

Beavercreek Township Comprehensive Plan

**An Update to the
Beavercreek Township
Land Use Plan**

April 2012

Prepared by

**Beavercreek Township Zoning Commission
&
Regional Planning and Coordinating Commission of Greene County**

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Beavercreek Township Comprehensive Plan

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Beavercreek Township Comprehensive Plan

Chapter One: Introduction

Growth and change are by no means unique to Beavercreek Township. Like many townships located on the outskirts of a metropolitan area, change takes place to meet new demands. Yet change brings new conflicts between competing uses for the land and between interests of individual land users and the common good of the community.

Planning to make the best use of the land is not a new idea. Farmers plan season after season, deciding what to grow and where to grow it. Their decisions are based according to their needs, the needs of the market, knowledge of the land and current technology, and the availability of labor and capital. Similarly, individuals engage in planning every day, distributing limited resources such as time, money, and energy to different activities.

Government shares problems similar to those of individuals. Limited resources, have to be carefully allocated to provide the highest level of physical, social and economic return to the people of the community. As the size of the area, the number of people involved and the complexity of the problems increase, so does the need for information and methods of analysis and planning.

As recommended in *Perspectives 2020: A Future Land Use Plan for Greene County, Ohio*, Beavercreek Township has developed a detailed comprehensive plan for their community. This comprehensive plan is intended to establish a guideline for decision making, particularly for land use and development issues. It does not attempt to establish the future total build-out of Beavercreek Township. The primary purpose of the plan is to provide direction to guide the Township's zoning, and the County's development standards and capital improvement programs. It is expected that additional growth will occur beyond this plan's twenty (20) year horizon.

The purpose of the comprehensive plan is to provide a working guide or framework which can simultaneously relate to all the physical elements within Beavercreek Township and to devise a strategy of action to bring about various levels of stability and desired goals. A comprehensive plan cannot be limited to timid measures; its concepts must be bold and broad and sufficiently farsighted to measure up to the anticipated problems and situations of the years to come. The individual goals of the comprehensive plan may not become a reality for many years. During this period, new development should be oriented towards the realization of the ultimate identified plan.

Our Mission: Sustainability

“...an environment that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

As we work towards the future, we may witness a continuing trend reflected in increased development, population shifts and the subsequent pressures that will be placed on our infrastructure, schools, housing, police and fire protection, natural resources, and the environment. The Township also shares the impacts of growth with other local government jurisdictions.

On the one hand, we want to retain a good quality of life and the character of our land and all its resources as it was in the times of our grandparents. Yet, we know that in order to meet the needs of our residents, we must anticipate and plan for changes without compromising the ability of future generations to meet their needs. To be successful in meeting increasingly complex challenges from many directions, we must be proactive in our planning and make decisions that weigh not only short-term goals but reach out into the future and respond to a community that will change over time.

Up front, it is acknowledged that Beaver Creek Township's rural character and atmosphere has been a magnet in drawing more and more residents to our area. The beauty of the land and the aesthetics and ambiance associated with our communities are the beacons that have drawn people to the Township.

Change is not all bad. We have all been, at some time in the past, "newcomers." If we accept this fact, then we also understand that we brought the knowledge of our previous dwelling places, our experience, our beliefs and expectations with us. Our collective history can also be portrayed as a tapestry in which our heritage unfolds to encompass new challenges. We share with all Beaver Creek Township residents, old and new alike, a realization that we must work together in addressing new requirements in forging a quality of life that is shared by all. We must be persistent in protecting our most vital resources - clean water, healthy air, and rich landscape. We must work together in building a community infrastructure that can accommodate population growth and its associated demands. We must be proactive in anticipating the tensions placed on our infrastructure, schools, housing stock, police and fire protection, and natural resources. We must also be sensitive and aggressive in protecting our diversity.

History of Beavercreek Township Planning

In 1951, Beavercreek Township undertook the task of administering its own zoning responsibilities and adopted the Beavercreek Township Zoning Resolution, as provided for in Chapter 519 of the Ohio Revised Code. At that time, the Beavercreek Township Trustees appointed a Zoning Commission and a Board of Zoning Appeals. Members serving on these boards must reside in the unincorporated area of the Township.

The Township's first venture in planning took place in 1965, with "Development of the Region" A Comprehensive Plan for Beavercreek and Bath Townships, Greene County, Ohio. This plan was prepared by the Western Regional Planning Commission of Greene County, Ohio by Carroll V. Hill & Associates. This plan pointed out the areas of future physical development within the Bath and Beavercreek Township areas. It relates the various land use areas and public improvements such as highways and streets, sewage and other municipal facilities which are needed to provide an adequate level of service for the present and future residents of the Township.

In 1975, the Township developed the Beavercreek Township Goals, Objectives, Existing Conditions and Land Use Plan. This plan was prepared by the Beavercreek Township Zoning Commission and Burgess and Niple Limited Consulting Engineers and Planners. At the time this plan was developed, Beavercreek Township was identified with 16 different land use classifications: Agriculture & Reserve, Single Family Residential, Multi-Family Residential, Commercial, Commercial PUD, Industrial, Offices, Commercial Industrial Office, Industrial Office Park, Industrial Commercial, Public & Semi-Public, Open Space Conservation, Open Space Recreation, Major Park, Community Park, and Neighborhood Park. Each identified land use had a special purpose of its own and each had a relatively basic interrelationship with other land uses.

