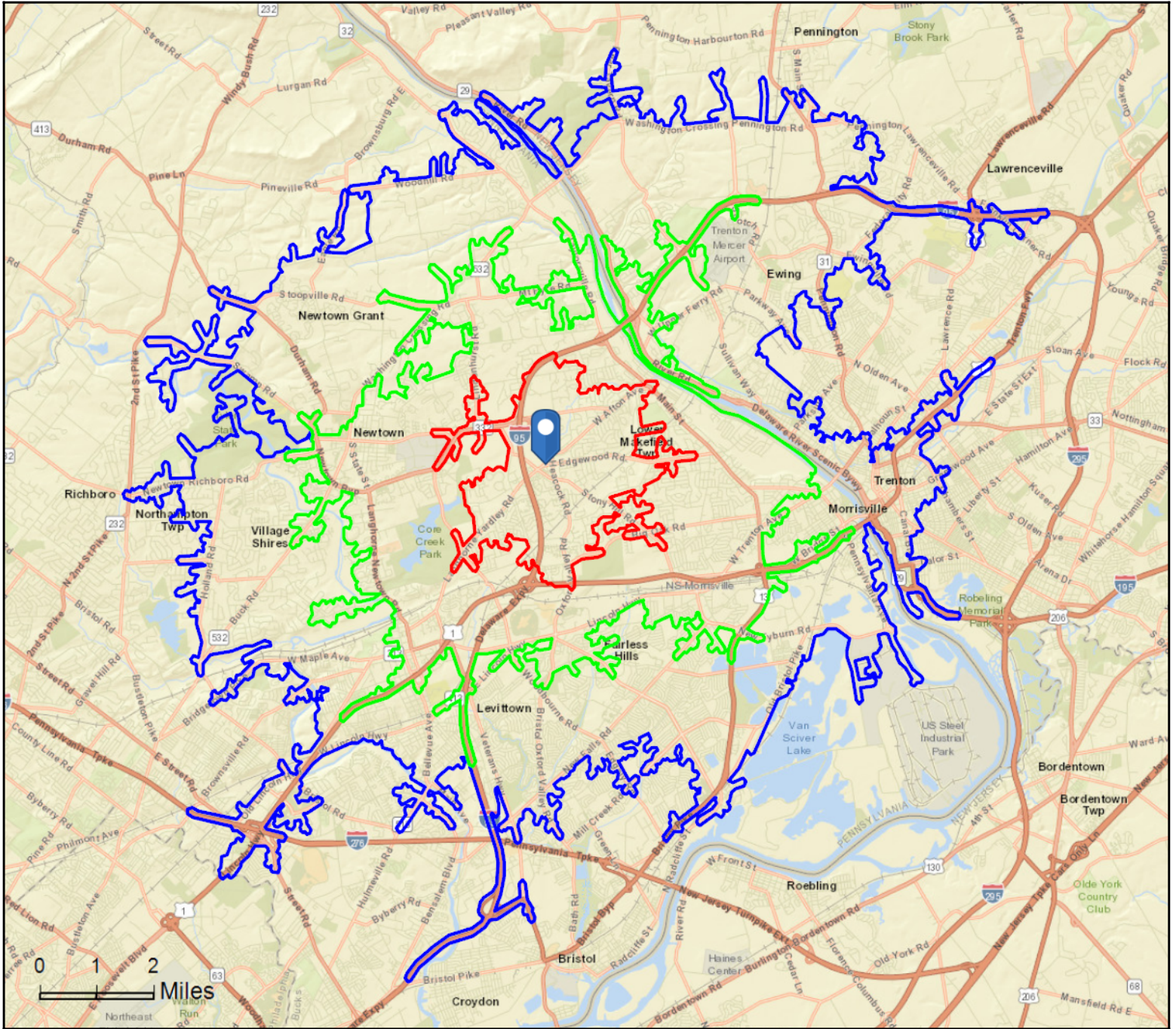
## **APPENDIX B: MARKETPLACE PROFILES**





Edgewood  
1683 Edgewood Rd, Morrisville, Pennsylvania, 19067  
Drive Time: 5, 10, 15 minute radii

Prepared by Esri  
Latitude: 40.22294  
Longitude: -74.87347





# Retail MarketPlace Profile

Edgewood  
1683 Edgewood Rd, Morrisville, Pennsylvania, 19067  
Drive Time: 5 minute radius

Prepared by Esri  
Latitude: 40.22294  
Longitude: -74.87347

## Summary Demographics

2018 Population	18,282
2018 Households	7,080
2018 Median Disposable Income	\$95,995
2018 Per Capita Income	\$61,189

## 2017 Industry Summary

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Total Retail Trade and Food & Drink	44-45,722	\$485,123,740	\$158,654,811	\$326,468,929	50.7	59
Total Retail Trade	44-45	\$436,974,676	\$149,218,946	\$287,755,730	49.1	43
Total Food & Drink	722	\$48,149,064	\$9,435,865	\$38,713,199	67.2	16

## 2017 Industry Group

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Motor Vehicle & Parts Dealers	441	\$92,123,745	\$0	\$92,123,745	100.0	0
Automobile Dealers	4411	\$74,944,958	\$0	\$74,944,958	100.0	0
Other Motor Vehicle Dealers	4412	\$9,742,439	\$0	\$9,742,439	100.0	0
Auto Parts, Accessories & Tire Stores	4413	\$7,436,348	\$0	\$7,436,348	100.0	0
Furniture & Home Furnishings Stores	442	\$16,597,325	\$0	\$16,597,325	100.0	0
Furniture Stores	4421	\$9,171,493	\$0	\$9,171,493	100.0	0
Home Furnishings Stores	4422	\$7,425,832	\$0	\$7,425,832	100.0	0
Electronics & Appliance Stores	443	\$15,111,289	\$5,126,010	\$9,985,279	49.3	4
Bldg Materials, Garden Equip. & Supply Stores	444	\$30,046,551	\$9,640,796	\$20,405,755	51.4	8
Bldg Material & Supplies Dealers	4441	\$27,577,523	\$7,331,159	\$20,246,364	58.0	4
Lawn & Garden Equip & Supply Stores	4442	\$2,469,028	\$2,309,636	\$159,392	3.3	4
Food & Beverage Stores	445	\$79,835,017	\$47,932,086	\$31,902,931	25.0	4
Grocery Stores	4451	\$72,204,951	\$45,106,235	\$27,098,716	23.1	3
Specialty Food Stores	4452	\$3,691,007	\$0	\$3,691,007	100.0	0
Beer, Wine & Liquor Stores	4453	\$3,939,059	\$2,824,845	\$1,114,214	16.5	1
Health & Personal Care Stores	446,4461	\$26,521,386	\$48,785,959	-\$22,264,573	-29.6	11
Gasoline Stations	447,4471	\$41,184,602	\$23,892,857	\$17,291,745	26.6	1
Clothing & Clothing Accessories Stores	448	\$26,647,766	\$1,622,849	\$25,024,917	88.5	4
Clothing Stores	4481	\$17,800,110	\$0	\$17,800,110	100.0	0
Shoe Stores	4482	\$3,889,676	\$0	\$3,889,676	100.0	0
Jewelry, Luggage & Leather Goods Stores	4483	\$4,957,980	\$1,205,649	\$3,752,331	60.9	3
Sporting Goods, Hobby, Book & Music Stores	451	\$13,294,823	\$1,673,431	\$11,621,392	77.6	3
Sporting Goods/Hobby/Musical Instr Stores	4511	\$11,545,380	\$1,648,582	\$9,896,798	75.0	3
Book, Periodical & Music Stores	4512	\$1,749,444	\$0	\$1,749,444	100.0	0
General Merchandise Stores	452	\$67,310,241	\$3,776,308	\$63,533,933	89.4	1
Department Stores Excluding Leased Depts.	4521	\$49,830,254	\$0	\$49,830,254	100.0	0
Other General Merchandise Stores	4529	\$17,479,987	\$595,338	\$16,884,649	93.4	1
Miscellaneous Store Retailers	453	\$19,012,047	\$4,227,659	\$14,784,388	63.6	6
Florists	4531	\$1,163,812	\$1,966,859	-\$803,047	-25.7	1
Office Supplies, Stationery & Gift Stores	4532	\$4,508,563	\$456,661	\$4,051,902	81.6	2
Used Merchandise Stores	4533	\$1,797,851	\$0	\$1,797,851	100.0	0
Other Miscellaneous Store Retailers	4539	\$11,541,820	\$1,651,135	\$9,890,685	75.0	3
Nonstore Retailers	454	\$9,289,883	\$0	\$9,289,883	100.0	0
Electronic Shopping & Mail-Order Houses	4541	\$7,139,707	\$0	\$7,139,707	100.0	0
Vending Machine Operators	4542	\$438,278	\$0	\$438,278	100.0	0
Direct Selling Establishments	4543	\$1,711,898	\$0	\$1,711,898	100.0	0
Food Services & Drinking Places	722	\$48,149,064	\$9,435,865	\$38,713,199	67.2	16
Special Food Services	7223	\$1,173,051	\$0	\$1,173,051	100.0	0
Drinking Places - Alcoholic Beverages	7224	\$2,833,085	\$296,745	\$2,536,340	81.0	1
Restaurants/Other Eating Places	7225	\$44,142,928	\$9,033,209	\$35,109,719	66.0	15

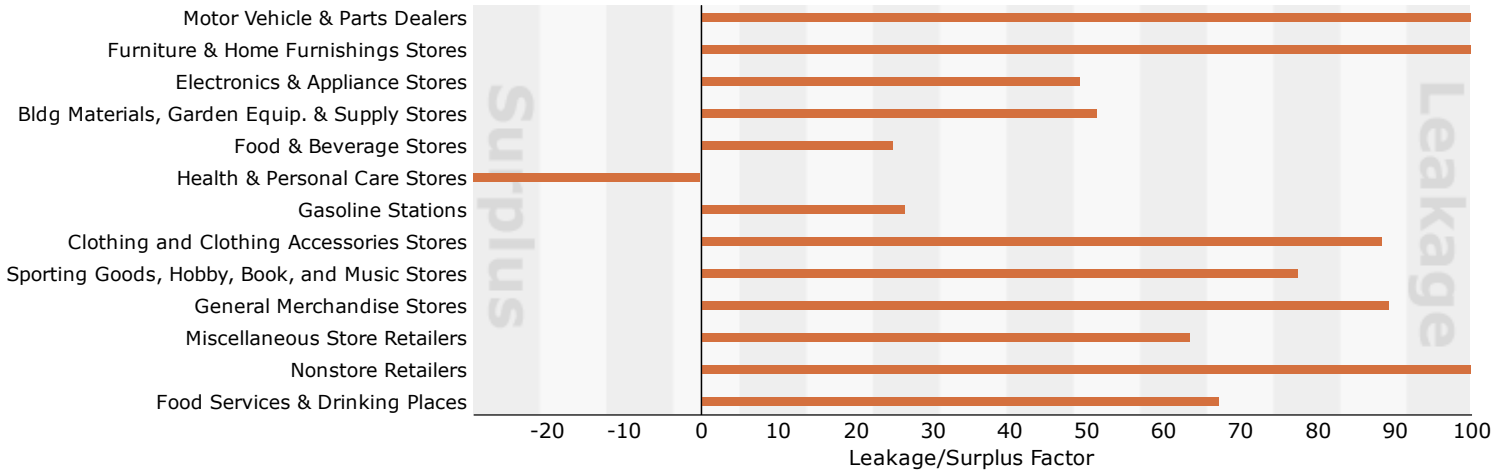
Data Note: Supply (retail sales) estimates sales to consumers by establishments. Sales to businesses are excluded. Demand (retail potential) estimates the expected amount spent by consumers at retail establishments. Supply and demand estimates are in current dollars. The Leakage/Surplus Factor presents a snapshot of retail opportunity. This is a measure of the relationship between supply and demand that ranges from +100 (total leakage) to -100 (total surplus). A positive value represents 'leakage' of retail opportunity outside the trade area. A negative value represents a surplus of retail sales, a market where customers are drawn in from outside the trade area. The Retail Gap represents the difference between Retail Potential and Retail Sales. Esri uses the North American Industry Classification System (NAICS) to classify businesses by their primary type of economic activity. Retail establishments are classified into 27 industry groups in the Retail Trade sector, as well as four industry groups within the Food Services & Drinking Establishments subsector. For more information on the Retail MarketPlace data, please click the link below to view the Methodology Statement. <http://www.esri.com/library/whitepapers/pdfs/esri-data-retail-marketplace.pdf>

Source: Esri and Infogroup. Esri 2018 Updated Demographics. Esri 2017 Retail MarketPlace. Copyright 2018 Esri. Copyright 2017 Infogroup, Inc. All rights reserved.

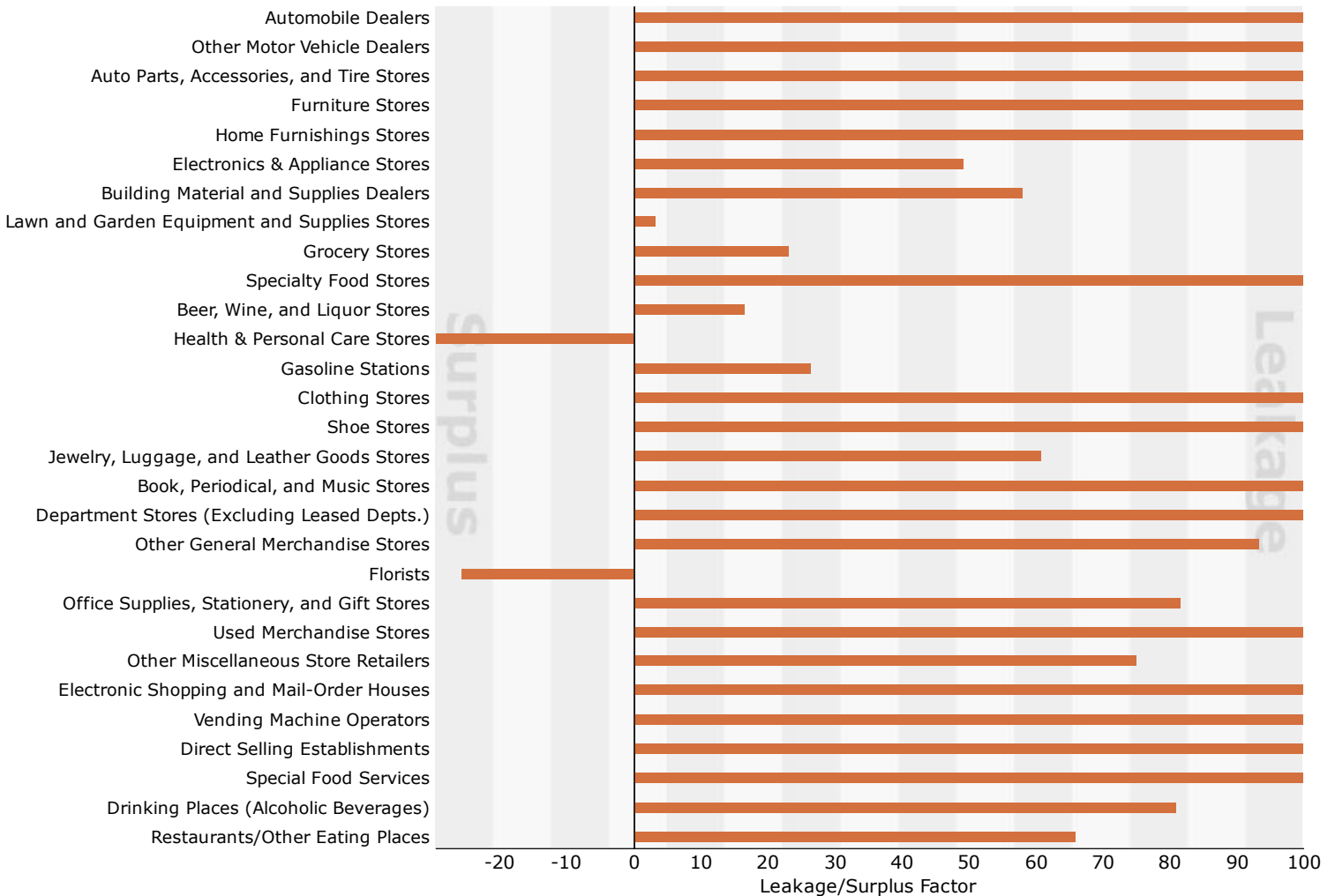
Edgewood  
 1683 Edgewood Rd, Morrisville, Pennsylvania, 19067  
 Drive Time: 5 minute radius

Prepared by Esri  
 Latitude: 40.22294  
 Longitude: -74.87347

## 2017 Leakage/Surplus Factor by Industry Subsector



## 2017 Leakage/Surplus Factor by Industry Group



Source: Esri and Infogroup. Esri 2018 Updated Demographics. Esri 2017 Retail MarketPlace. Copyright 2018 Esri. Copyright 2017 Infogroup, Inc. All rights reserved.



# Retail MarketPlace Profile

Edgewood  
1683 Edgewood Rd, Morrisville, Pennsylvania, 19067  
Drive Time: 10 minute radius

Prepared by Esri  
Latitude: 40.22294  
Longitude: -74.87347

## Summary Demographics

2018 Population	76,638
2018 Households	29,571
2018 Median Disposable Income	\$86,134
2018 Per Capita Income	\$55,555

## 2017 Industry Summary

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Total Retail Trade and Food & Drink	44-45,722	\$1,866,673,000	\$1,834,355,730	\$32,317,270	0.9	687
Total Retail Trade	44-45	\$1,683,289,448	\$1,699,487,218	-\$16,197,770	-0.5	505
Total Food & Drink	722	\$183,383,553	\$134,868,512	\$48,515,041	15.2	182

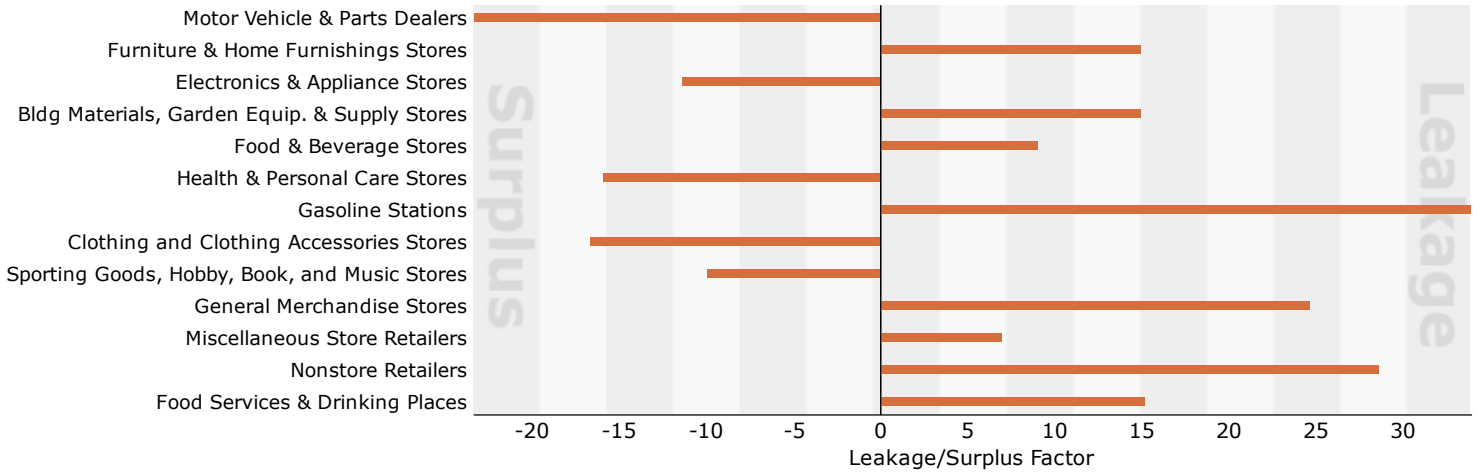
## 2017 Industry Group

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Motor Vehicle & Parts Dealers	441	\$354,102,344	\$570,449,160	-\$216,346,816	-23.4	61
Automobile Dealers	4411	\$287,868,225	\$471,910,100	-\$184,041,875	-24.2	28
Other Motor Vehicle Dealers	4412	\$37,397,637	\$50,485,636	-\$13,087,999	-14.9	3
Auto Parts, Accessories & Tire Stores	4413	\$28,836,482	\$48,053,425	-\$19,216,943	-25.0	29
Furniture & Home Furnishings Stores	442	\$63,635,066	\$46,994,046	\$16,641,020	15.0	25
Furniture Stores	4421	\$34,926,064	\$33,757,450	\$1,168,614	1.7	12
Home Furnishings Stores	4422	\$28,709,003	\$13,236,597	\$15,472,406	36.9	13
Electronics & Appliance Stores	443	\$58,146,446	\$73,102,801	-\$14,956,355	-11.4	27
Bldg Materials, Garden Equip. & Supply Stores	444	\$116,781,496	\$86,232,371	\$30,549,125	15.0	40
Bldg Material & Supplies Dealers	4441	\$107,145,457	\$79,105,518	\$28,039,939	15.1	25
Lawn & Garden Equip & Supply Stores	4442	\$9,636,038	\$7,126,854	\$2,509,184	15.0	15
Food & Beverage Stores	445	\$307,629,855	\$256,452,132	\$51,177,723	9.1	39
Grocery Stores	4451	\$278,085,121	\$217,906,369	\$60,178,752	12.1	19
Specialty Food Stores	4452	\$14,199,123	\$5,547,081	\$8,652,042	43.8	12
Beer, Wine & Liquor Stores	4453	\$15,345,610	\$32,998,682	-\$17,653,072	-36.5	8
Health & Personal Care Stores	446,4461	\$104,271,845	\$144,132,948	-\$39,861,103	-16.0	66
Gasoline Stations	447,4471	\$158,866,045	\$78,194,030	\$80,672,015	34.0	15
Clothing & Clothing Accessories Stores	448	\$101,810,016	\$142,547,639	-\$40,737,623	-16.7	99
Clothing Stores	4481	\$68,051,988	\$114,831,800	-\$46,779,812	-25.6	66
Shoe Stores	4482	\$14,697,178	\$13,120,743	\$1,576,435	5.7	13
Jewelry, Luggage & Leather Goods Stores	4483	\$19,060,849	\$14,595,095	\$4,465,754	13.3	20
Sporting Goods, Hobby, Book & Music Stores	451	\$50,629,317	\$61,859,958	-\$11,230,641	-10.0	28
Sporting Goods/Hobby/Musical Instr Stores	4511	\$43,968,188	\$54,791,487	-\$10,823,299	-11.0	25
Book, Periodical & Music Stores	4512	\$6,661,129	\$7,068,471	-\$407,342	-3.0	3
General Merchandise Stores	452	\$257,789,399	\$155,709,852	\$102,079,547	24.7	19
Department Stores Excluding Leased Depts.	4521	\$190,245,722	\$94,853,117	\$95,392,605	33.5	7
Other General Merchandise Stores	4529	\$67,543,677	\$60,856,736	\$6,686,941	5.2	12
Miscellaneous Store Retailers	453	\$73,482,096	\$63,775,181	\$9,706,915	7.1	80
Florists	4531	\$4,503,589	\$5,453,587	-\$949,998	-9.5	9
Office Supplies, Stationery & Gift Stores	4532	\$17,385,344	\$11,707,509	\$5,677,835	19.5	16
Used Merchandise Stores	4533	\$6,810,783	\$6,791,448	\$19,335	0.1	18
Other Miscellaneous Store Retailers	4539	\$44,782,381	\$39,822,637	\$4,959,744	5.9	37
Nonstore Retailers	454	\$36,145,523	\$20,037,100	\$16,108,423	28.7	7
Electronic Shopping & Mail-Order Houses	4541	\$27,434,630	\$19,010,597	\$8,424,033	18.1	2
Vending Machine Operators	4542	\$1,678,251	\$440,962	\$1,237,289	58.4	2
Direct Selling Establishments	4543	\$7,032,641	\$585,541	\$6,447,100	84.6	2
Food Services & Drinking Places	722	\$183,383,553	\$134,868,512	\$48,515,041	15.2	182
Special Food Services	7223	\$4,430,007	\$1,861,602	\$2,568,405	40.8	5
Drinking Places - Alcoholic Beverages	7224	\$10,823,950	\$2,325,395	\$8,498,555	64.6	4
Restaurants/Other Eating Places	7225	\$168,129,596	\$130,681,515	\$37,448,081	12.5	173

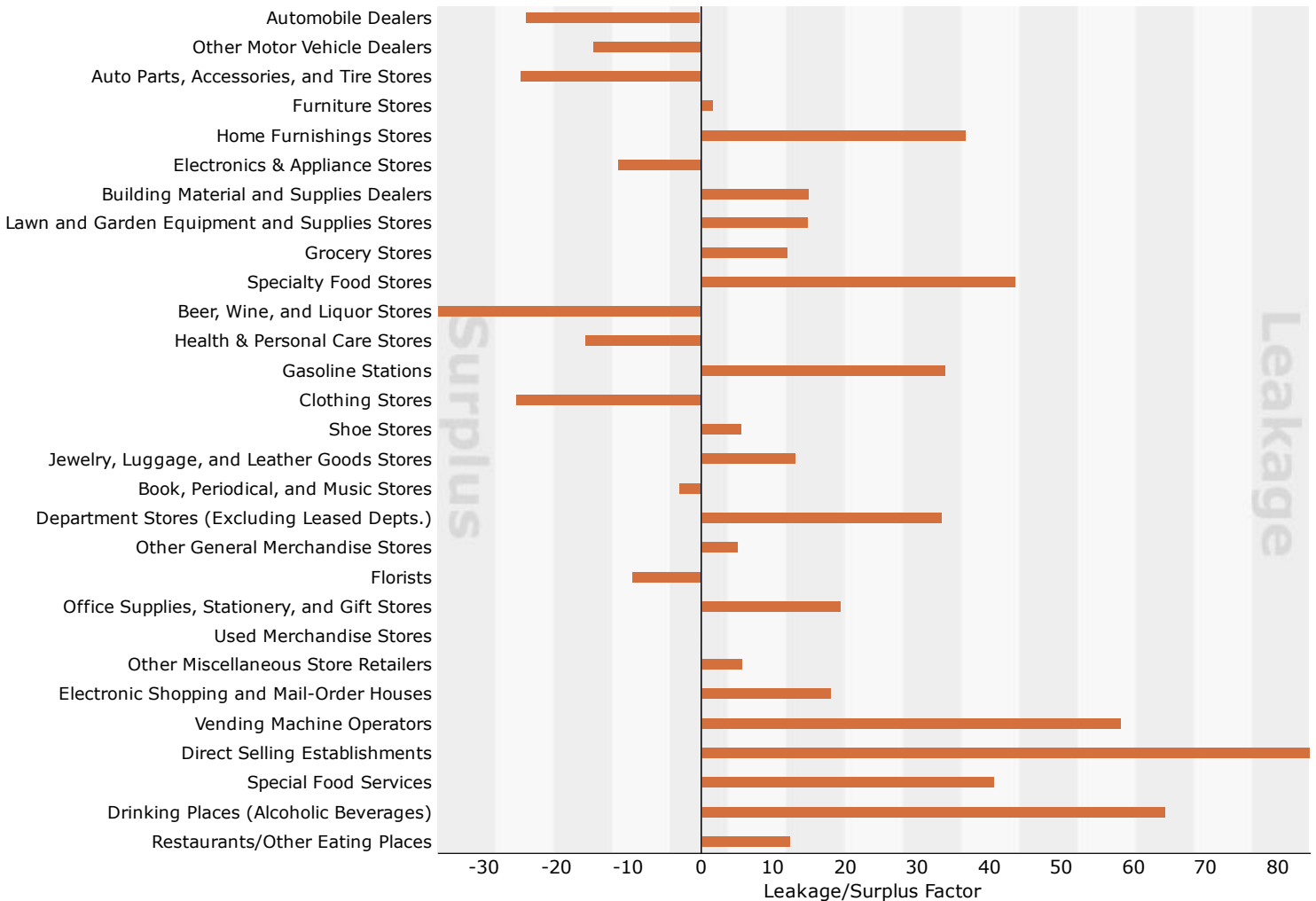
Data Note: Supply (retail sales) estimates sales to consumers by establishments. Sales to businesses are excluded. Demand (retail potential) estimates the expected amount spent by consumers at retail establishments. Supply and demand estimates are in current dollars. The Leakage/Surplus Factor presents a snapshot of retail opportunity. This is a measure of the relationship between supply and demand that ranges from +100 (total leakage) to -100 (total surplus). A positive value represents 'leakage' of retail opportunity outside the trade area. A negative value represents a surplus of retail sales, a market where customers are drawn in from outside the trade area. The Retail Gap represents the difference between Retail Potential and Retail Sales. Esri uses the North American Industry Classification System (NAICS) to classify businesses by their primary type of economic activity. Retail establishments are classified into 27 industry groups in the Retail Trade sector, as well as four industry groups within the Food Services & Drinking Establishments subsector. For more information on the Retail MarketPlace data, please click the link below to view the Methodology Statement. <http://www.esri.com/library/whitepapers/pdfs/esri-data-retail-marketplace.pdf>

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## 2017 Leakage/Surplus Factor by Industry Subsector



## 2017 Leakage/Surplus Factor by Industry Group



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# Retail MarketPlace Profile

Edgewood  
1683 Edgewood Rd, Morrisville, Pennsylvania, 19067  
Drive Time: 15 minute radius

Prepared by Esri  
Latitude: 40.22294  
Longitude: -74.87347

## Summary Demographics

2018 Population	251,055
2018 Households	94,044
2018 Median Disposable Income	\$65,136
2018 Per Capita Income	\$42,902

## 2017 Industry Summary

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Total Retail Trade and Food & Drink	44-45,722	\$4,650,250,322	\$4,099,280,655	\$550,969,667	6.3	1,836
Total Retail Trade	44-45	\$4,196,211,565	\$3,750,924,675	\$445,286,890	5.6	1,244
Total Food & Drink	722	\$454,038,757	\$348,355,980	\$105,682,777	13.2	592

## 2017 Industry Group

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Motor Vehicle & Parts Dealers	441	\$876,275,914	\$942,252,754	-\$65,976,840	-3.6	147
Automobile Dealers	4411	\$714,613,512	\$795,738,372	-\$81,124,860	-5.4	75
Other Motor Vehicle Dealers	4412	\$89,189,466	\$63,229,836	\$25,959,630	17.0	6
Auto Parts, Accessories & Tire Stores	4413	\$72,472,935	\$83,284,546	-\$10,811,611	-6.9	66
Furniture & Home Furnishings Stores	442	\$158,879,378	\$93,650,551	\$65,228,827	25.8	60
Furniture Stores	4421	\$86,447,459	\$52,462,018	\$33,985,441	24.5	25
Home Furnishings Stores	4422	\$72,431,919	\$41,188,533	\$31,243,386	27.5	34
Electronics & Appliance Stores	443	\$147,232,375	\$107,546,100	\$39,686,275	15.6	65
Bldg Material, Garden Equip. & Supply Stores	444	\$283,158,570	\$227,780,345	\$55,378,225	10.8	112
Bldg Material & Supplies Dealers	4441	\$259,646,046	\$217,837,342	\$41,808,704	8.8	88
Lawn & Garden Equip & Supply Stores	4442	\$23,512,523	\$9,943,003	\$13,569,520	40.6	24
Food & Beverage Stores	445	\$768,646,071	\$983,156,541	-\$214,510,470	-12.2	154
Grocery Stores	4451	\$687,771,517	\$814,154,299	-\$126,382,782	-8.4	90
Specialty Food Stores	4452	\$35,287,403	\$17,533,668	\$17,753,735	33.6	33
Beer, Wine & Liquor Stores	4453	\$45,587,151	\$151,468,574	-\$105,881,423	-53.7	31
Health & Personal Care Stores	446,4461	\$267,120,751	\$278,719,122	-\$11,598,371	-2.1	135
Gasoline Stations	447,4471	\$399,316,245	\$224,562,521	\$174,753,724	28.0	54
Clothing & Clothing Accessories Stores	448	\$262,142,622	\$212,210,627	\$49,931,995	10.5	179
Clothing Stores	4481	\$177,204,315	\$161,807,631	\$15,396,684	4.5	112
Shoe Stores	4482	\$37,059,971	\$19,971,376	\$17,088,595	30.0	21
Jewelry, Luggage & Leather Goods Stores	4483	\$47,878,336	\$30,431,621	\$17,446,715	22.3	46
Sporting Goods, Hobby, Book & Music Stores	451	\$126,290,749	\$89,514,091	\$36,776,658	17.0	68
Sporting Goods/Hobby/Musical Instr Stores	4511	\$109,334,804	\$77,141,465	\$32,193,339	17.3	54
Book, Periodical & Music Stores	4512	\$16,955,944	\$12,372,627	\$4,583,317	15.6	14
General Merchandise Stores	452	\$639,929,818	\$402,861,325	\$237,068,493	22.7	50
Department Stores Excluding Leased Depts.	4521	\$458,664,972	\$242,994,332	\$215,670,640	30.7	17
Other General Merchandise Stores	4529	\$181,264,846	\$159,866,992	\$21,397,854	6.3	33
Miscellaneous Store Retailers	453	\$179,487,984	\$137,749,620	\$41,738,364	13.2	192
Florists	4531	\$10,993,011	\$10,166,353	\$826,658	3.9	21
Office Supplies, Stationery & Gift Stores	4532	\$43,394,307	\$31,653,888	\$11,740,419	15.6	43
Used Merchandise Stores	4533	\$15,791,139	\$16,878,940	-\$1,087,801	-3.3	34
Other Miscellaneous Store Retailers	4539	\$109,309,528	\$79,050,440	\$30,259,088	16.1	94
Nonstore Retailers	454	\$87,731,089	\$50,921,077	\$36,810,012	26.5	28
Electronic Shopping & Mail-Order Houses	4541	\$65,496,681	\$38,655,949	\$26,840,732	25.8	8
Vending Machine Operators	4542	\$4,055,400	\$2,258,129	\$1,797,271	28.5	6
Direct Selling Establishments	4543	\$18,179,008	\$10,006,999	\$8,172,009	29.0	14
Food Services & Drinking Places	722	\$454,038,757	\$348,355,980	\$105,682,777	13.2	592
Special Food Services	7223	\$11,162,346	\$14,570,111	-\$3,407,765	-13.2	24
Drinking Places - Alcoholic Beverages	7224	\$24,668,229	\$15,029,434	\$9,638,795	24.3	32
Restaurants/Other Eating Places	7225	\$418,208,181	\$318,756,435	\$99,451,746	13.5	536

Data Note: Supply (retail sales) estimates sales to consumers by establishments. Sales to businesses are excluded. Demand (retail potential) estimates the expected amount spent by consumers at retail establishments. Supply and demand estimates are in current dollars. The Leakage/Surplus Factor presents a snapshot of retail opportunity. This is a measure of the relationship between supply and demand that ranges from +100 (total leakage) to -100 (total surplus). A positive value represents 'leakage' of retail opportunity outside the trade area. A negative value represents a surplus of retail sales, a market where customers are drawn in from outside the trade area. The Retail Gap represents the difference between Retail Potential and Retail Sales. Esri uses the North American Industry Classification System (NAICS) to classify businesses by their primary type of economic activity. Retail establishments are classified into 27 industry groups in the Retail Trade sector, as well as four industry groups within the Food Services & Drinking Establishments subsector. For more information on the Retail MarketPlace data, please click the link below to view the Methodology Statement. <http://www.esri.com/library/whitepapers/pdfs/esri-data-retail-marketplace.pdf>

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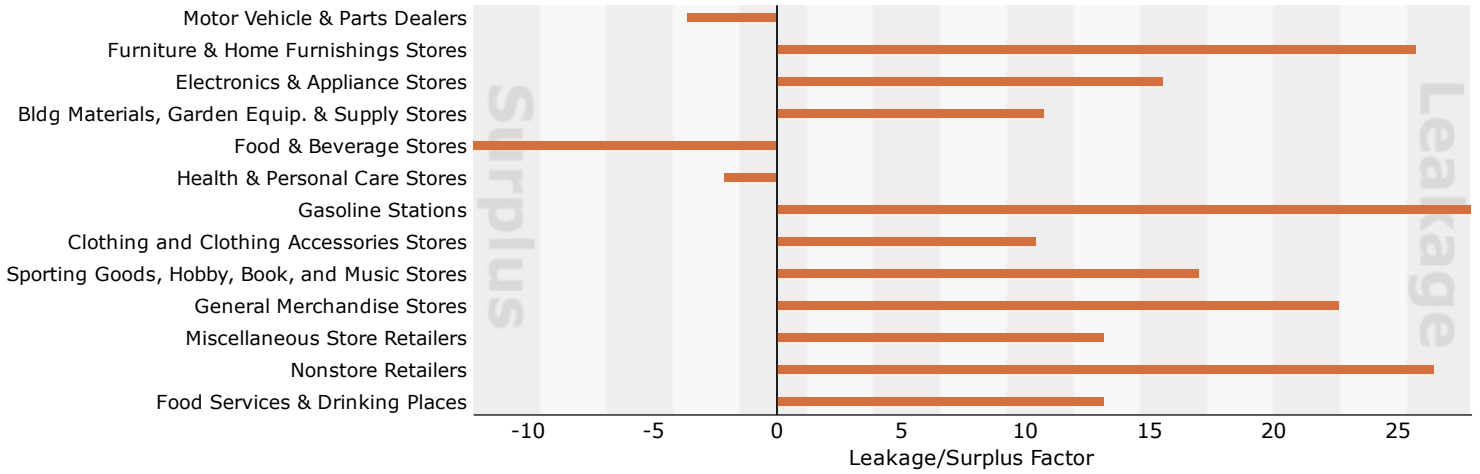