In 1978, Perspectives: A Future Land Use Plan for Greene County, Ohio; was developed by the Regional Planning and Coordinating Commission of Greene County. This was the first county wide Land Use Plan. The *Perspectives* plan attempted to coordinate local plans with the regional plan adopted by the Miami Valley Regional Planning Commission.

In 1983, the Beavercreek Township Zoning Commission and the Regional Planning and Coordinating Commission of Greene County prepared the Beavercreek Township Future Land Use Plan. This plan identified 12 different land use classifications:

- Agriculture
- Open Space, Conservation, Recreation
- Mineral Extraction
- Residential Estate

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Office/Light Industrial
- Offices
- General Industrial
- Public/Institutional

In 2002, the Beavercreek Township Land Use Plan was adopted. Its intent was to establish a basis for decision making, particularly for land use and development issues. It does not attempt to establish the future total build-out of Beavercreek Township. The primary purpose of the plan is to provide direction to guide the Township's zoning, and the County's development standards and capital improvement programs. It is expected that additional growth will occur beyond this plan's twenty (20) year horizon.

Perspectives 2020: A Future Land Use Plan for Greene County, Ohio, is based on the strong foundation provided by previous plans and studies. This plan is a guideline for growth management which sets forth desired types of physical growth within Greene County. It represents the first update of the county land use plan, which attempts to coordinate the planning efforts of all the various political jurisdictions within Greene County and presents a singular statement of how the county should develop.

Planning Influences

Over time, the urban edge of the Dayton suburbs have moved east across Montgomery County and into Greene County. Rapid growth in western Greene County has created concerns about traffic, adequacy of services, and loss of open space and community identity. Continuing east, citizens of the rural areas are concerned about the future of agriculture, land values, traffic, environmental degradation, and the sprawl of residential subdivisions and home sites. As Beavercreek Township moves into the future it will experience increased development pressures and the possible conversion of open areas and farmland to other uses.

The thrust of this plan is to retain Beavercreek Township's open space and rural identity, while entertaining residential densities within the Township which are made possible by the sanitary sewer and public water infrastructure provided by Greene County.

Beavercreek Township is changing. This change is due to a wide range of reasons and issues which reinforce the idea of cooperative planning between the Township, the County and other surrounding communities like the cities of

Beavercreek, Fairborn, Kettering, and Xenia. These adjacent communities have the most immediate influence on the Township, as well as the townships of Bath, Xenia, and Sugarcreek. Developmental policy changes and land availability within these jurisdictions can impact Beavercreek Township.

Beavercreek Township has distinct elements that have created a diversity of unique natural landscapes. The natural landscapes of the Beaver Creek Wetlands Corridor and the Little Miami State and National Scenic River provides natural habitat, which is accessible for the enjoyment of Township residents. The Creekside Trail and its associated greenway is a good example of how open space enhances the community image, increases opportunities for recreation, attracts visitors and encourages tourism. The multi-purpose trail also provides an alternative transportation route for pedestrians and bicyclists.

With this plan the Township is building the foundation for balanced and managed growth that will retain the unique character of Beavercreek Township and preserve its physical beauty and natural resources. The success of this plan depends on the support and cooperation of the surrounding communities, support of the Township’s residents and the future critical land use decisions that will be made.

Population

As with many communities that are adjacent to cities, Beavercreek Township has continued to grow. The population table shows the growth of Beavercreek Township and surrounding communities between 1980 and the 2010 Census.

<u>POPULATION</u>				
<u>Community</u>	<u>1980 Population</u>	<u>1990 Population</u>	<u>2000 Population</u>	<u>2010 Population</u>
Greene County	129,769	136,731	147,886	161,573
Bath Township	7,136	6,979	8,887	8,241
Beavercreek Township	1,775	1,910	3,063	5,762
Spring Valley Township	1,951	2,106	2,307	2,102
Sugarcreek Township	2,496	3,400	6,629	8,039
Xenia Township	7,318	7,633	6,117	6,537
City of Beavercreek	31,589	33,626	37,984	45,193
City of Fairborn	29,702	31,298	32,052	32,352
City of Xenia	24,653	24,664	24,164	25,719

Source: U.S. Census of Population

Beavercreek Township as a growth node continues to capture an ever increasing portion of the total county growth.

Lots Created and Housing Units

While the Census data provides a reliable estimate of population, local information such as lot creation data and building permit data can provide an even more accurate estimate of how change is occurring in Beavercreek Township. Information provided by the Regional Planning and Coordinating Commission of Greene County shows that the number of lots created has fluctuated over the years, ranging from one new lot created in 2009 that is 10 acres or less in size, to 208 lots in 2004. The number of single family dwelling units permitted each year from 1999 to 2010 is shown in the table below. This 12-year history shows that Beavercreek Township has averaged almost 90 single family dwelling units per year.

LOTS CREATED AND HOUSING PERMITS ISSUED PER YEAR

<u>Year</u>	<u>Lots Created Less than 10 acres *</u>	<u>Single Family Dwelling Permits Issued **</u>
1999	155	64
2000	84	76
2001	149	113
2002	70	111
2003	150	123
2004	208	131
2005	130	100
2006	118	94
2007	128	72
2008	33	53
2009	1	45
2010	46	58

* Source: Regional Planning and Coordinating Commission of Greene County

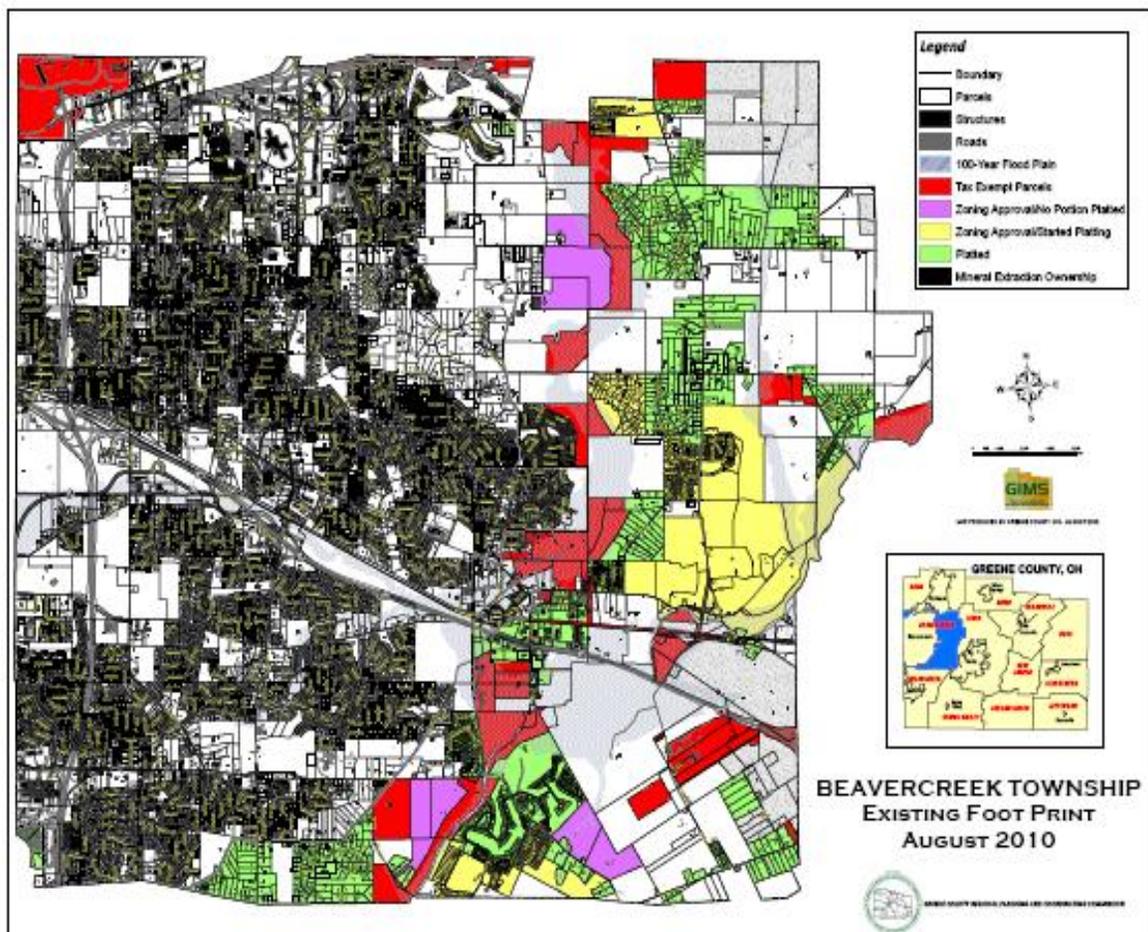
** Source: Greene County Building Department.

Land Demand

Based on the projection of population, an estimate was prepared of the developable land necessary to accommodate the projected level of growth for the planning period of this Comprehensive Plan (2010 to 2030). The total demand for land for new development is the result. This analysis should not be interpreted to mean that uses and acreages that exceed those projections cannot occur. Rather, the demand is a translation of the projections of future population trends into terms of land area.

The projected increase in population in the unincorporated area of Beaver Creek Township over the planning period is a total of approximately 1000 persons. Based on past development patterns, most of this increase will take place in areas of the Township that have already received legislative Planned Unit Development approval (The Brooks, The Estates at Country Club of the North, Indian Walk, Nathaniel's Grove, River Reserve, River West, Spring Meadows, Spring Ridge, Stonehill Village, Windemere, etc.).

The 1980 census reported the average household size of 2.88 persons in Greene County. In 1990 that average fell to 2.70 and in 2000 it was 2.54. Given the trend of falling household size, it is likely that the household size of closer to 2.40 can be expected by a point midway through the planning period. Based on existing average residential density, this results in a likely projected demand for 260.6 acres for residential development or 417 dwelling units.



Existing Footprint

The existing footprint of the community provides the Township decision makers and the developers with a starting point for roadways, public water, wastewater sources, and utilities. Other existing features and land uses such as schools, parks, shopping areas, places of employment, housing opportunities and places of worship contribute to our existing footprint. Land uses that already exist or have Planned Unit Developments legislatively approved will likely make up a great percentage of what is needed in the future.