# Retail MarketPlace Profile

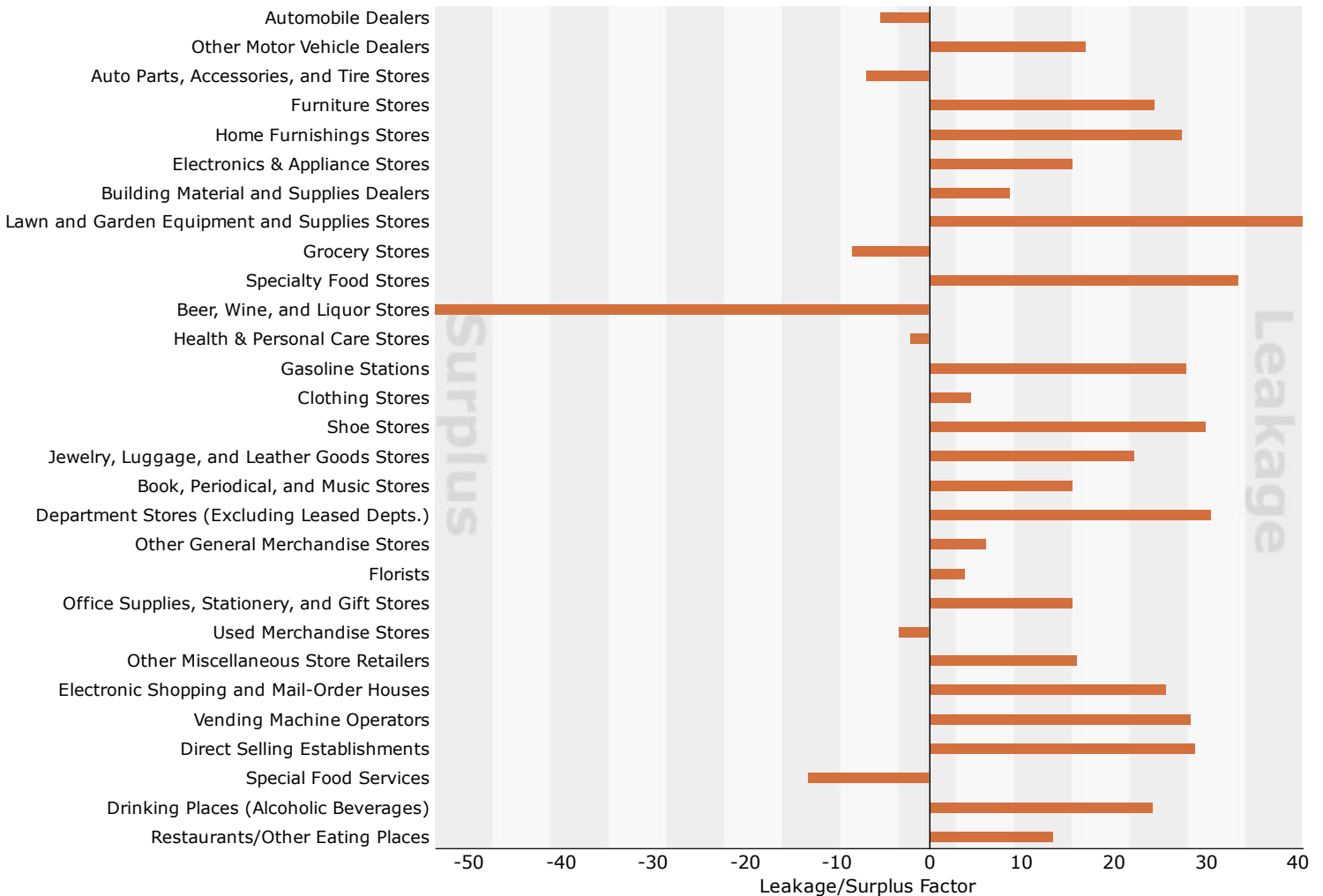
Edgewood  
 1683 Edgewood Rd, Morrisville, Pennsylvania, 19067  
 Drive Time: 15 minute radius

Prepared by Esri  
 Latitude: 40.22294  
 Longitude: -74.87347

## 2017 Leakage/Surplus Factor by Industry Subsector



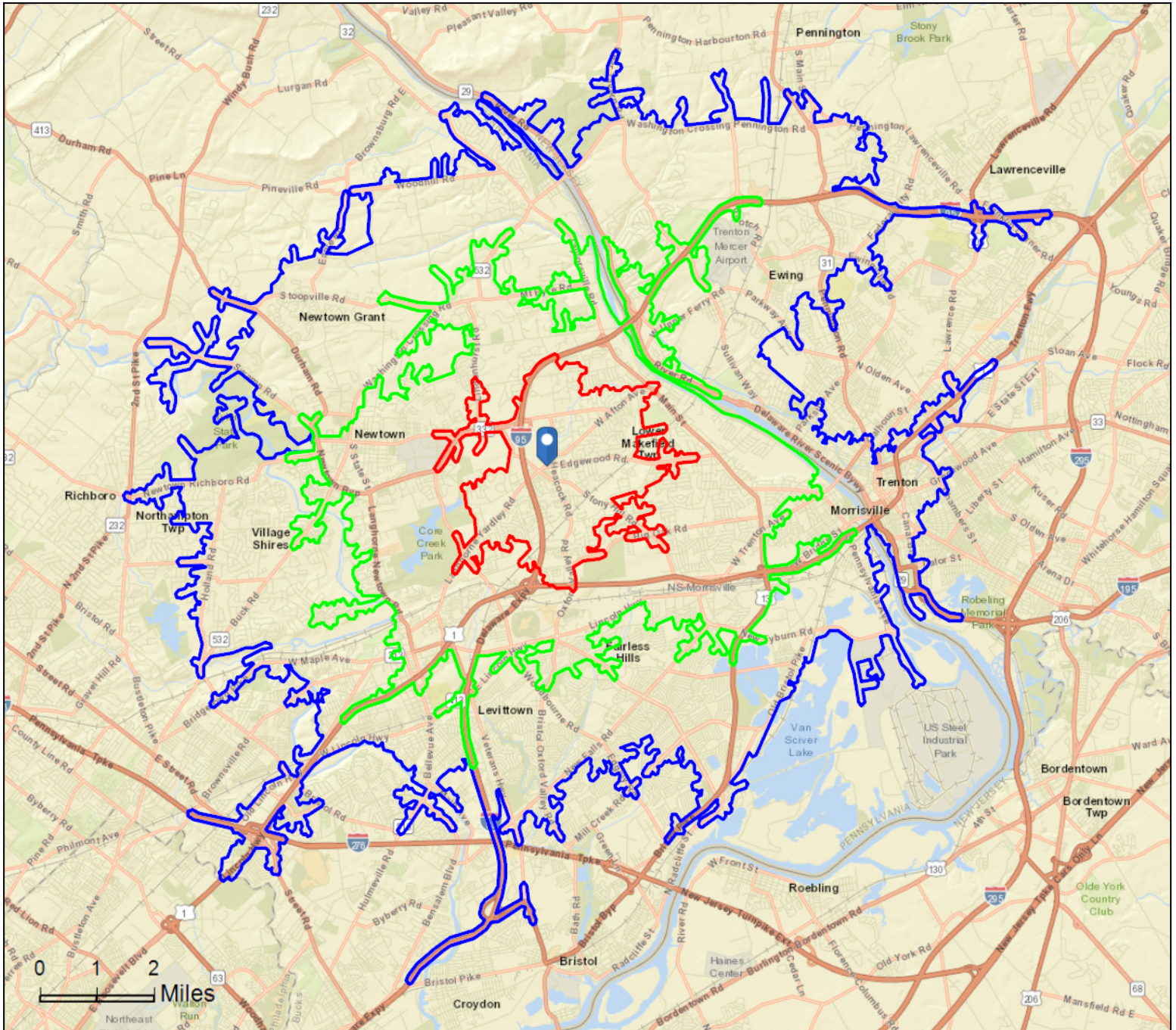
## 2017 Leakage/Surplus Factor by Industry Group



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Edgewood  
 1683 Edgewood Rd, Morrisville, Pennsylvania, 19067  
 Drive Time: 5, 10, 15 minute radii

Site Details Map  
 Latitude: 40.22294  
 Longitude: -74.87347



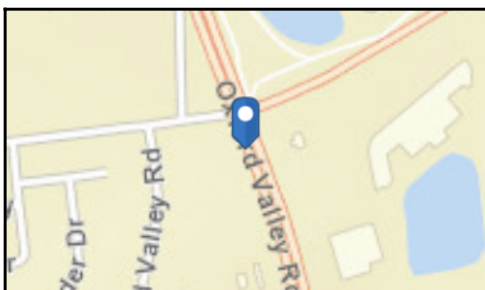
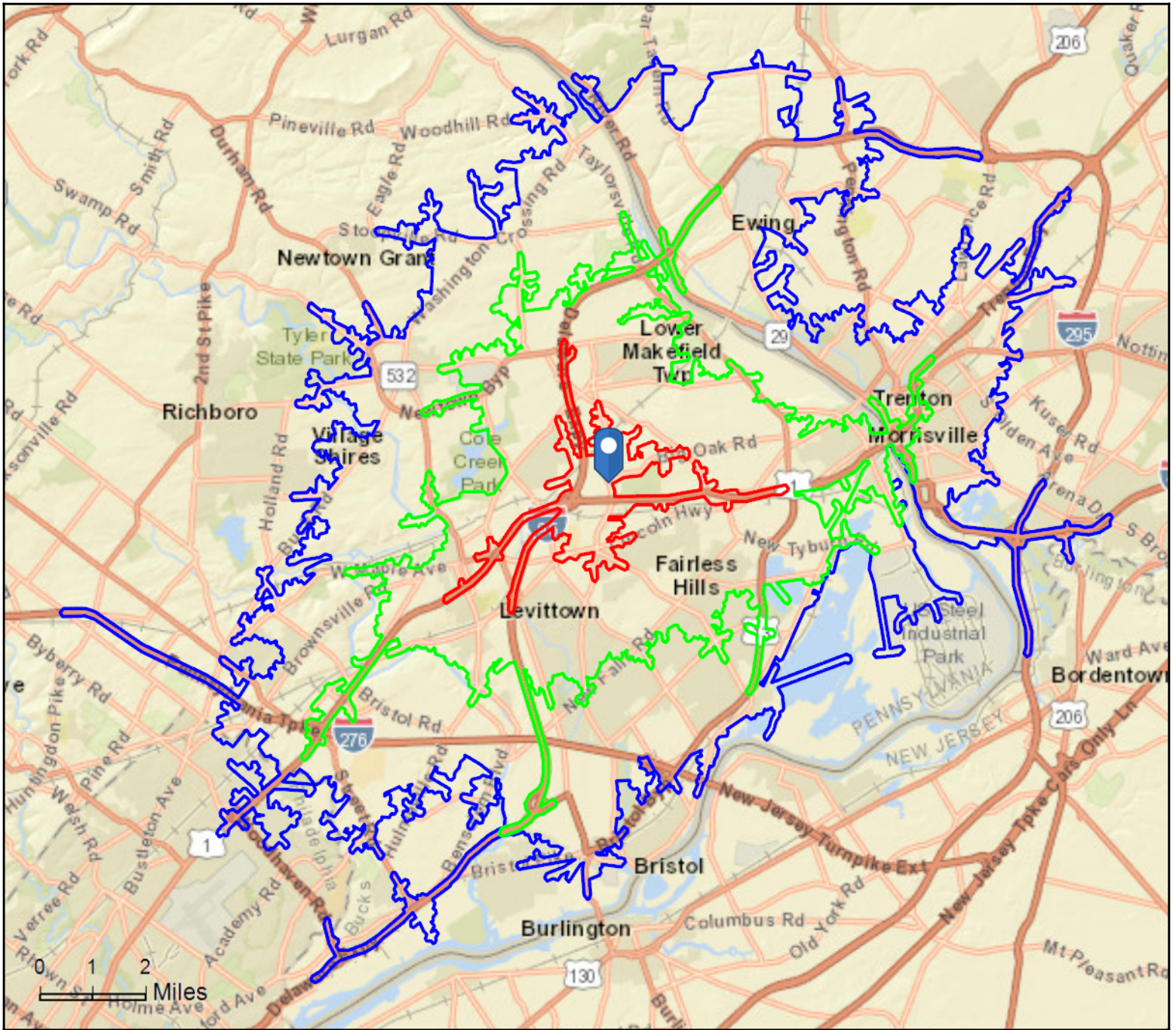
**This site is located in:**

- City:** Lower Makefield Twp
- County:** Bucks County
- State:** Pennsylvania
- ZIP Code:** 19067
- Census Tract:** 42017105506
- Census Block Group:** 420171055061
- CBSA:** Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area



101 Oxford Valley Rd, Morrisville, Pennsylvania, 19067  
Drive Time: 5, 10, 15 minute radii

Prepared by Esri  
Latitude: 40.19788  
Longitude: -74.86615





# Retail MarketPlace Profile

101 Oxford Valley Rd, Morrisville, Pennsylvania, 19067  
 Drive Time: 5 minute radius

Prepared by Esri  
 Latitude: 40.19788  
 Longitude: -74.86615

## Summary Demographics

2018 Population	5,745
2018 Households	2,424
2018 Median Disposable Income	\$80,030
2018 Per Capita Income	\$52,275

## 2017 Industry Summary

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Total Retail Trade and Food & Drink	44-45,722	\$130,574,224	\$667,371,465	-\$536,797,241	-67.3	169
Total Retail Trade	44-45	\$117,719,447	\$628,559,837	-\$510,840,390	-68.5	134
Total Food & Drink	722	\$12,854,777	\$38,811,628	-\$25,956,851	-50.2	34

## 2017 Industry Group

	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Motor Vehicle & Parts Dealers	441	\$24,853,568	\$330,481,525	-\$305,627,957	-86.0	24
Automobile Dealers	4411	\$20,233,800	\$285,427,705	-\$265,193,905	-86.8	14
Other Motor Vehicle Dealers	4412	\$2,613,846	\$22,018,151	-\$19,404,305	-78.8	1
Auto Parts, Accessories & Tire Stores	4413	\$2,005,922	\$23,035,668	-\$21,029,746	-84.0	8
Furniture & Home Furnishings Stores	442	\$4,402,047	\$19,519,476	-\$15,117,429	-63.2	10
Furniture Stores	4421	\$2,441,174	\$15,425,938	-\$12,984,764	-72.7	6
Home Furnishings Stores	4422	\$1,960,874	\$4,093,538	-\$2,132,664	-35.2	4
Electronics & Appliance Stores	443	\$4,025,035	\$12,314,388	-\$8,289,353	-50.7	5
Bldg Materials, Garden Equip. & Supply Stores	444	\$7,916,205	\$30,363,148	-\$22,446,943	-58.6	7
Bldg Material & Supplies Dealers	4441	\$7,281,545	\$29,510,696	-\$22,229,151	-60.4	6
Lawn & Garden Equip & Supply Stores	4442	\$634,660	\$852,451	-\$217,791	-14.6	1
Food & Beverage Stores	445	\$21,702,481	\$18,915,014	\$2,787,467	6.9	5
Grocery Stores	4451	\$19,654,565	\$14,514,780	\$5,139,785	15.0	1
Specialty Food Stores	4452	\$1,004,298	\$996,679	\$7,619	0.4	3
Beer, Wine & Liquor Stores	4453	\$1,043,618	\$3,403,555	-\$2,359,937	-53.1	1
Health & Personal Care Stores	446,4461	\$7,224,566	\$16,341,542	-\$9,116,976	-38.7	12
Gasoline Stations	447,4471	\$11,288,779	\$6,930,902	\$4,357,877	23.9	2
Clothing & Clothing Accessories Stores	448	\$7,062,087	\$74,358,698	-\$67,296,611	-82.7	42
Clothing Stores	4481	\$4,737,751	\$59,700,617	-\$54,962,866	-85.3	28
Shoe Stores	4482	\$1,034,902	\$7,987,839	-\$6,952,937	-77.1	7
Jewelry, Luggage & Leather Goods Stores	4483	\$1,289,433	\$6,670,241	-\$5,380,808	-67.6	7
Sporting Goods, Hobby, Book & Music Stores	451	\$3,537,853	\$28,250,114	-\$24,712,261	-77.7	7
Sporting Goods/Hobby/Musical Instr Stores	4511	\$3,072,515	\$25,879,715	-\$22,807,200	-78.8	6
Book, Periodical & Music Stores	4512	\$465,338	\$2,370,399	-\$1,905,061	-67.2	1
General Merchandise Stores	452	\$18,060,400	\$67,652,745	-\$49,592,345	-57.9	6
Department Stores Excluding Leased Depts.	4521	\$13,322,453	\$45,872,712	-\$32,550,259	-55.0	3
Other General Merchandise Stores	4529	\$4,737,948	\$21,780,033	-\$17,042,085	-64.3	2
Miscellaneous Store Retailers	453	\$5,148,810	\$17,533,323	-\$12,384,513	-54.6	15
Florists	4531	\$290,628	\$267,723	\$22,905	4.1	1
Office Supplies, Stationery & Gift Stores	4532	\$1,213,374	\$3,597,008	-\$2,383,634	-49.6	4
Used Merchandise Stores	4533	\$477,597	\$1,305,603	-\$828,006	-46.4	2
Other Miscellaneous Store Retailers	4539	\$3,167,211	\$12,362,990	-\$9,195,779	-59.2	7
Nonstore Retailers	454	\$2,497,616	\$5,898,963	-\$3,401,347	-40.5	2
Electronic Shopping & Mail-Order Houses	4541	\$1,916,402	\$5,652,343	-\$3,735,941	-49.4	1
Vending Machine Operators	4542	\$118,914	\$172,944	-\$54,030	-18.5	1
Direct Selling Establishments	4543	\$462,301	\$73,676	\$388,625	72.5	1
Food Services & Drinking Places	722	\$12,854,777	\$38,811,628	-\$25,956,851	-50.2	34
Special Food Services	7223	\$309,308	\$0	\$309,308	100.0	0
Drinking Places - Alcoholic Beverages	7224	\$742,414	\$341,594	\$400,820	37.0	1
Restaurants/Other Eating Places	7225	\$11,803,055	\$38,382,032	-\$26,578,977	-53.0	33