Number of existing residential lots with structures
in the unincorporated area of the Township

As of Spring 2010:

1,754

Existing undeveloped lots available
with public water and/or public wastewater collection

As of Fall of 2010:

387

Legislatively approved Planned Unit Development
number of proposed lots

As of Fall of 2010:

3,150

Future development should complement existing land uses. It is important that new development does not negatively affect existing adjacent land uses and that the character of the community be carried throughout the new development.

Concept and Scope of the Comprehensive Plan

In a free society the quality of life for everyone is largely determined by decisions made by individuals. This is particularly true regarding the use of private land, where choices made by an individual affect not only them but also their neighbors and the community as a whole.

When new uses of land begin, they usually become a permanent part of the landscape and the local environment. New land uses, especially those that require high levels of community services, deserve community attention as they are being planned.

A comprehensive plan is important because it articulates the values and attitudes of the community as to how land should be used in the future. The goal of this plan is to promote and support community health, safety, and general well-being through balanced community development and sound resource management.

The comprehensive plan for the unincorporated portion of the Township is intended to communicate to residents, citizens, property owners, local officials and developers the types of development that should be considered when developing a certain parcel. The comprehensive plan should serve as a practical foundation for the various land use/development regulations that the Township Trustees and Zoning Commission use when they enact, modify, revise or amend the Zoning Resolution or other development regulations and policy documents. The comprehensive plan should be continually referred to in deciding upon development issues that will arise.

The comprehensive plan should not be viewed as a tool of implementation that presents an ideal picture of physical development at a specific date in the future. The development of the Township will occur as a gradual and incremental process, making it impossible to apply a set of principles that work in every situation throughout the planning period. The plan should be regarded as a guide to the future and a means to an end, not an end in itself.

Quality of life, whether individual or public, is the central basic goal of all our activities. Each choice we make, each goal we set, is made because we think it will improve our quality of life either immediately or in the future. It is the concept of people actively participating in the creation of place.

Plan Goals

The course of action that any community, organization, or governmental body pursues, and the values by which it exists, are in part determined by the goals that it adopts. A necessary task in any planning program is the process of establishing a set of goals that apply to the future. It must be emphasized, however, that planning is not merely the process of determining the most efficient way to achieve certain goals. Most importantly, it is the process of visualizing a better future and pursuing that vision as practical. Above all, the process is a rational one that must be utilized and reviewed on a continual basis.

Goals and Guiding Principles

As will be detailed throughout this plan, Beaver Creek Township has tremendous historic, natural and economic resources that provide defining characteristics for the community. Preserving these resources while supporting planned growth is of primary importance to residents.

Goal: Maintain and enhance a strong sense of community character and community life.

Guiding Principles:

- Maintain Beaver Creek Township's unique character
- Promote Beaver Creek Township's positive image as a desirable community in which to live, work and play
- Keep and encourage a strong physical sense of both neighborhood and community
- Families build healthy communities (preserve the family farm, protect the countryside rural home site lifestyle, and maintain residential homes)
- Preserve the rural atmosphere
- Promote Beaver Creek Township's distinct heritage and traditions
- Preserve the basic principles/ideas of the Township
- Provide adequate opportunities for youth

Goal: Preserve Beaver Creek Township's environmental resources.

Guiding Principles:

- Promote the preservation and protection of trees, woodlands and important community open spaces, natural resources and wildlife
- Preserve and maintain Beaver Creek Township's water quality and resources by protecting natural stream and river corridors, floodplains, wetlands, aquifer recharge areas, and groundwater resources

- Enhance the Little Miami River’s qualities that make it a state and national scenic river
- Preserve, protect and enhance open space and the Township’s natural resources

Goal: Manage Beavercreek Township’s growth and development to maintain and enhance Beavercreek Township’s quality of life.

Guiding Principles:

- Place compatible land uses next to each other
- Preserve and maintain Beavercreek Township’s neighborhoods and open spaces
- Encourage and provide for a balance of sustainable mixed-use development that provides a variety of housing types, densities and nonresidential uses
- Promote appropriate infill development to limit the growth in the rural areas of the Township
- Encourage balanced growth that does not outgrow the infrastructure that supports development
- Encourage development at a pedestrian scale that integrates neighborhood amenities and provides open space, multi-purpose trails, greenways and community services

Goal: Provide adequate, safe, supportive and comprehensive facilities, services and infrastructure that encourage sustainability and stewardship.

Guiding Principles:

- Proactively plan for adequate recreational sites, sports and cultural facilities to provide and sustain an adequate level of service
- Develop community open spaces and greenways to adequately serve Beavercreek Township’s existing and growing population
- Maintain and improve the current high level of public safety and emergency services
- Expand and maintain Beavercreek Township’s utility infrastructure to adequately serve future growth and development
- Implementation of a well thought out transportation improvement and maintenance program
- Expand the multi-purpose trails north and south and connect them to the existing multipurpose trails
- Enhance the ability to safely cross the street and ride a bike to school, etc.
- Manage storm water runoff on a watershed/sub-water shed basis, make developers responsible for mitigation and encourage low impact principles
- Maintain the vital, well-supported regional airport

Goal: Support balanced, appropriate economic development.

Guiding Principles:

- Encourage high quality, “clean and green” businesses and industry to locate and expand in Beaver Creek Township
- Promote the balanced growth of residential/non-residential land uses with respect to the economic vitality of the community

Goal: Promote and sustain a progressive and positive planning process for Beaver Creek Township.