Data Note: Supply (retail sales) estimates sales to consumers by establishments. Sales to businesses are excluded. Demand (retail potential) estimates the expected amount spent by consumers at retail establishments. Supply and demand estimates are in current dollars. The Leakage/Surplus Factor presents a snapshot of retail opportunity. This is a measure of the relationship between supply and demand that ranges from +100 (total leakage) to -100 (total surplus). A positive value represents 'leakage' of retail opportunity outside the trade area. A negative value represents a surplus of retail sales, a market where customers are drawn in from outside the trade area. The Retail Gap represents the difference between Retail Potential and Retail Sales. Esri uses the North American Industry Classification System (NAICS) to classify businesses by their primary type of economic activity. Retail establishments are classified into 27 industry groups in the Retail Trade sector, as well as four industry groups within the Food Services & Drinking Establishments subsector. For more information on the Retail MarketPlace data, please click the link below to view the Methodology Statement. <http://www.esri.com/library/whitepapers/pdfs/esri-data-retail-marketplace.pdf>

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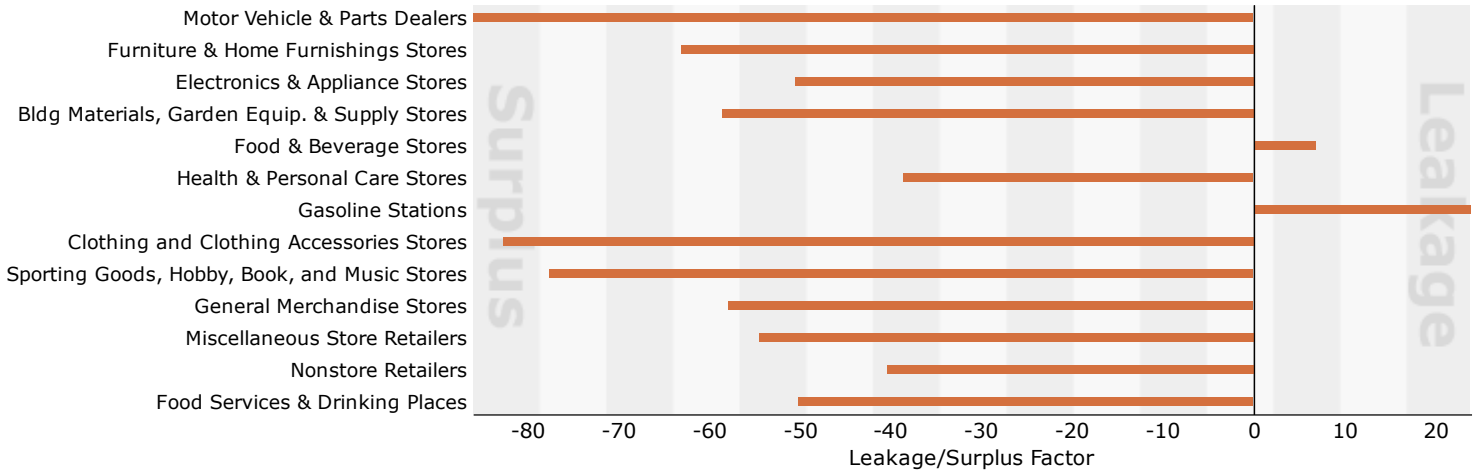


# Retail MarketPlace Profile

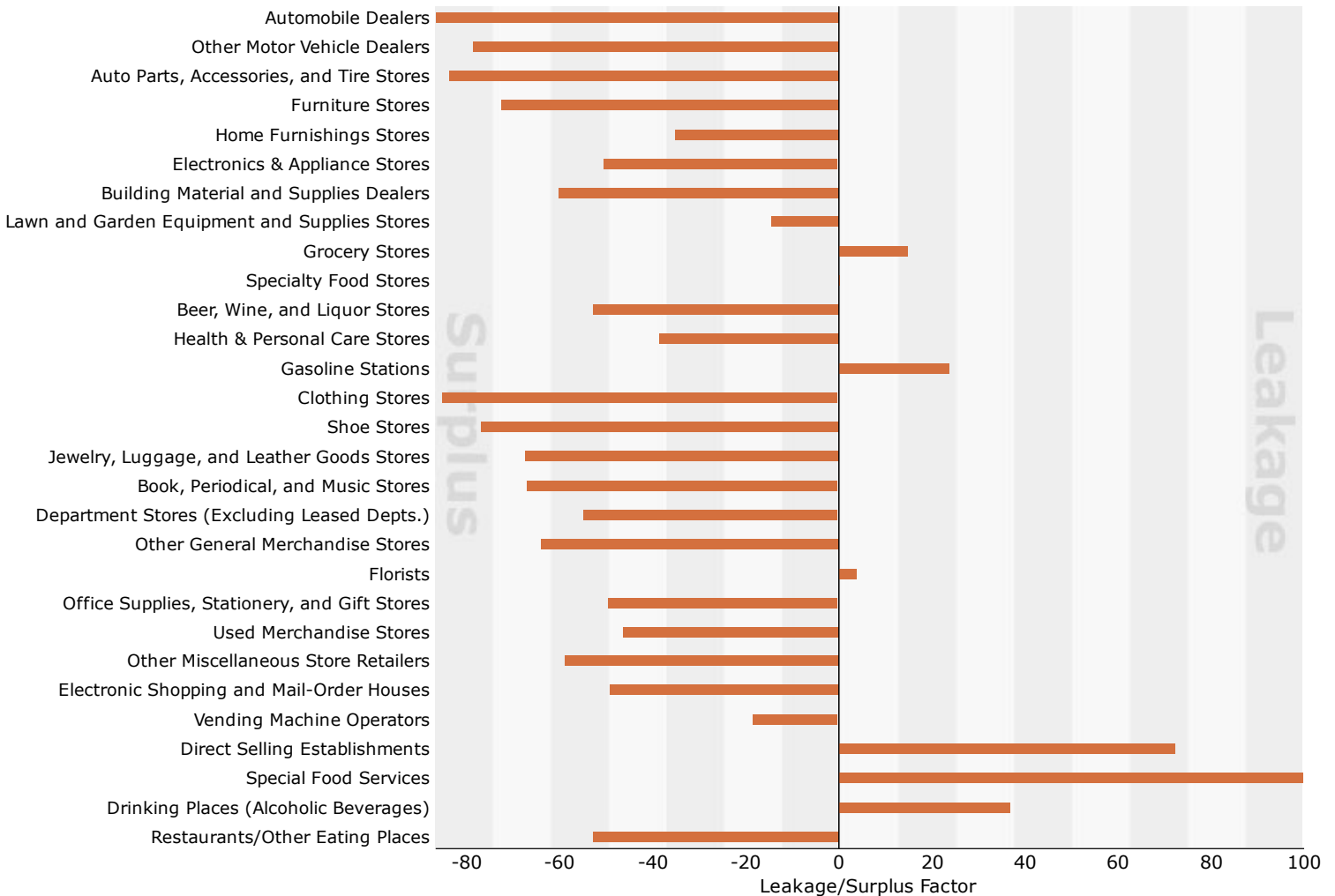
101 Oxford Valley Rd, Morrisville, Pennsylvania, 19067  
 Drive Time: 5 minute radius

Prepared by Esri  
 Latitude: 40.19788  
 Longitude: -74.86615

## 2017 Leakage/Surplus Factor by Industry Subsector



## 2017 Leakage/Surplus Factor by Industry Group



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# Retail MarketPlace Profile

101 Oxford Valley Rd, Morrisville, Pennsylvania, 19067  
 Drive Time: 10 minute radius

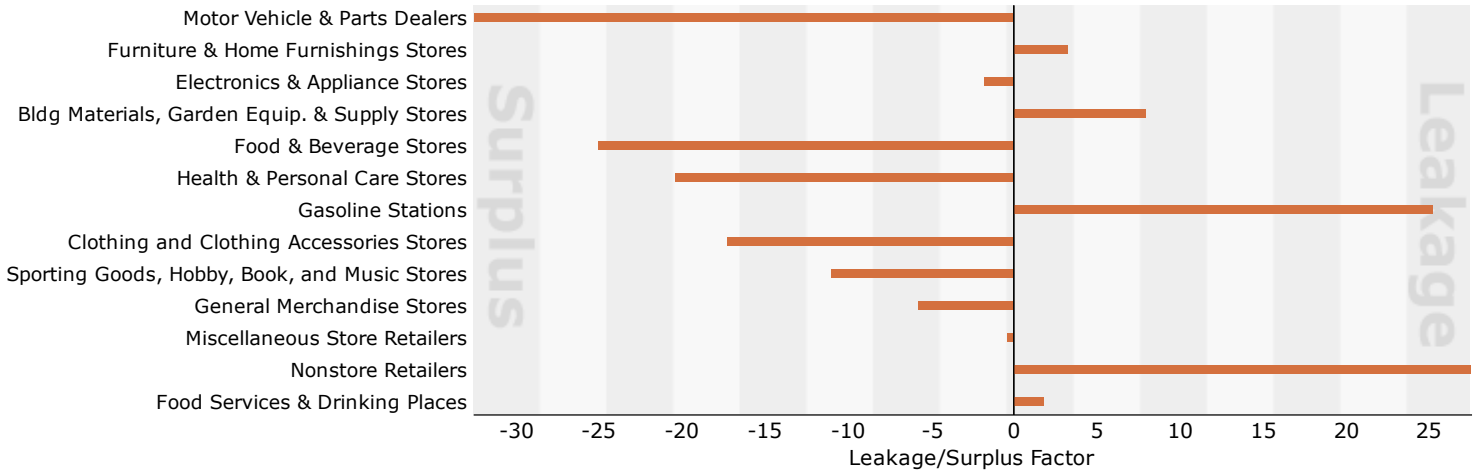
Prepared by Esri  
 Latitude: 40.19788  
 Longitude: -74.86615

Summary Demographics						
2018 Population						112,504
2018 Households						42,019
2018 Median Disposable Income						\$67,232
2018 Per Capita Income						\$42,143
2017 Industry Summary	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Total Retail Trade and Food & Drink	44-45,722	\$2,056,831,416	\$2,701,969,850	-\$645,138,434	-13.6	938
Total Retail Trade	44-45	\$1,856,038,677	\$2,508,211,809	-\$652,173,132	-14.9	655
Total Food & Drink	722	\$200,792,739	\$193,758,042	\$7,034,697	1.8	283
2017 Industry Group	NAICS	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap	Leakage/Surplus Factor	Number of Businesses
Motor Vehicle & Parts Dealers	441	\$389,599,995	\$766,351,414	-\$376,751,419	-32.6	99
Automobile Dealers	4411	\$316,776,337	\$649,440,300	-\$332,663,963	-34.4	50
Other Motor Vehicle Dealers	4412	\$40,936,740	\$56,398,444	-\$15,461,704	-15.9	4
Auto Parts, Accessories & Tire Stores	4413	\$31,886,918	\$60,512,670	-\$28,625,752	-31.0	45
Furniture & Home Furnishings Stores	442	\$69,248,751	\$64,866,621	\$4,382,130	3.3	36
Furniture Stores	4421	\$38,175,515	\$40,911,303	-\$2,735,788	-3.5	17
Home Furnishings Stores	4422	\$31,073,236	\$23,955,317	\$7,117,919	12.9	18
Electronics & Appliance Stores	443	\$63,687,786	\$66,030,891	-\$2,343,105	-1.8	29
Bldg Materials, Garden Equip. & Supply Stores	444	\$126,898,200	\$108,072,334	\$18,825,866	8.0	52
Bldg Material & Supplies Dealers	4441	\$116,475,764	\$100,343,507	\$16,132,257	7.4	36
Lawn & Garden Equip & Supply Stores	4442	\$10,422,436	\$7,728,827	\$2,693,609	14.8	16
Food & Beverage Stores	445	\$341,841,093	\$571,110,691	-\$229,269,598	-25.1	57
Grocery Stores	4451	\$309,296,834	\$540,706,779	-\$231,409,945	-27.2	37
Specialty Food Stores	4452	\$15,815,114	\$6,299,719	\$9,515,395	43.0	12
Beer, Wine & Liquor Stores	4453	\$16,729,144	\$24,104,193	-\$7,375,049	-18.1	8
Health & Personal Care Stores	446,4461	\$115,056,370	\$174,538,959	-\$59,482,589	-20.5	72
Gasoline Stations	447,4471	\$177,384,854	\$105,830,126	\$71,554,728	25.3	28
Clothing & Clothing Accessories Stores	448	\$111,610,717	\$158,252,469	-\$46,641,752	-17.3	105
Clothing Stores	4481	\$74,765,818	\$125,734,907	-\$50,969,089	-25.4	67
Shoe Stores	4482	\$16,150,662	\$16,523,987	-\$373,325	-1.1	16
Jewelry, Luggage & Leather Goods Stores	4483	\$20,694,238	\$15,993,575	\$4,700,663	12.8	23
Sporting Goods, Hobby, Book & Music Stores	451	\$55,474,142	\$69,307,451	-\$13,833,309	-11.1	36
Sporting Goods/Hobby/Musical Instr Stores	4511	\$48,138,641	\$62,696,979	-\$14,558,338	-13.1	30
Book, Periodical & Music Stores	4512	\$7,335,502	\$6,610,472	\$725,030	5.2	5
General Merchandise Stores	452	\$284,041,364	\$319,323,835	-\$35,282,471	-5.8	27
Department Stores Excluding Leased Depts.	4521	\$209,172,032	\$170,915,238	\$38,256,794	10.1	10
Other General Merchandise Stores	4529	\$74,869,332	\$148,408,597	-\$73,539,265	-32.9	17
Miscellaneous Store Retailers	453	\$81,032,996	\$81,758,992	-\$725,996	-0.4	102
Florists	4531	\$4,828,984	\$5,116,002	-\$287,018	-2.9	8
Office Supplies, Stationery & Gift Stores	4532	\$19,068,814	\$17,506,021	\$1,562,793	4.3	26
Used Merchandise Stores	4533	\$7,445,933	\$7,000,833	\$445,100	3.1	17
Other Miscellaneous Store Retailers	4539	\$49,689,265	\$52,136,136	-\$2,446,871	-2.4	52
Nonstore Retailers	454	\$40,162,409	\$22,768,026	\$17,394,383	27.6	13
Electronic Shopping & Mail-Order Houses	4541	\$30,117,105	\$20,278,111	\$9,838,994	19.5	3
Vending Machine Operators	4542	\$1,861,221	\$858,258	\$1,002,963	36.9	3
Direct Selling Establishments	4543	\$8,184,083	\$1,631,658	\$6,552,425	66.8	6
Food Services & Drinking Places	722	\$200,792,739	\$193,758,042	\$7,034,697	1.8	283
Special Food Services	7223	\$4,882,179	\$9,401,369	-\$4,519,190	-31.6	13
Drinking Places - Alcoholic Beverages	7224	\$11,788,481	\$9,123,636	\$2,664,845	12.7	16
Restaurants/Other Eating Places	7225	\$184,122,079	\$175,233,037	\$8,889,042	2.5	253

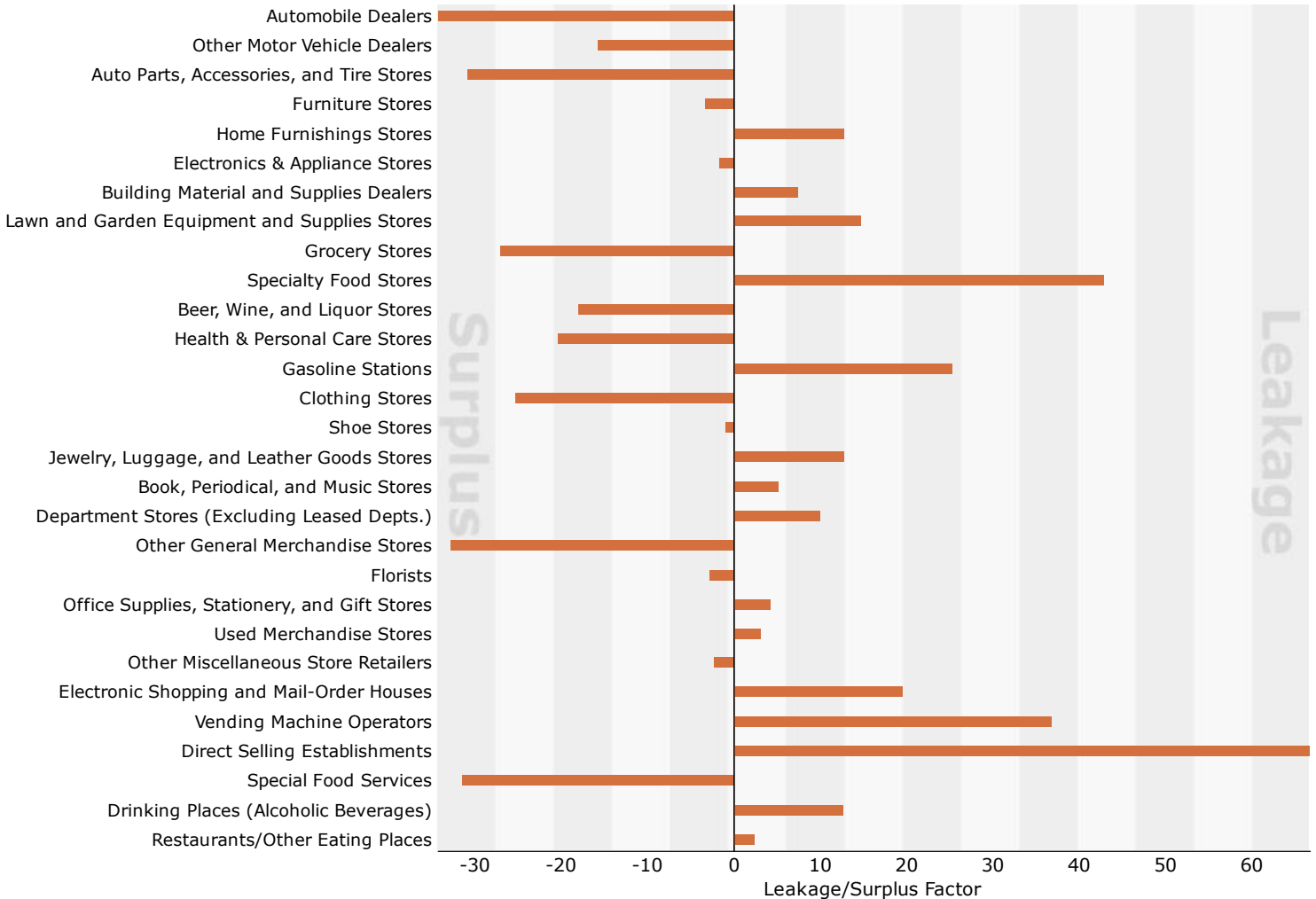
Data Note: Supply (retail sales) estimates sales to consumers by establishments. Sales to businesses are excluded. Demand (retail potential) estimates the expected amount spent by consumers at retail establishments. Supply and demand estimates are in current dollars. The Leakage/Surplus Factor presents a snapshot of retail opportunity. This is a measure of the relationship between supply and demand that ranges from +100 (total leakage) to -100 (total surplus). A positive value represents 'leakage' of retail opportunity outside the trade area. A negative value represents a surplus of retail sales, a market where customers are drawn in from outside the trade area. The Retail Gap represents the difference between Retail Potential and Retail Sales. Esri uses the North American Industry Classification System (NAICS) to classify businesses by their primary type of economic activity. Retail establishments are classified into 27 industry groups in the Retail Trade sector, as well as four industry groups within the Food Services & Drinking Establishments subsector. For more information on the Retail MarketPlace data, please click the link below to view the Methodology Statement. <http://www.esri.com/library/whitepapers/pdfs/esri-data-retail-marketplace.pdf>

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## 2017 Leakage/Surplus Factor by Industry Subsector



## 2017 Leakage/Surplus Factor by Industry Group



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# Retail MarketPlace Profile

101 Oxford Valley Rd, Morrisville, Pennsylvania, 19067  
 Drive Time: 15 minute radius

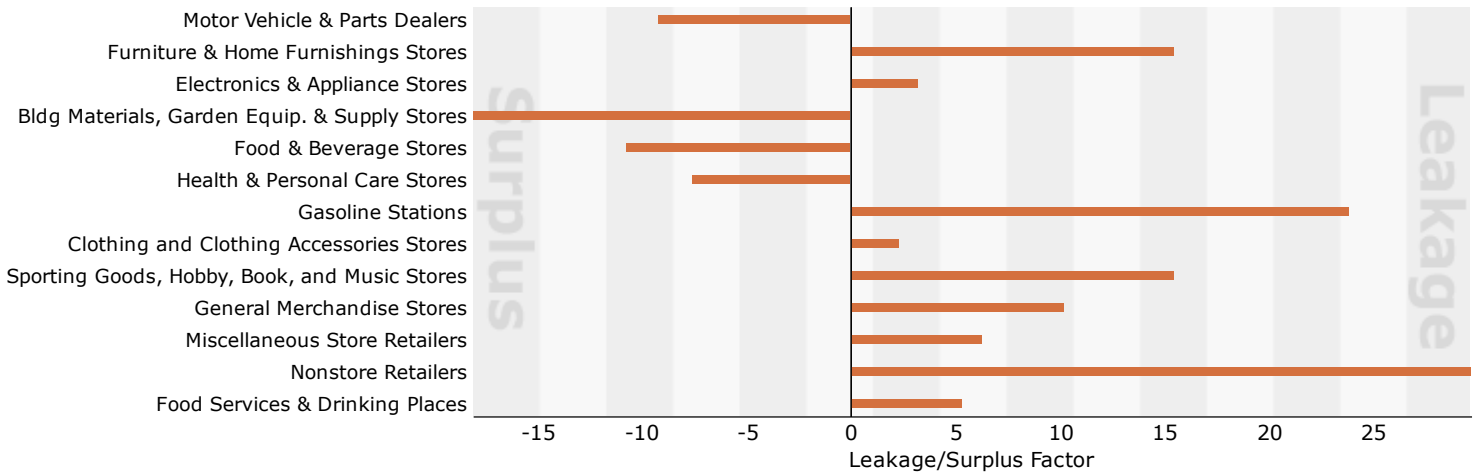
Prepared by Esri  
 Latitude: 40.19788  
 Longitude: -74.86615

<b>Summary Demographics</b>						
2018 Population						356,022
2018 Households						130,642
2018 Median Disposable Income						\$54,894
2018 Per Capita Income						\$35,077
<b>2017 Industry Summary</b>	<b>NAICS</b>	<b>Demand</b> (Retail Potential)	<b>Supply</b> (Retail Sales)	<b>Retail Gap</b>	<b>Leakage/Surplus</b> <b>Factor</b>	<b>Number of</b> <b>Businesses</b>
Total Retail Trade and Food & Drink	44-45,722	\$5,437,485,754	\$5,502,489,859	-\$65,004,105	-0.6	2,690
Total Retail Trade	44-45	\$4,909,016,742	\$5,027,387,922	-\$118,371,180	-1.2	1,834
Total Food & Drink	722	\$528,469,012	\$475,101,937	\$53,367,075	5.3	856
<b>2017 Industry Group</b>	<b>NAICS</b>	<b>Demand</b> (Retail Potential)	<b>Supply</b> (Retail Sales)	<b>Retail Gap</b>	<b>Leakage/Surplus</b> <b>Factor</b>	<b>Number of</b> <b>Businesses</b>
Motor Vehicle & Parts Dealers	441	\$1,021,994,118	\$1,232,014,720	-\$210,020,602	-9.3	232
Automobile Dealers	4411	\$834,624,213	\$1,038,180,553	-\$203,556,340	-10.9	120
Other Motor Vehicle Dealers	4412	\$102,444,378	\$71,590,513	\$30,853,865	17.7	10
Auto Parts, Accessories & Tire Stores	4413	\$84,925,527	\$122,243,654	-\$37,318,127	-18.0	102
Furniture & Home Furnishings Stores	442	\$184,052,053	\$134,789,754	\$49,262,299	15.5	92
Furniture Stores	4421	\$100,572,374	\$79,030,839	\$21,541,535	12.0	41
Home Furnishings Stores	4422	\$83,479,679	\$55,758,915	\$27,720,764	19.9	50
Electronics & Appliance Stores	443	\$172,063,040	\$161,541,914	\$10,521,126	3.2	87
Bldg Materials, Garden Equip. & Supply Stores	444	\$321,407,819	\$463,228,784	-\$141,820,965	-18.1	177
Bldg Material & Supplies Dealers	4441	\$295,035,071	\$450,006,454	-\$154,971,383	-20.8	146
Lawn & Garden Equip & Supply Stores	4442	\$26,372,748	\$13,222,330	\$13,150,418	33.2	32
Food & Beverage Stores	445	\$906,766,277	\$1,126,799,999	-\$220,033,722	-10.8	270
Grocery Stores	4451	\$810,390,300	\$936,418,292	-\$126,027,992	-7.2	171
Specialty Food Stores	4452	\$41,642,294	\$39,233,124	\$2,409,170	3.0	49
Beer, Wine & Liquor Stores	4453	\$54,733,683	\$151,148,583	-\$96,414,900	-46.8	50
Health & Personal Care Stores	446,4461	\$314,696,704	\$366,735,915	-\$52,039,211	-7.6	183
Gasoline Stations	447,4471	\$473,403,272	\$290,634,294	\$182,768,978	23.9	76
Clothing & Clothing Accessories Stores	448	\$307,892,831	\$294,184,391	\$13,708,440	2.3	245
Clothing Stores	4481	\$209,242,846	\$222,464,012	-\$13,221,166	-3.1	150
Shoe Stores	4482	\$43,495,716	\$34,579,983	\$8,915,733	11.4	35
Jewelry, Luggage & Leather Goods Stores	4483	\$55,154,268	\$37,140,396	\$18,013,872	19.5	60
Sporting Goods, Hobby, Book & Music Stores	451	\$147,516,612	\$108,032,415	\$39,484,197	15.5	88
Sporting Goods/Hobby/Musical Instr Stores	4511	\$127,516,659	\$94,742,764	\$32,773,895	14.7	73
Book, Periodical & Music Stores	4512	\$19,999,952	\$13,289,651	\$6,710,301	20.2	15
General Merchandise Stores	452	\$748,854,140	\$610,271,872	\$138,582,268	10.2	87
Department Stores Excluding Leased Depts.	4521	\$531,699,375	\$432,685,593	\$99,013,782	10.3	30
Other General Merchandise Stores	4529	\$217,154,765	\$177,586,280	\$39,568,485	10.0	57
Miscellaneous Store Retailers	453	\$208,528,798	\$183,934,562	\$24,594,236	6.3	257
Florists	4531	\$12,193,757	\$9,582,091	\$2,611,666	12.0	24
Office Supplies, Stationery & Gift Stores	4532	\$50,616,453	\$46,955,416	\$3,661,037	3.8	60
Used Merchandise Stores	4533	\$18,009,466	\$22,601,616	-\$4,592,150	-11.3	46
Other Miscellaneous Store Retailers	4539	\$127,709,123	\$104,795,439	\$22,913,684	9.9	128
Nonstore Retailers	454	\$101,841,080	\$55,219,303	\$46,621,777	29.7	40
Electronic Shopping & Mail-Order Houses	4541	\$75,783,712	\$38,995,851	\$36,787,861	32.1	10
Vending Machine Operators	4542	\$4,743,653	\$5,384,300	-\$640,647	-6.3	13
Direct Selling Establishments	4543	\$21,313,715	\$10,839,152	\$10,474,563	32.6	17
Food Services & Drinking Places	722	\$528,469,012	\$475,101,937	\$53,367,075	5.3	856
Special Food Services	7223	\$12,966,434	\$17,911,239	-\$4,944,805	-16.0	34
Drinking Places - Alcoholic Beverages	7224	\$27,932,202	\$22,570,031	\$5,362,171	10.6	56
Restaurants/Other Eating Places	7225	\$487,570,376	\$434,620,666	\$52,949,710	5.7	766

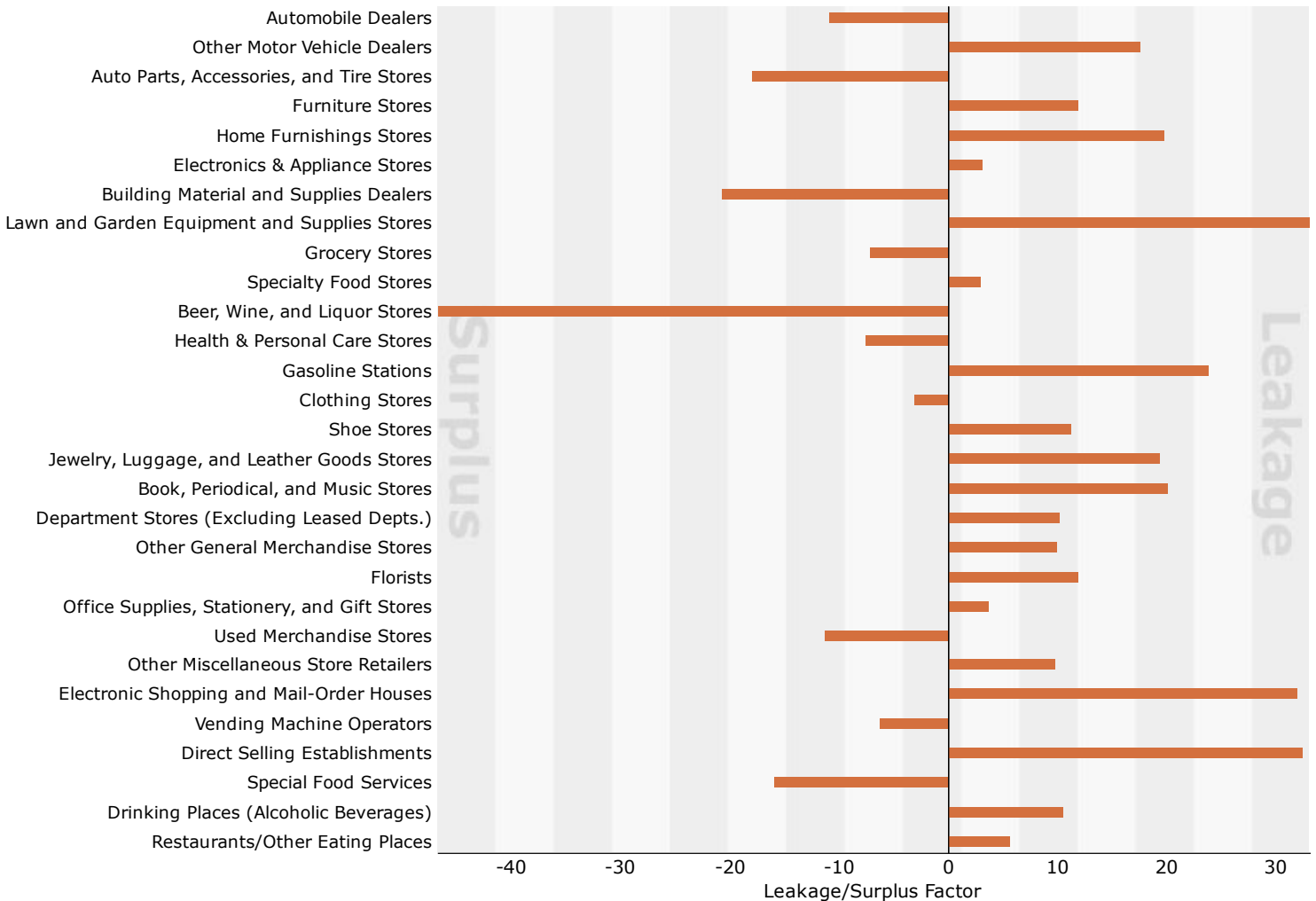
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## 2017 Leakage/Surplus Factor by Industry Subsector



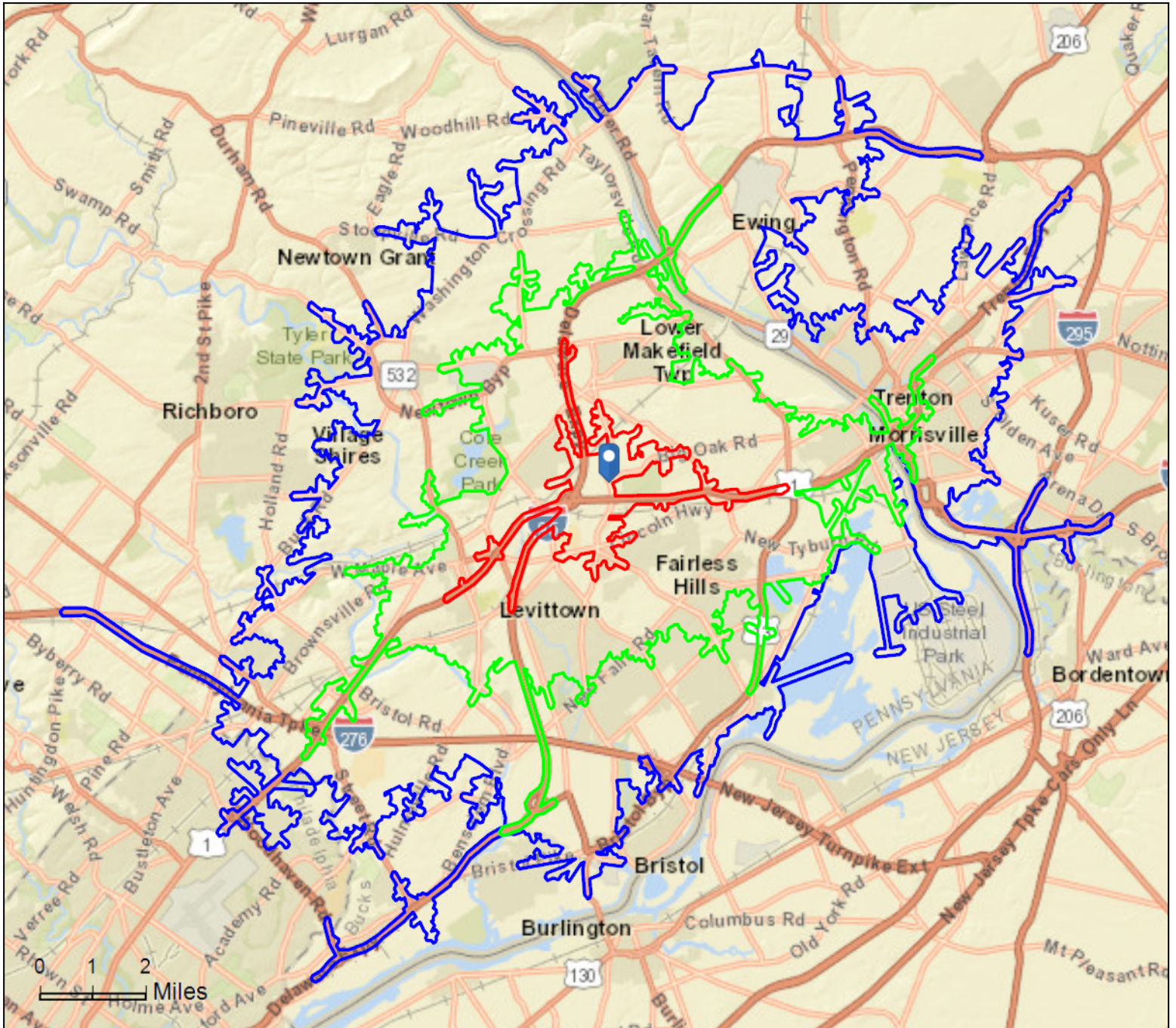
## 2017 Leakage/Surplus Factor by Industry Group



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101 Oxford Valley Rd, Morrisville, Pennsylvania, 19067  
Drive Time: 5, 10, 15 minute radii

Site Details Map  
Latitude: 40.19788  
Longitude: -74.86615



**This site is located in:**

- City:** Lower Makefield Twp
- County:** Bucks County
- State:** Pennsylvania
- ZIP Code:** 19067
- Census Tract:** 42017105510
- Census Block Group:** 420171055101
- CBSA:** Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area



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## APPENDIX C: METHODOLOGY USED TO CALCULATE POTENTIAL DWELLING UNITS

Parcels mapped as Developable on Map 5 Developable Lands were evaluated to determine the possible number of additional dwelling units that could be built on currently uncommitted lands within the township. The development capacity of these parcels was based on a methodology similar to that required by Section 200.52 of the township zoning ordinance, which assesses the natural resources land on a site to be protected, the net buildable site area, and the maximum permitted density for each site based on the district where the site is located.

The natural resource protection land for each developable parcel was determined using the county's Geographical Information System (GIS). The area of hydrological surface features, steep slopes, and woodlands were identified and the resource protected portion of these lands was calculated by multiplying the natural resource areas by the required resource protection ratio. Only the resource with the highest protection ration was used where two or more resources overlapped. The net buildable site area was then calculated by subtracting the resource protected land from the base site area.<sup>11</sup>

The equation found in Section 200.52.C(1)(a)[2][a] of the zoning ordinance (shown below) was used to determine site capacity (number of permitted dwelling units) of the developable parcels. This equation results in the number of dwelling units as a product of dividing the net buildable site area by the product resulting from dividing 1 by the maximum permitted density and adding the result to a recreation factor of 0.05 (as established in the township subdivision and land development ordinance).

$$\text{Net buildable site area} \div [(1 \div \text{Max. Density}) + 0.05] = \text{Total number of dwellings permitted}$$

Most of the township's residential zoning districts base maximum density on the percent of base site area classified as resource protection land, which was determined by dividing the base site area by the total amount of resource protected land. The site capacity calculations were based on maximum density listed in the table of performance standards for each residential district based on percentage of base site area classified as resource protection land. However, for the Age Qualified Community use permitted by right in the C-3 district, natural resource protected land was not subtracted out since the maximum density for that use is calculated just on the base site area of a site.