Guiding Principles:

- Effectively manage long-term growth through a comprehensive and proactive planning process
- Master plan development under the Planned Unit Development concept;
- Actively participate in regional planning efforts
- Support effective zoning, land use, and development regulations and enforcement
- Maintain and enhance the quality of life of Township residents and be fundamentally fair to all our citizens with respect to their individual rights

Goal: Inclusive, responsive, forward-thinking and creative community leadership that shares resources and practices both local and regional collaboration.

Guiding Principles:

- Encourage decision makers to protect the investments the citizens have in their properties
- Create a plan that enables the residents to control the Township’s destiny
- Create and enforce flexible policy documents that respect individual property owners’ rights
- Encourage new and broader partnerships
- Support inclusive citizen involvement and information sharing

These goals are desired outcomes expressed in simple terms together with the guiding principles that make up the community’s values and aspirations around which the policies, design concepts, and criteria for future growth have been designed. The following chapters present the new growth scenarios, Land Use Plan Maps, and recommendations for future land use implementation.

Chapter Two: Planning Foundation

Introduction

Many of the things that we value most—family, a safe and pleasant living environment, and the opportunity for personal growth—are guiding factors for making decisions in our lives. They can also be linked to the strengths of our communities. We tend to overlook the fact that many of the things that make life enjoyable, and that we share as a community, are the same things that make our communities an attractive place to live, work, and play.

To accomplish the goals of the comprehensive plan established by Beaver Creek Township, each factor and component of the plan needs to be advanced together because of their interwoven relationships. To positively impact the quality of our community in a balanced way, all issues and concerns need to progress in unison with the others.

The future land use plan of this document is intended to be general in nature. The graphic plan (maps) are simple drawings showing the location of natural and man-made features throughout the Township. The comprehensive plan envisions the Township's land use into the future and, more importantly, it provides a framework of guidelines to effectively manage growth and development. The information from previous basic studies, plans, reports and inventories, along with the goals, objectives, guiding principles, policies for future development, and location requirements for various types of land uses combine into a workable plan.

Land Use Compatibility/Suitability Analysis

The principal question facing those responsible for developmental decisions is clearly, "How shall we organize for sustainable development to control and coordinate the process of community growth in order to protect what we value most in our community?" We must consider environmental, cultural and aesthetic characteristics of land use while meeting the essential needs of our changing population for new housing, roads, employment, open space, and consumer opportunities.

Land itself is a resource that must be used with wisdom. It is therefore paramount to understand the interdependence between the environment and economic development. Through this understanding we strive to achieve sustainable development that meets the needs of the present without compromising the needs of future generations. Land use compatibility and suitability analysis is a tool used to understand the relationship between the natural features of the land and the suitability of development options.

Land capability/suitability analysis is a way of evaluating natural feature (resource) information along with man-made features to determine an area's tolerance for various land uses. Resource data such as soil, topography, ground cover, and floodplain are collected and their interrelationships assessed to determine the type of development for which an area is best suited. These features are then integrated with man-made features such as public utilities, transportation facilities, and adjacent land use compatibility to identify the most suitable land use alternatives. The guiding principle behind land use capability/suitability analysis is that some areas are better suited for development than others because of variations in the natural as well as man-made environment.

As part of this analysis, the following natural and man-made features were inventoried:

Natural Features

The success of any plan requires that the existing natural features of the site be considered. As such, an understanding of the existing natural features of the Township will provide direction in the selection of land use alternatives.

Hydrology

Hydrology is the science that deals with the waters of the earth. The hydrology of Beavercreek Township includes rainfall, runoff, storage, and the movement of the water through its landscape and ground. Areas of special concern include: drainage basins, the Little Miami River, floodplains, wetlands, and aquifers.

Scenic River

The Ohio Scenic River Program focuses on preserving natural stream systems for the benefit of present and future generations. The designation of the Little Miami River as Ohio's first Scenic River (1969) and its recognition as a National Scenic River (1973), serves to emphasize the need to act responsibly to protect our natural environment for the future.

It is in everyone's best interest to protect the Little Miami Scenic River against development that could adversely affect its National and State designation as a "Scenic River." The Township will continue to protect the lands adjacent to the river through planned land use and zoning decisions.

Drainage

Beavercreek Township is located within the Little Miami River drainage basin (Hydrologic Unit 05090202). A drainage basin is the total land surface area occupied by a network of rivers and streams and their adjacent slopes. Within Beavercreek Township the Little Miami River Drainage Basin is divided into three (3) sub-basins or watersheds. Each watershed within the Township is typically named for its receiving body of water, Beaver Creek (Big and Little), Ludlow Creek, and Ripple Road Brook.

Floodplains

A floodplain is an area of low-lying ground on either side of a river, stream, pond, lake or other water body that is subject to periodic inundation by flooding. Floodplains are the natural storage areas for water overflow.

The preservation and maintenance of floodplains and associated water and land ecosystems in their natural condition represent important functions that provide both opportunities and limitations for certain uses and activities. It is the intent of the Township to protect its citizens and minimize public and private property damage by controlling development that will, when acting alone or in combination with other developments, cause flood losses and create additional burden to public services, public infrastructure and other utilities, and to the health and safety services.