While most of the township's residential districts have an open space cluster development option, that option was not used because open space cluster developments are not permitted to yield more dwelling units than actually could be constructed on the site without open space clustering given the development constraints of the physical site and the otherwise applicable township ordinance requirements. Also, within the R-2 Residential Medium-Density District, it was assumed that all developable parcels are within areas served by public sewer to determine maximum density.

Where two or more developable parcels are adjacent to each other, the parcels were combined to determine the potential number of dwelling units for the parcel grouping. The number of potential dwelling units from the parcel grouping was compared with that calculated for the individual lots. The

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<sup>11</sup> Base site area was assumed to be the acreage of the parcel or group of parcels as measured by the County GIS. No attempt was made to identify and subtract land in existing or required rights-of-way or easements.

method that yielded the higher number of potential dwelling units, either using grouped parcels or individual parcels, was used to calculate the total number of potential dwellings.

## APPENDIX D: HISTORIC RESOURCES

**Table 24**  
**National Register-Listed and Potentially Eligible Historic Resources in Lower Makefield**

Address	Name	National Register Status
Lindenhurst Rd.	Balderston Homestead	Eligible
Oxford Valley Rd.	Stone Dwelling with addition, frame cottage, buildings	Eligible
949 Mirror Lake Rd.	John Brown, Jr. (Patterson Farm)	Eligible
Mirror Lake Rd.	Joseph Satterthwaite Farm (Patterson Farm) Philadelphia & Reading Railroad: New York Division	Eligible
SR7935	Sommer's Camelback Bridge	Eligible
SR1016	Delaware Road Bridge	Contributes to resource
1561 Dolington Road	Beans Farm	Insufficient information to evaluate
	Village of Edgewood Historic District	Local Historic District
1324 Dolington Road	Elm Lowne	Eligible
	Delaware Division of the Pennsylvania Canal	National Historic Landmark
Washington Crossing Road	Benjamin Taylor Homestead (Dolington Manor)	Listed
Stony Hill Rd.	Richard Janney House	Eligible
931 Stony Hill Rd.	Jacob Janney House, Shady Brook	Eligible
Township Line Rd.	Amos Palmer House	Listed
Yardley-Langhorne Rd.	Mirror Lake Farm Tenant/School House	Eligible
Lindenhurst Rd.	Ashton Farm	Insufficient information to evaluate
Yardley-Langhorne Rd.	Floral Vale Farm	Insufficient information to evaluate
Yardley-Morrisville Rd.	Slate Hill Cemetery	Eligible
20 Moyer Rd.	John and Phineas Hough House (Twin Arches)	Eligible

Sources PHMC CRGIS, adapted by the Bucks County Planning Commission



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## **APPENDIX E: STATE LAWS SUPPORTING HISTORIC PRESERVATION**

### **STATE LAWS SUPPORTING HISTORIC PRESERVATION**

The Commonwealth of Pennsylvania has enacted laws that support historic preservation efforts at the municipal level. The state's preservation enabling legislation has two distinct arms, but the regulatory measures afforded by each work well in concert.

One preservation path is through the zoning power granted municipalities by Act 247, the Pennsylvania Municipalities Planning Code. Zoning ordinances can include regulations that allow municipalities to choose the types of land uses that may be permitted in a historic district or an area of historic properties. They can also guide other characteristics such as density of development, building size and setbacks, or allow for reuse and redevelopment of properties within a historic district so that newer or rebuilt structures will complement its appearance and maintain its character. The township's TND overlay district is an example.

Another path toward resource preservation is through Act 167, the state Historic District Act, which enables municipalities to designate local historic districts and adopt ordinances to protect them. The act provides for appointment of a local historic architectural review board (HARB) to advise the governing body on the appropriateness of proposed construction and renovations within a historic district.

Historic district ordinances are a means of regulating the appearance of places with historic resources by establishing a mechanism for reviewing exterior changes. The level of regulation a municipality may undertake through a historic district ordinance can extend from controls on the demolition of buildings to detailed guidelines governing exterior alterations.

These controls govern only those alterations that require a building permit and are visible from a public street. Activities like painting and minor repairs are not subject to HARB review.

While the township regulates Edgewood Village through its zoning ordinance, the regulatory scheme in the village in effect is a hybrid form, with the HARB acting in an advisory capacity even though Edgewood has not been designated a historic district under Act 167. (It is a National Register-listed historic district.)



## APPENDIX F: LOWER MAKEFIELD TOWNSHIP TRAFFIC COUNTS

**Table 25**  
**Traffic Counts**

<b>Traffic Counts</b>				
<b>PA Route 532 - Washington Crossing Road</b>				
<b>From</b>	<b>To</b>	<b>ADT</b>	<b>Year</b>	<b>Truck %</b>
Township Border	Lindhurst Road	6,213	2016	3%
<b>Interstate 295</b>				
<b>From</b>	<b>To</b>	<b>ADT</b>	<b>Year</b>	<b>Truck %</b>
US Route 1	PA Route 332	62,018	2001	9-10%
PA Route 332	Taylorsville Road	43,171	2016	7-12%
Taylorsville Road	Delaware River	48,997	2015	6%
<b>Dolington Road</b>				
<b>From</b>	<b>To</b>	<b>ADT</b>	<b>Year</b>	<b>Truck %</b>
PA Route 532	Taylorsville Road	2,262	2015	3%
<b>Taylorsville Road</b>				
<b>From</b>	<b>To</b>	<b>ADT</b>	<b>Year</b>	<b>Truck %</b>
Mount Eyre Road	Interstate 295	9,965	2017	5%
Interstate 295	Dolington Road	9,167	2016	3%
<b>Route 32 - River Road</b>				
<b>From</b>	<b>To</b>	<b>ADT</b>	<b>Year</b>	<b>Truck %</b>
Mount Eyre Road	Yardley Borough	4,588	2018	3%
Yardley Borough	Richard Road	5,373	2017	1%
Richard Road	Morrisville Borough	4,795	2016	2%
<b>Twining Road</b>				
<b>From</b>	<b>To</b>	<b>ADT</b>	<b>Year</b>	<b>Truck %</b>
Township Border	Lindhurst Road	3,193	2017	1%
<b>Quarry Road</b>				
<b>From</b>	<b>To</b>	<b>ADT</b>	<b>Year</b>	<b>Truck %</b>
Lindhurst Road	Dolington Road	2,054	2016	5%

Traffic Counts				
<b>PA Route 332 - Yardley Newtown Road</b>				
From	To	ADT	Year	Truck %
Campus Drive	Stony Hill Road	45,765	2017	6-7%
Stony Hill Road	Interstate 295	37,182	2018	6-8%
Interstate 295	Mirror Lake Road	10,995	2014	3%
Mirror Lake Road	Langhorne Yardley	7,192	2018	3%
<b>PA Route 332 - West Afton Avenue</b>				
From	To	ADT	Year	Truck %
Schuyler Road	Yardley Borough	7,531	2018	3%
<b>Stony Hill Road</b>				
From	To	ADT	Year	Truck %
Yardley Newtown Road	Township Line Road	6,792	2015	2%
Township Line Road	Yardley Langhorne Road	6,790	2015	2%
Yardley Langhorne Road	Heacock Road	10,856	2014	2%
Heacock Road	Big Oak Road	7,110	2018	3%
Big Oak Road	Falls Township	7,262	2017	4%
<b>Yardley Langhorne Road</b>				
From	To	ADT	Year	Truck %
Township Line Road	Stony Hill Road	7,042	2017	7%
Stony Hill Road	Mirror Lake Road	2,066	2015	7%
Mirror Lake Road	Schuyler Road	3,022	2015	2%
<b>Mirror Lake Road</b>				
From	To	ADT	Year	Truck %
Yardley Newtown Road	Yardley Newtown Road	5,156	2015	2%
<b>Edgewood Road</b>				
From	To	ADT	Year	Truck %
Yardley Langhorne Road	Schuyler Road	6,022	2018	3%
Schuyler Road	Gainsway Road	6,282	2016	3%
Gainsway Road	Yardley Morrisville Road	5,365	2017	4%
<b>Heacock Road</b>				
From	To	ADT	Year	Truck %
Stony Hill Road	Oxford Valley Road	14,021	2016	4%



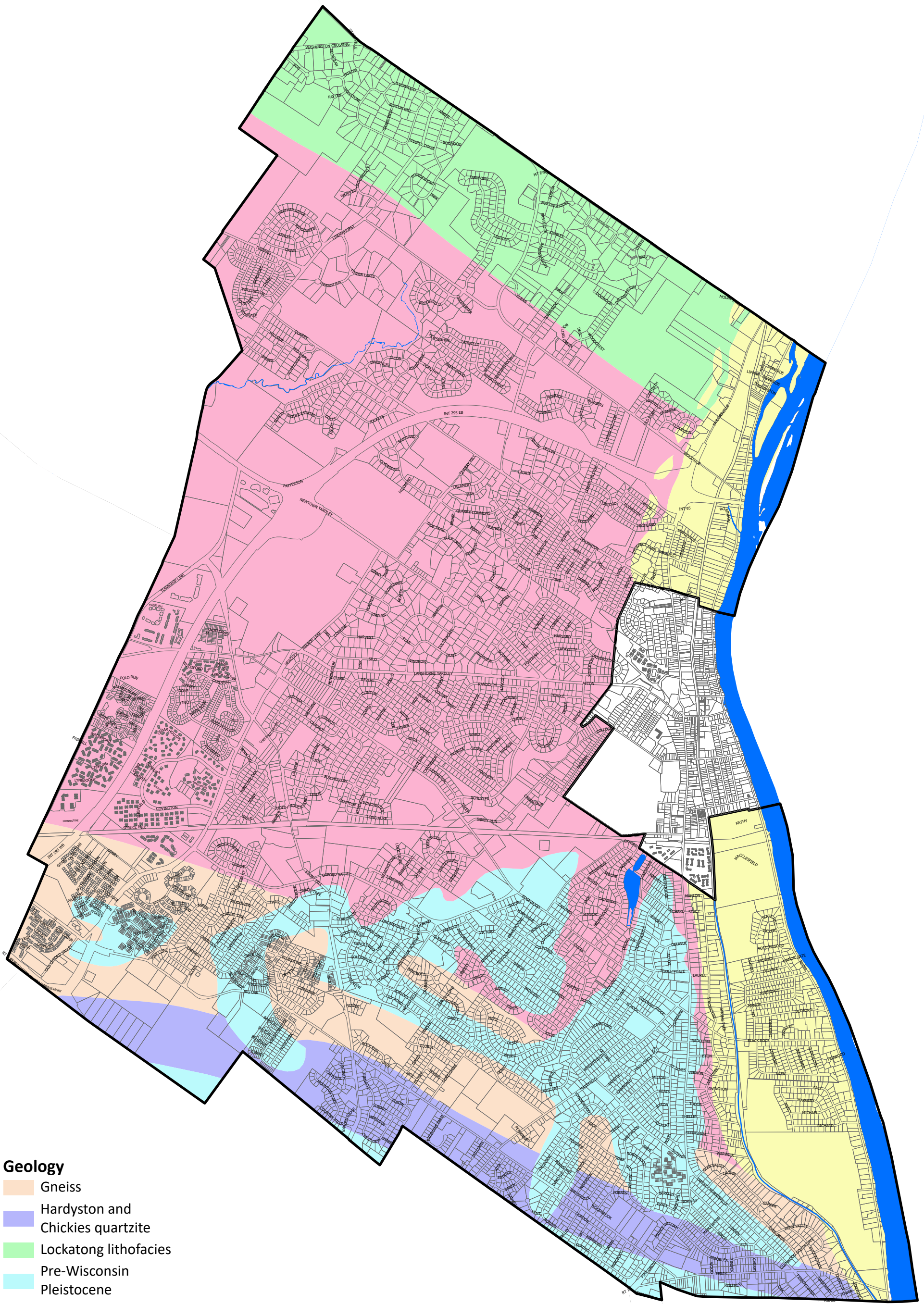
Traffic Counts				
<b>Oxford Valley Road</b>				
From	To	ADT	Year	Truck %
US Route 1	Big Oak Road	31,249	2012	2%
Big Oak Road	Heacock Road	14,021	2016	4%
Reading Avenue	Edgewood Road	2,361	2018	2%
<b>Big Oak Road</b>				
From	To	ADT	Year	Truck %
Interstate 295	Oxford Valley Road	8,126	2017	2%
Oxford Valley Road	Stony Hill Road	5,886	2018	2%
Stony Hill Road	Pine Grove Road	6,398	2016	3%
Pine Grove Road	W. Trenton Avenue	4,460	2018	2%
<b>Lindenhurst Road</b>				
From	To	ADT	Year	Truck %
PA Route 532	Yardley Newtown Road	8,117	2018	6%
<b>Makefield Road</b>				
From	To	ADT	Year	Truck %
Yardley Morrisville Road	Central Drive	2,948	2017	5%
Central Drive	Oxford Valley Road	5,809	2017	3%
<b>Yardley Morrisville Road</b>				
From	To	ADT	Year	Truck %
Yardley Borough	Edgewood Road	8,669	2017	6%
Edgewood Road	Pine Grove Road	7,810	2015	4%
Pine Grove Road	Trenton Avenue	3,761	2014	4%
<b>Black Rock Road</b>				
From	To	ADT	Year	Truck %
Yardley Morrisville Road	River Road	5,365	2017	4%
<b>Pine Grove Road</b>				
From	To	ADT	Year	Truck %
Yardley Morrisville Road	Big Oak Road	7,546	2017	4%
Big Oak Road	W. Trenton Avenue	6,838	2015	4%



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**MAPS**





Source: Geology - Pennsylvania Geological Survey, 2001

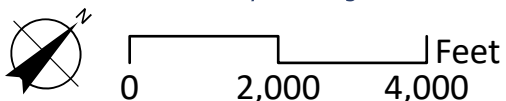
**Geology**

- Gneiss
- Hardyston and Chickies quartzite
- Lokatong lithofacies
- Pre-Wisconsin
- Pleistocene
- Stockton lithofacies
- Wisconsin (Pleistocene) and Recent