All water bodies are dynamic systems that undergo changes as a result of precipitation. Flooding, erosion and sedimentation are parts of the physical and biological processes of the floodplain. Flooding is a natural process that is valuable to ecosystems. It serves a beneficial function by slowing the velocity of the water flow and increases soil fertility. The floodplain retains the water until it can be released downstream, evaporated into the atmosphere or absorbed by the ground. Flooding becomes especially hazardous if development is allowed to occur within the floodplain.

While most categories of floodplain management strategies are oriented towards dealing with existing problems, the focus in this plan is to ensure that future development does not increase flood damages and that the storage capacity of the floodplain system is maintained.

Wetlands

Wetlands are a sensitive environmental resource, integral to the hydrologic cycle. Wetlands are ecosystems periodically inundated by water. The 1997 Miami Valley Wetlands Inventory identified 536.3 acres of inventoried wetlands in Beavercreek Township.

Wetlands provide a variety of valuable services. The preservation and maintenance of wetlands in their undisturbed natural condition promotes water purification and aeration, sedimentation control, floodwater storage, and

public and private water supply enhancement. They are also home to a variety of wildlife species and may serve as recharge areas for the groundwater system.

The preservation and maintenance of the Beaver Creek Wetlands Corridor and its associated water and land ecosystems represent important natural functions that provide both opportunities and limitations for certain uses and activities.

The Beaver Creek Wetlands occur along a narrow corridor of land at the base of the Beaver Creek valley. The wetland corridor is comprised of a group of natural and restored wetland habitats that are found along the paths of the Beaver Creek and Little Beaver Creek in Bath and Beaver Creek Townships. Most of the habitats are contiguous to one another and encompass nearly 1,700 acres. The northern most portion containing the Southdown Reserve is in the City of Fairborn immediately south of State Route 235 and west of Interstate 675. The southern terminus is located at the confluence of Beaver Creek with the Little Miami River and is owned by Little Miami, Inc. An east-west portion owned by the Greene County Park District extends west from Beaver Creek along Little Beaver Creek. Other owners currently providing protection include the Division of Wildlife, Ohio Department of Natural Resources, the cities of Fairborn and Beaver Creek, Beaver Creek Township Park Board, Beaver Creek Township Board of Trustees, Greene County Board of Commissioners, and the Beaver Creek Wetlands Association. It is the intent of Beaver Creek Township to protect the Beaver Creek Wetlands Corridor for the benefit of present and future generations.

Aquifers/Groundwater

Groundwater aquifers are zones below the earth's surface that contain water in the voids present in soil and rock. Most groundwater aquifers are recharged from surface waters that percolate down from the surface or from surface bodies of water such as rivers, lakes, ponds, wetlands, streams, etc.

Groundwater resources in the Beaver Creek area are vital to the sustainability of the area because of its use as the primary source for drinking water. The ground water is retrieved from the Little Miami River Buried Valley Aquifer System, which was designated by the United States Environmental Protection Agency (USEPA) as a sole-source aquifer in 1988. The aquifer system consists of geologic materials that were transported to the area by glaciers thousands of years ago. The deposits range in thickness from 0 to 450 feet and overlie bedrock valleys carved by the glaciers. The thickest and coarser-grained deposits are generally located near the center of the bedrock valleys, located beneath the Little Miami River, Beaver Creek, Little Beaver Creek, and Ludlow Creek. Within these valleys, the deposits (sand and gravel) are segregated into upper and lower aquifer, separated by finer-grained material or 'confining units.' Public water supply wells in the area generally draw water from the lower aquifer due to its capacity to produce large quantities of water.

Public water for the City of Beavercreek and Beavercreek Township is supplied by Greene County's Northwest Regional Water (NWR) Treatment and Supply system. In 1999, the Ohio EPA endorsed the one and five (1 & 5) year time-of-travels as designated wellhead protection areas for the county. The county is currently working on a wellhead protection area management plan for the approved protection areas.

Soils

Whether we are building roads and houses, reforesting the land or using it as a pasture, success or failure depends in part upon the soils on which they are located. Furthermore, knowledge of an area's soil characteristics is vital information for any land use planning effort. The suitability of land to support development is directly related to soil characteristics. Soils are the basic building block upon which development takes place. Each type of soil possesses specific characteristics that may place constraints on development alternatives.

There are seven (7) general soil groups found in Beavercreek Township, as identified by the Soil Survey of Greene County. For limitations and a more detailed description, please refer to the Soil Survey of Greene County, United States Department of Agriculture, Soil Conservation Service, 1978. The general soil groups include:

Miamian-Celina Association: Gently sloping to steep, well-drained and moderately well-drained soils that formed in loam glacial till on uplands.

Miamiam-Eldean-Casco Association: Gradually sloping to very steep, well-drained soils formed in loam glacial till and sand and gravel on uplands.

Milton-Miamian Association: Nearly level to very steep, well-drained soils formed in loam glacial till overlying limestone bedrock, and well-drained soils that formed in loam glacial till on uplands.

Miamian-Russell-Xenia Association: Nearly level to sloping, well-drained and moderately well-drained soils that formed in a thin layer of silty material and the underlying loam glacial till on uplands.

Ockley-Rush Association: Mainly nearly level to gently sloping, well-drained soil that formed in loamy or silty material in deep to sand and gravel areas on terraces.