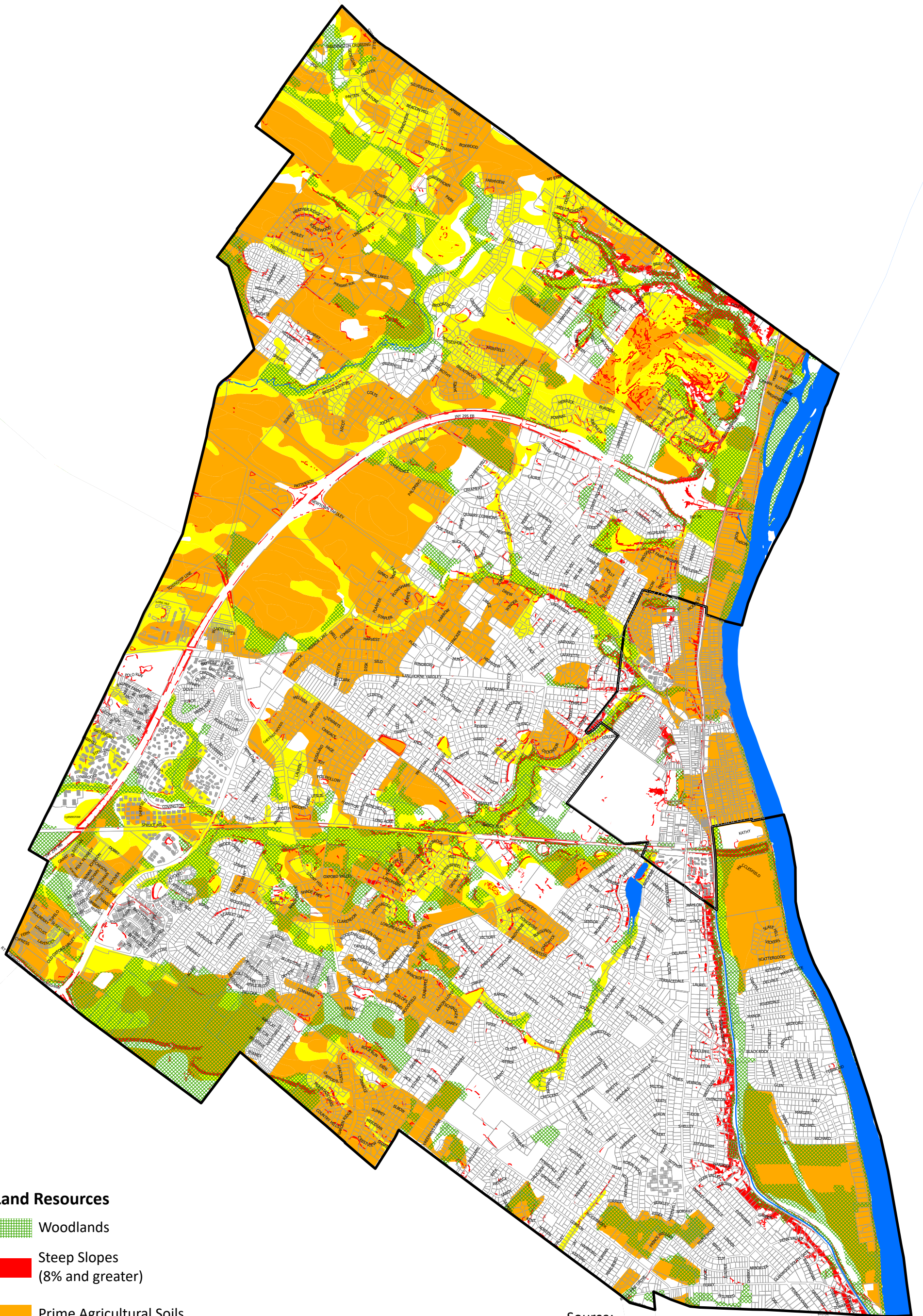


**Township of Lower Makefield  
Master Plan Update 2019**


**Map 1  
Geology**







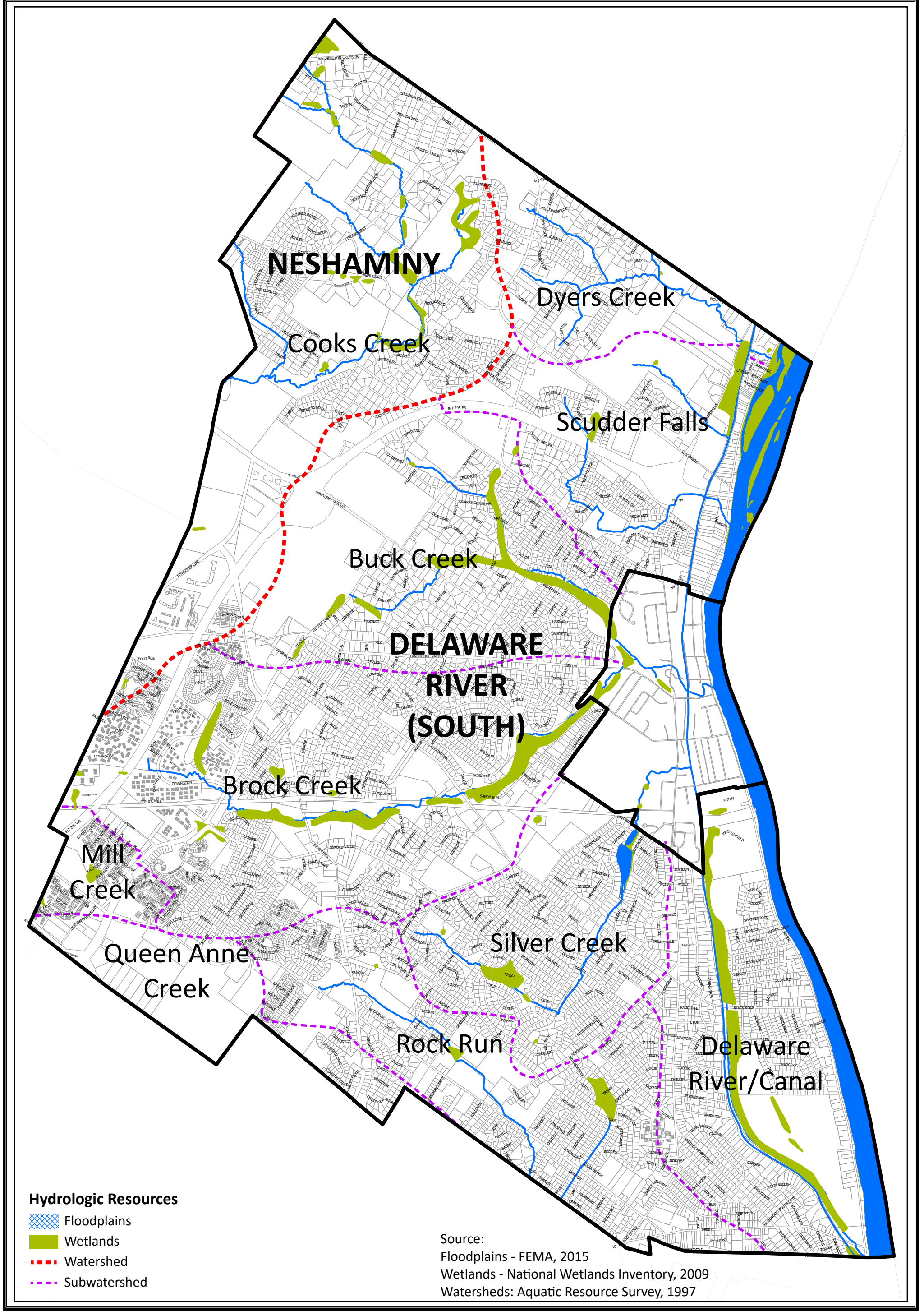
**Land Resources**

-  Woodlands
-  Steep Slopes (8% and greater)
-  Prime Agricultural Soils
-  Farmland of Statewide Importance

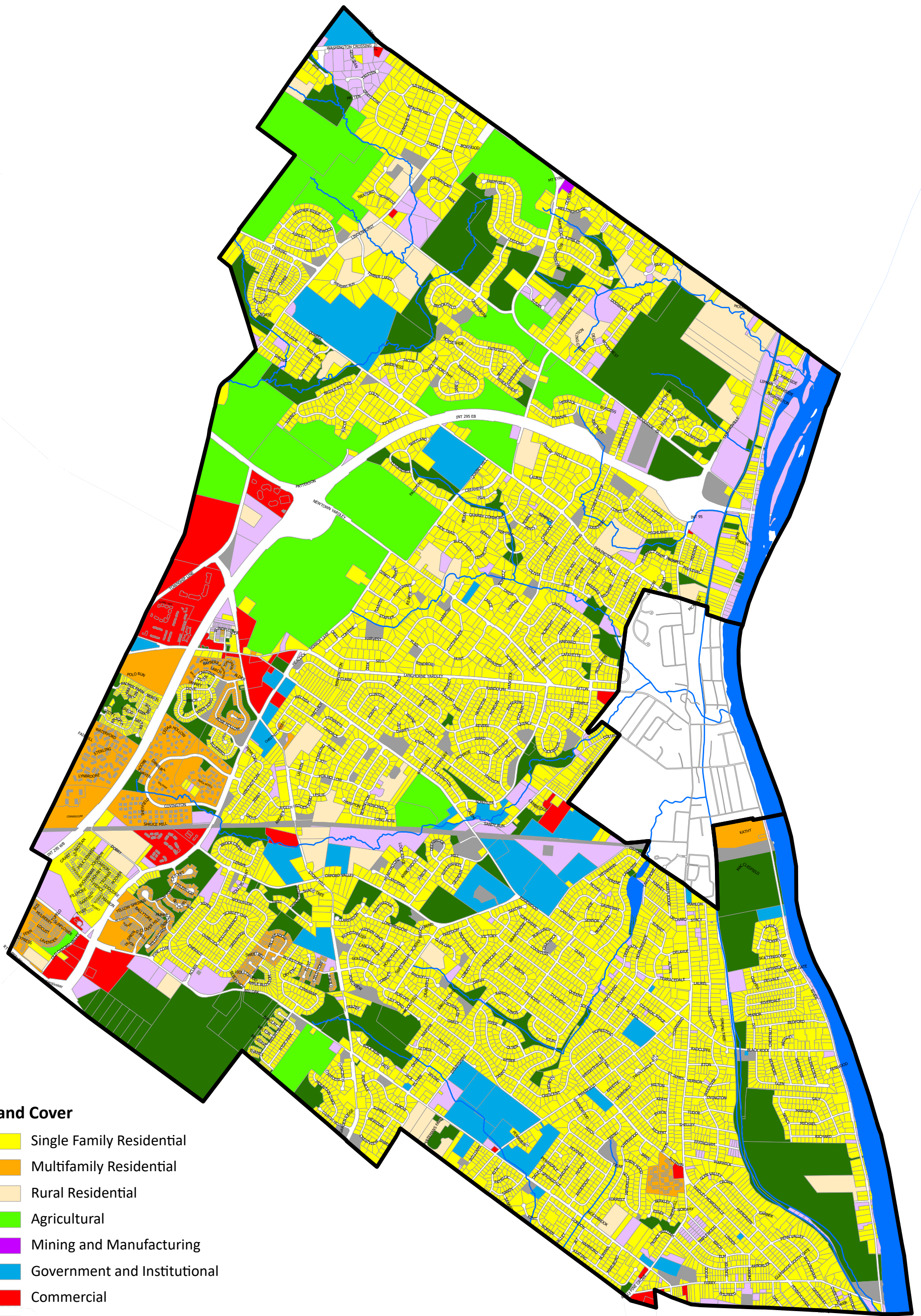
Source:  
 Woodlands - DVRPC Land Cover Data Set, 2015  
 Steep Slopes - DCNR PAMAP Program, 2008  
 Soils - USDA-NRCS, 2008









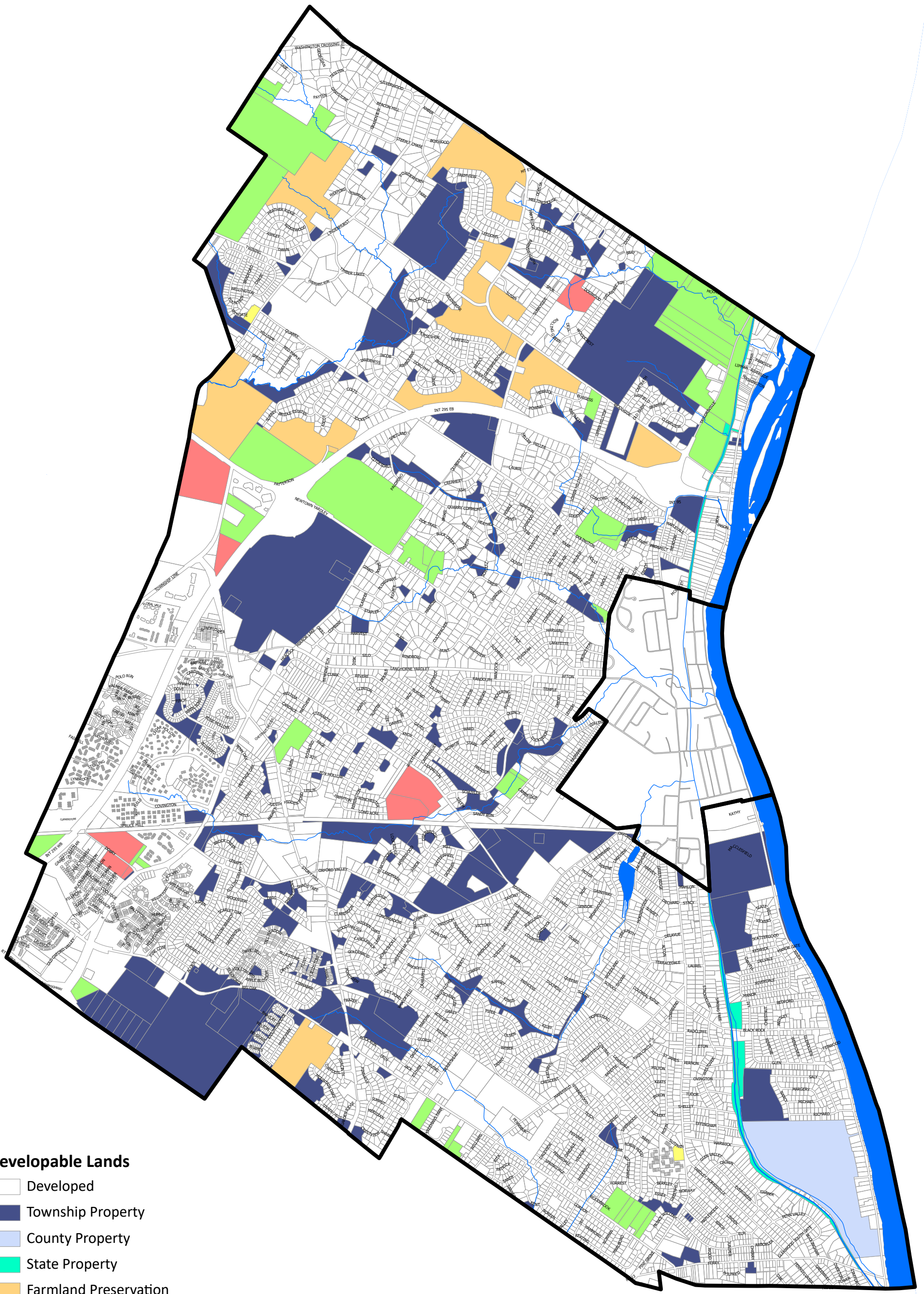


**Land Cover**

- Single Family Residential
- Multifamily Residential
- Rural Residential
- Agricultural
- Mining and Manufacturing
- Government and Institutional
- Commercial
- Parks, Recreation and Protected Open Space
- Transportation and Utilities
- Vacant

Source:  
Lower Makefield Township







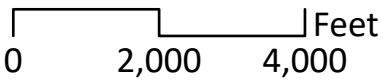
**Developable Lands**

- Developed
- Township Property
- County Property
- State Property
- Farmland Preservation
- In the Development Process
- Sketch Plan
- Developable

Source:  
Lower Makefield Township



BCPC  
Bucks County Planning Commission

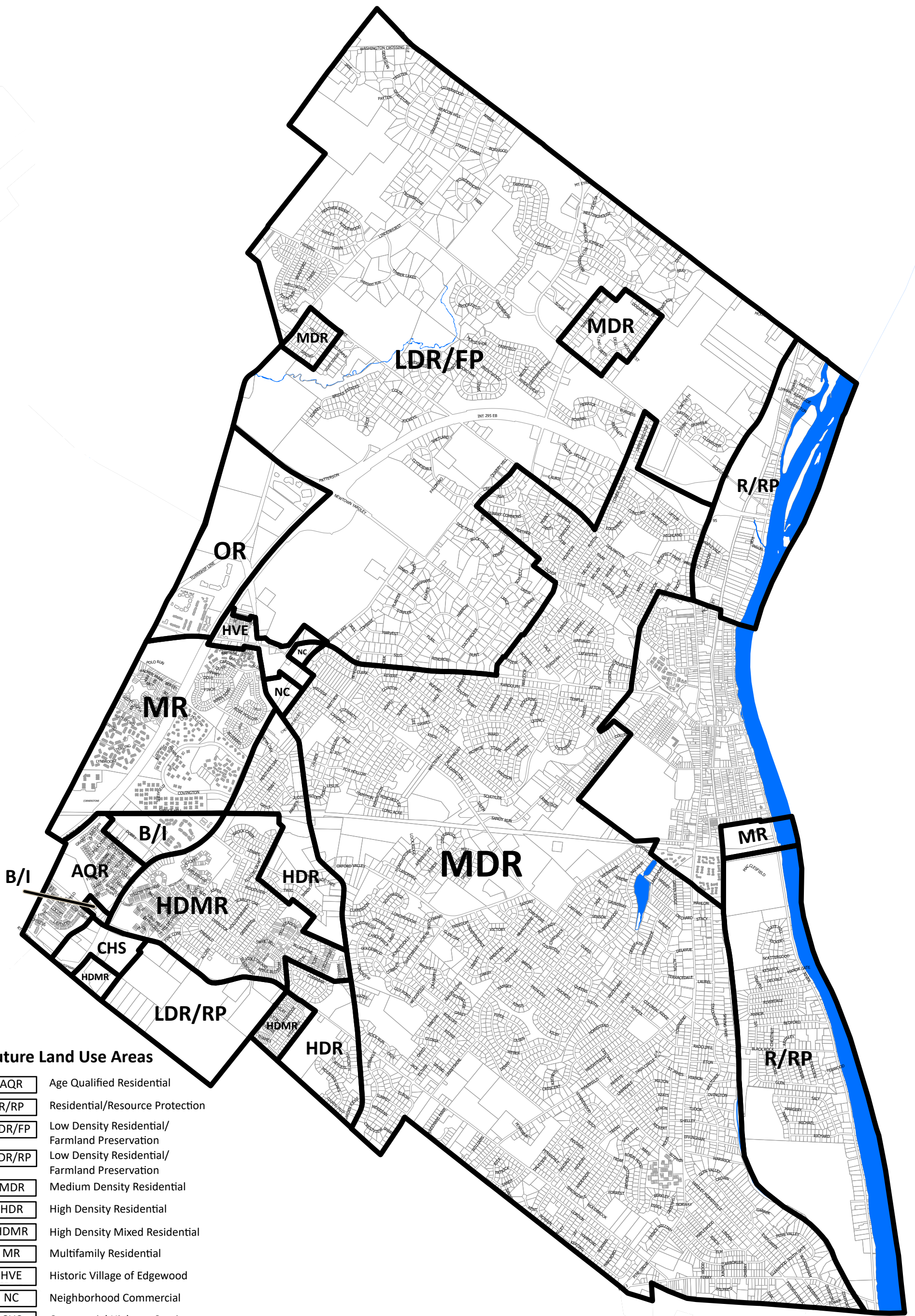



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**Township of Lower Makefield  
Master Plan Update 2019**

**Map 5  
Developable Lands**





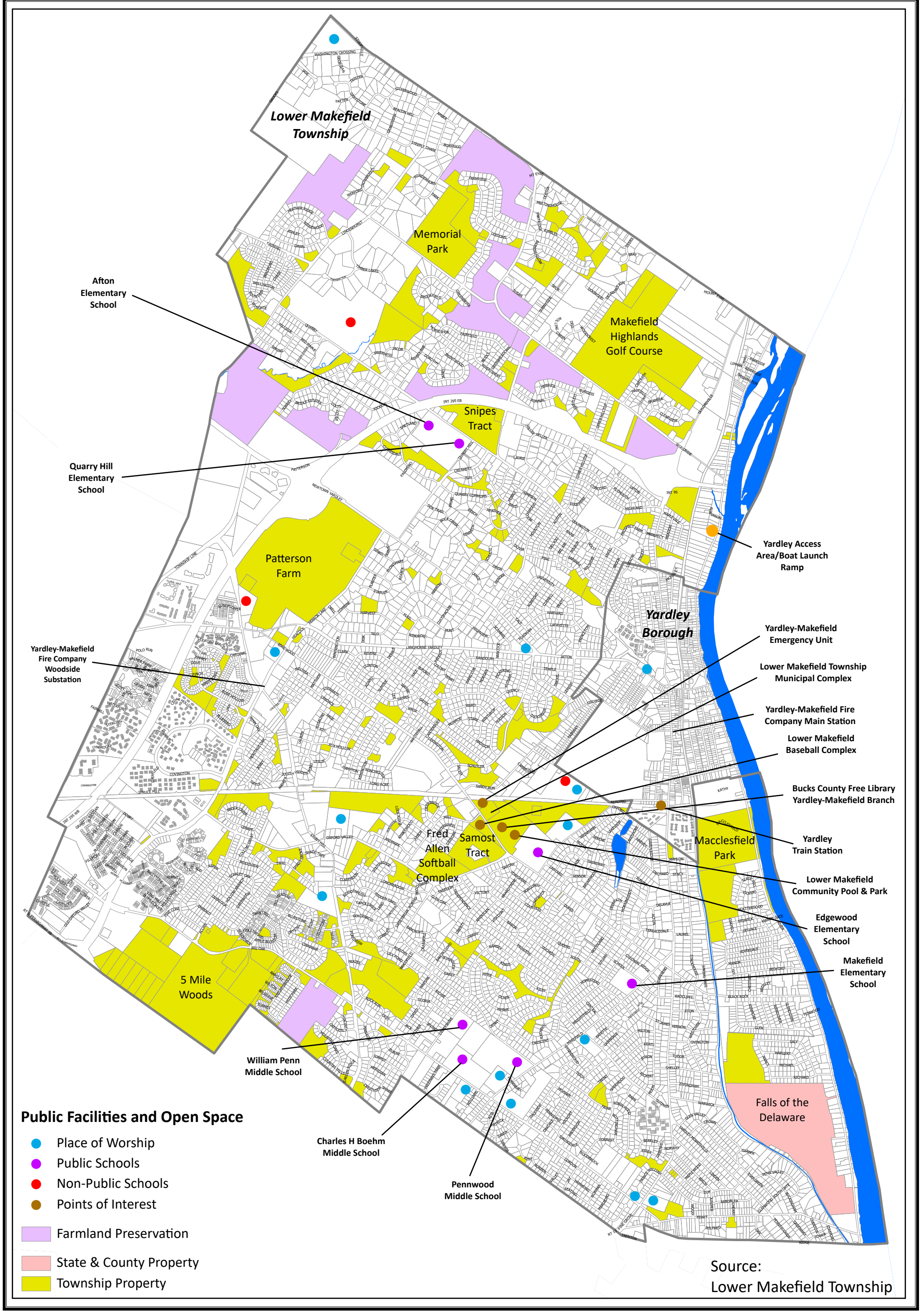
**Future Land Use Areas**

- AQR Age Qualified Residential
- R/RP Residential/Resource Protection
- LDR/FP Low Density Residential/  
Farmland Preservation
- LDR/RP Low Density Residential/  
Farmland Preservation
- MDR Medium Density Residential
- HDR High Density Residential
- HDMR High Density Mixed Residential
- MR Multifamily Residential
- HVE Historic Village of Edgewood
- NC Neighborhood Commercial
- CHS Commercial Highway Services
- B/I Business/Industrial
- OR Office Research