Eldean-Ockley-Wea Association: Mainly nearly level to gently sloping, well-drained soils that formed in loamy or silty material in moderately deep to sand and gravel areas on terraces.

Sloan-Ross-Algiers Association: Level to nearly level, very poorly-drained to well-drained soils that formed in loamy, stream-deposited material in floodplains.

Topography

Topography is the “lay of the land,” the degree and variation of slopes which characterize the site. A varied topography (a combination of steep and moderately and gently sloping land) usually makes for an attractive site and is typical of Beavercreek Township. At the same time, the density and design of topography can limit the degree to which new development may occur with minimal environmental damage.

Development is strongly affected by the slope of the land. The costs of adjusting structural or foundation systems, providing measures to prevent erosion, location of septic systems, and constructing roads increase as the steepness of the slope increases. In addition, there are often costs associated with developing the more attractive areas of a site, as opposed to leaving them open for recreational use or merely to look at. Topographic features, including ridges, hilltops, and valleys, contribute to the overall form of a site. Refraining from construction in such areas can be financially beneficial and contribute to preserving the marketability of the overall area.

Topography and slope can be an amenity of development by providing variation in terrain, and maximizing solar orientation. A change in the ground elevation can allow for the development of walk-out basement units and permit separate development types or uses. Slopes that are too steep for development can be used to add character to open space through strategic placement of trails and overlooks.

Vegetation

The vegetation of Beavercreek before it was settled consisted mostly of hardwood forests. Other lands were in prairie grass and fresh water wetlands. The climate, soils, and geographic features of the area influenced this vegetation pattern. At the present time woodland vegetation is generally located on small lots and along the Township’s rivers and streams. These small lots are in areas where the soils are least suited for agriculture. When the trees were first cleared in Beavercreek Township, they were cleared for the distinct purpose of making room for agricultural crops. A majority of the Township’s vegetative cover is agricultural in nature, including croplands and pastures. Today, much of this agricultural land has become lawns, landscaped islands, and housing.

Wooded lots, hedgerows, and mature trees add beauty and variety to a development by creating a sense of closure and privacy, providing shade and cooling, serving as windbreaks, softening the visual impacts of manmade elements, providing for erosion control, and creating habitat for wildlife. Existing hedgerows can be used to separate different density residential development or different uses within the study area.

The presence of environmentally sensitive lands or natural features can be transformed into community assets (open space, wildlife habitat and natural functioning). They provide the developer with an opportunity to make a statement on environmental protection. The protection of natural features can provide the developer with greater citizen support while adding value to the home sites.

Man-Made Features

Man-made features of the Township are as important as the natural features. They provide the developer with a starting point for roadways, public water and sewer sources, and utilities. Other important features in a development could include proximity to schools, parks, shopping, employment, recreational opportunities, and the compatibility of adjacent use.

Cities

The cities that are adjacent to Beaver Creek Township (Beaver Creek, Fairborn, Kettering, Riverside, and Xenia) have the most influence on the Township. This influence comes in the form of possible annexation. Annexation laws are governed by chapter 709 of the Ohio Revised Code.

Residential Lots

Residential land uses are the second largest land use in Beaver Creek Township after agriculture. The dominant housing type in the unincorporated areas is a single family dwelling unit.

In Beaver Creek Township some development has occurred in the form of rural residential lots scattered sporadically over the Township along existing roads where public water and/or wastewater collection is not available. Within the Township approximately 2,705 acres have been absorbed between 1976 and 2008. Of the 2,705 acres absorbed for residential use, 79.8% (2160 acres) were created as minor subdivisions or survey records and are classified as rural residential lots.

Farmland

Based upon productive soil, adequate water supplies, parcel size, parcels enrolled in the Current Agricultural Use Value (CAUV) program, and contiguous plots of land devoid of land use conflicts, farmland is an integral part of Beaver Creek Township's landscape and natural resource base. It comprises approximately 44 percent of the unincorporated area of the Township in 2010.

Within Beaver Creek Township more and more farmland is being converted to non-farm uses. It is important for us to remember that past and present land use decisions greatly affect future generations. While farming may not be a