Source:  
Lower Makefield Township







**Public Facilities and Open Space**

- Place of Worship
- Public Schools
- Non-Public Schools
- Points of Interest
- Farmland Preservation
- State & County Property
- Township Property

Source:  
Lower Makefield Township

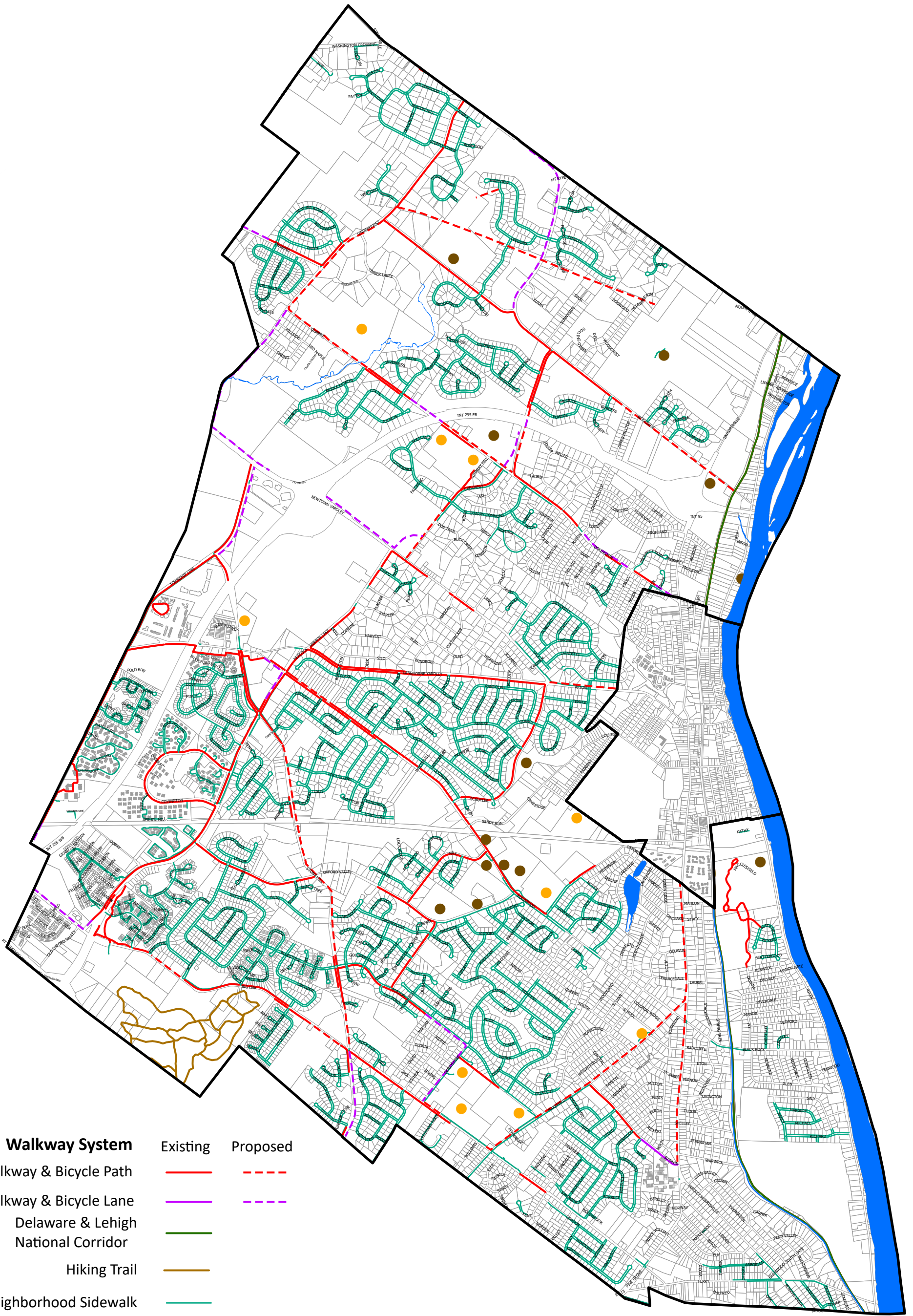
BCPC  
Bucks County Planning Commission

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**Township of Lower Makefield  
Master Plan Update 2019**

**Map 7 Public  
Facilities, Recreation  
and Open Space**





Source:  
Lower Makefield Township

<b>Walkway System</b>	Existing	Proposed
Walkway & Bicycle Path		
Walkway & Bicycle Lane		
Delaware & Lehigh National Corridor		
Hiking Trail		
Neighborhood Sidewalk		
Public Services/ Recreation Facilities		
Schools		

BCPC  
Bucks County Planning Commission

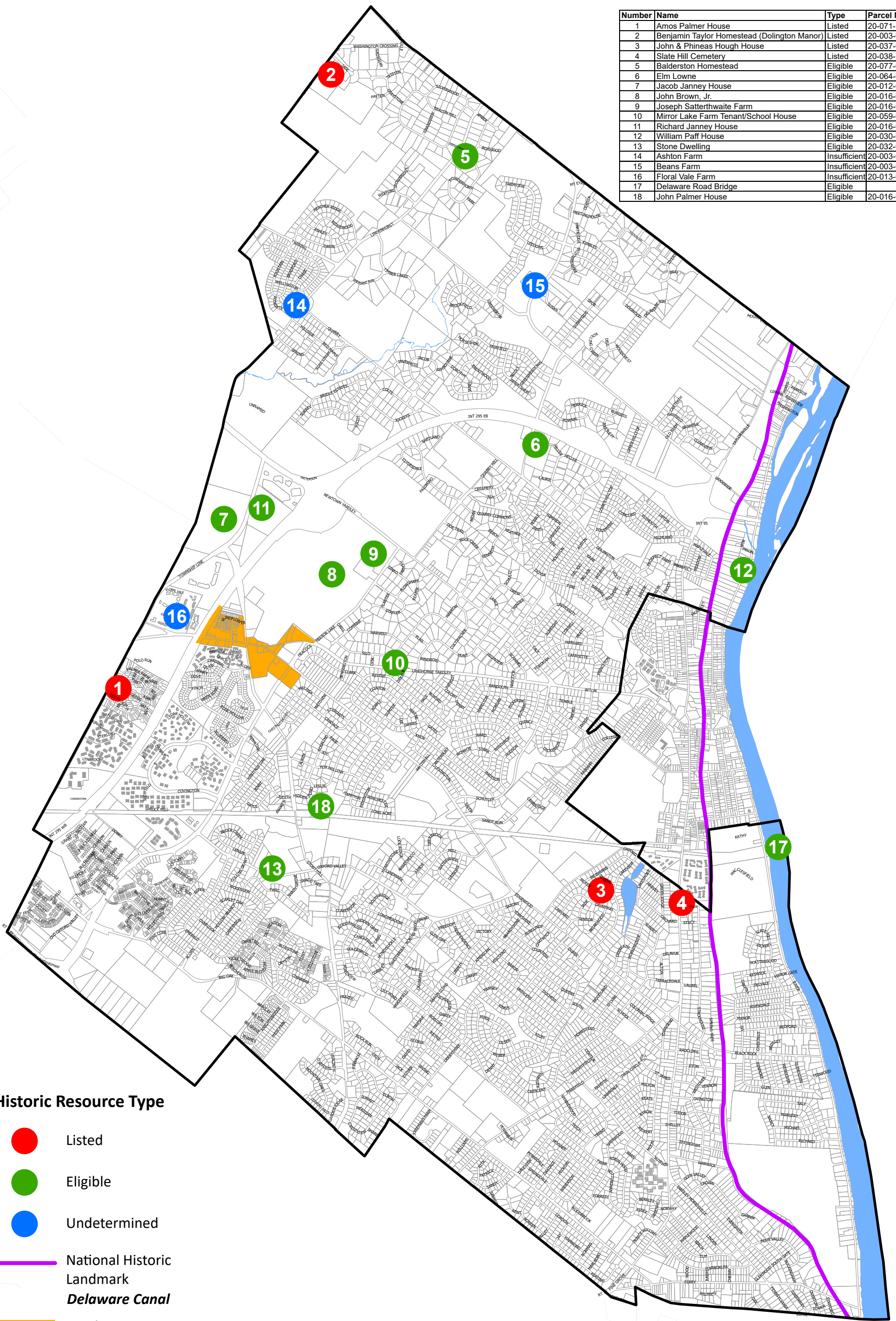
0 2,000 4,000 Feet

## Township of Lower Makefield Master Plan Update 2019

## Map 8 Walkway System



Number	Name	Type	Parcel Number
1	Amos Palmer House	Listed	20-071-140
2	Benjamin Taylor Homestead (Dolington Manor)	Listed	20-003-004-001
3	John & Phineas Hough House	Listed	20-037-092
4	Slate Hill Cemetery	Listed	20-038-121
5	Balderston Homestead	Eligible	20-077-069
6	Elm Lowne	Eligible	20-064-072
7	Jacob Janney House	Eligible	20-012-001
8	John Brown, Jr.	Eligible	20-016-049
9	Joseph Satterthwaite Farm	Eligible	20-016-046
10	Mirror Lake Farm Tenant/School House	Eligible	20-059-068
11	Richard Janney House	Eligible	20-016-040-001
12	William Paff House	Eligible	20-030-073
13	Stone Dwelling	Eligible	20-032-018
14	Ashton Farm	Insufficient	20-003-020
15	Beans Farm	Insufficient	20-003-026-001
16	Floral Vale Farm	Insufficient	20-013-005
17	Delaware Road Bridge	Eligible	
18	John Palmer House	Eligible	20-016-075

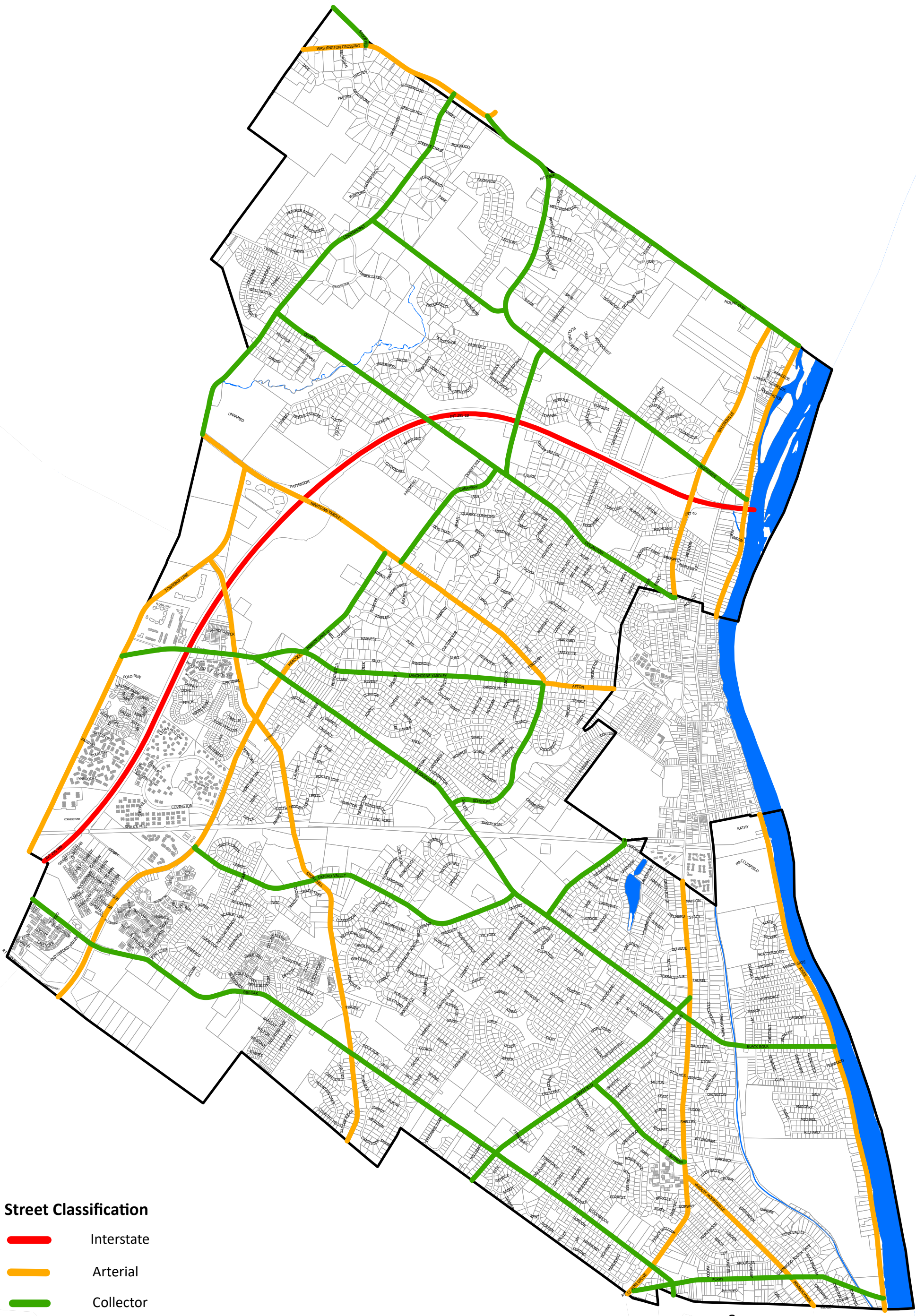


**Historic Resource Type**

- Listed
- Eligible
- Undetermined
- National Historic Landmark  
*Delaware Canal*
- Local Historic District  
*Edgewood Village*

Source:  
 Pennsylvania Historical & Museum  
 Commission, CRGIS, 2014

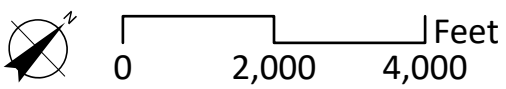




**Street Classification**

- Interstate
- Arterial
- Collector
- Local Roads

Source:  
Lower Makefield Township

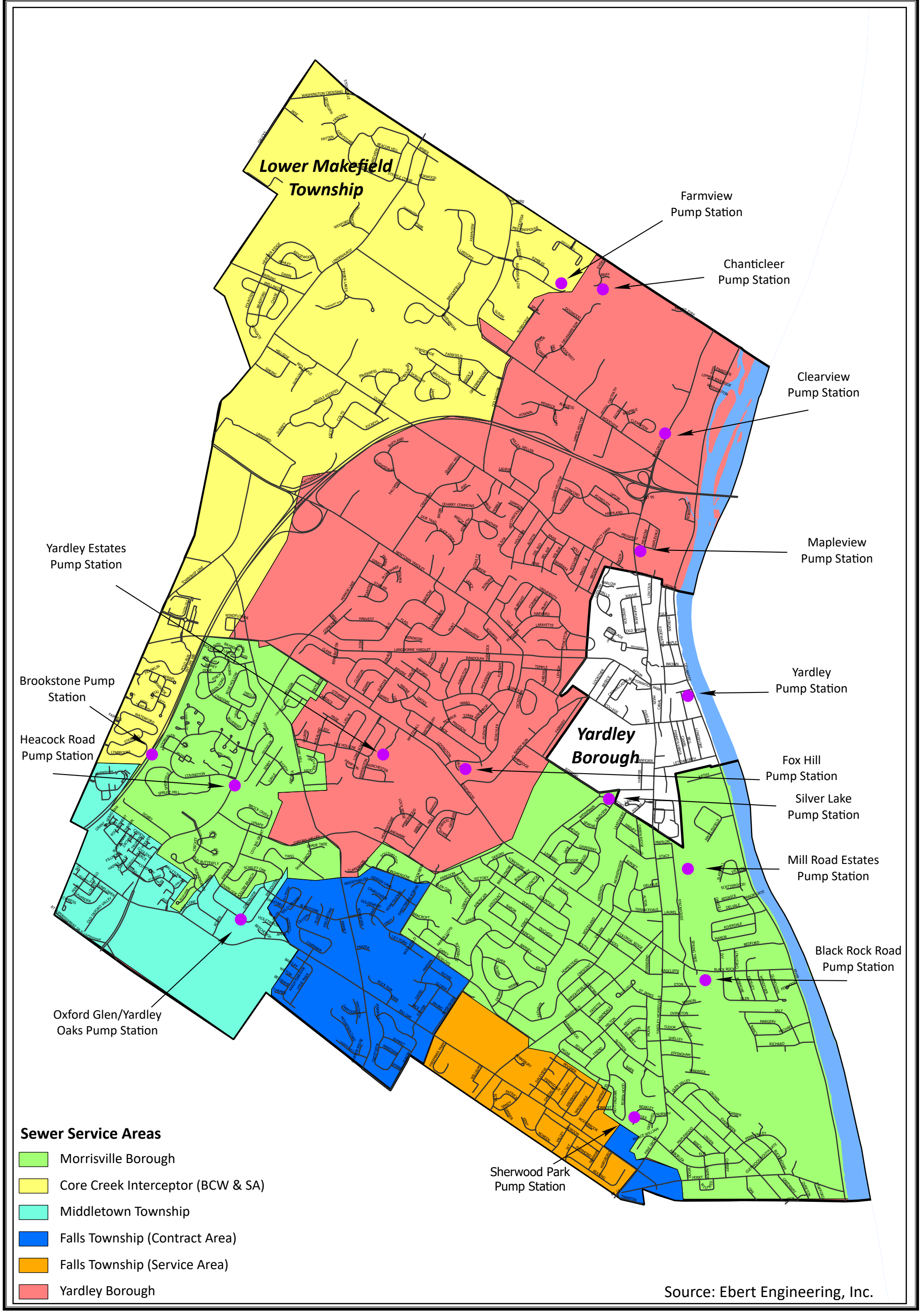


**Township of Lower Makefield  
Master Plan Update 2019**

**Map 10  
Street Classification**







**Sewer Service Areas**

- Morrisville Borough
- Core Creek Interceptor (BCW & SA)
- Middletown Township
- Falls Township (Contract Area)
- Falls Township (Service Area)
- Yardley Borough

Source: Ebert Engineering, Inc.

BCPC  
Bucks County Planning Commission

0 2,000 4,000 Feet

**Township of Lower Makefield  
Master Plan Update 2019**

**Map 11  
Sewer Service Areas**