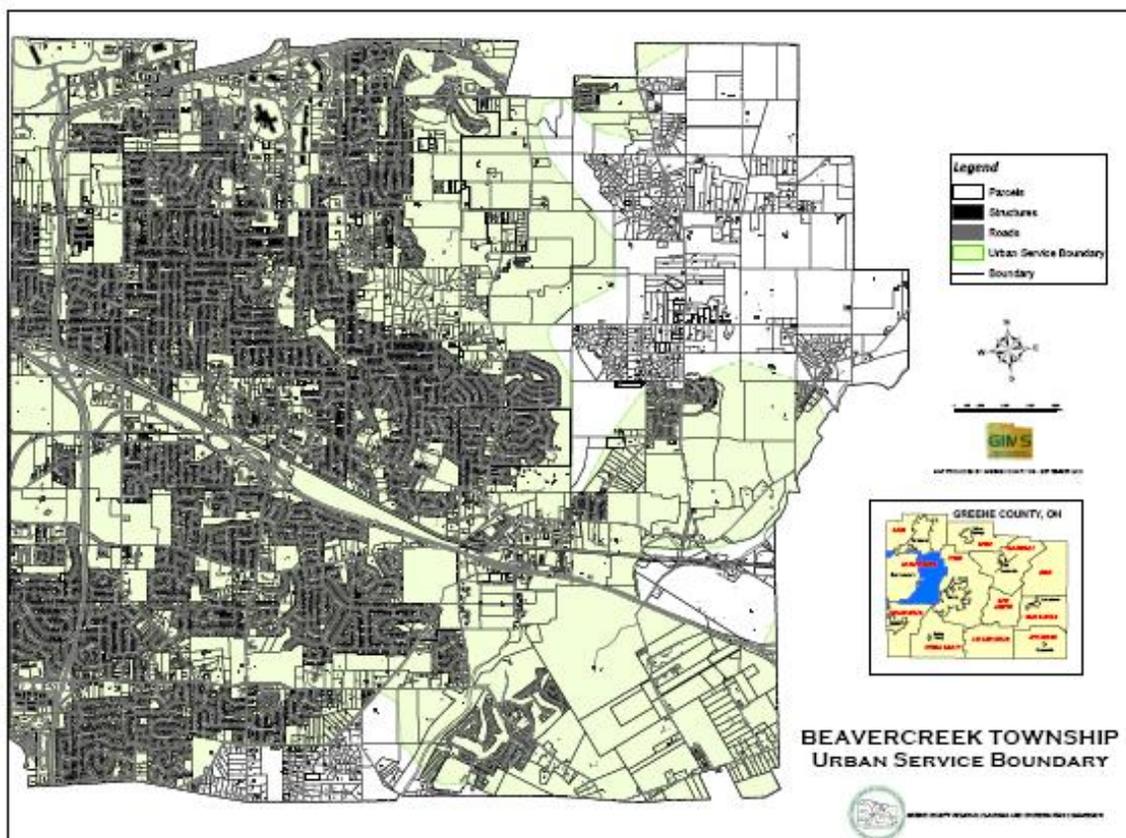
long term land use within the Township, provisions for garden plots or community gardens should be examined as a viable alternative to farming. Development decisions involving farmland should also address stewardship and sustainability to ensure its viability for future generations.

Infrastructure

Urban Service Boundaries

By definition, urban service boundaries are the line(s) on the Land Use Map that are used to mark the desired separation of urbanized land from rural land and within which urban growth should be contained for a period of time as specified by the plan. Urban service boundaries are based on population forecasts and include areas and densities sufficient to permit the urban growth that is projected to occur for a specific period. They also delineate the area in which services are now available or may be provided physically and economically within the planning period. When determining the urban service boundaries it is important to keep in mind that all areas neither can nor should receive urban services because of physical and economic limitation or social desires. Utility extensions should occur within the urban service areas, directing development to areas of the Township that are capable of handling the pressures associated with new development.

Sound planning principles require that the urban service boundaries be based on urban service capability and the potential carrying capacity of the land.



Facility Planning Area

Facility Planning Areas (FPA) are discrete areas of land for which wastewater treatment services will be planned and operated. An FPA need not adhere to any particular jurisdictional boundary, though they are typically associated with, and often extend beyond, a municipality. Most facility planning areas were created following topographic lines of slope, since most sewers are gravity sewers. The Miami Valley Regional Planning Commission maintains the Facility Planning Areas within the five Ohio Counties under its designation.

Beavercreek Township is under the influence of three FPA's: Beavercreek, Sugarcreek, and Xenia. For two of the three facility planning areas Greene County is the Designated Management Agency (DMA) (Beavercreek, Sugarcreek) while the City of Xenia is the DMA for the Xenia FPA.

Urban Services (Public Water and Wastewater Collection available)

Within Beavercreek Township, public water and wastewater collection is provided by the Greene County Department of Sanitary Engineering. For a more comprehensive discussion of Urban Services, Utility Extension, and Growth Management see *Perspectives 2020: A Future Land Use Plan for Greene County.*

As we have seen in the development of our community, there are many factors that influence where a community should encourage new development. Those same factors should influence where it builds, encourages, or permits the construction of new infrastructure. Where development takes place and when it happens are critical issues to a community. The ability to provide wastewater collection and potable water is the most important component in determining an area's ability to support growth. The provision for effective treatment and disposal of sewage generated and an adequate potable water supply is necessary to maintain a healthful environment as the community grows.

Maintaining public health, safety, and welfare is the core doctrine which drives the need for governments to set standards and to develop criteria for water supplies and wastewater collection systems. The purpose of these standards is to enable community growth without exceeding the land's and the water and/or wastewater system's capability to healthfully and safely support an area and its future growth. The general public welfare objectives are addressed in public water supply and wastewater regulations applied through federal, state, and local authorities. This involvement at all government levels indicates the importance society has placed upon wastewater disposal and water supply systems.

Wastewater Collection Systems

Greene County Facilities that are located in or service Beaver Creek Township include:

- The Beaver Creek Wastewater Treatment Plant, located on Factory Road - this facility serves Beaver Creek City and portions of Beaver Creek Township
- The Greene County, Sugar Creek Regional Wastewater Treatment Plant also serves portions of Beaver Creek Township and the City of Beaver Creek

Water Supply Systems

Beaver Creek Township is blessed with an extensive aquifer that provides the citizens of the community with a dependable source of potable water. However, this supply is not unlimited. It is essential that all citizens conserve this precious resource and that any negative impact to our groundwater supply be mitigated.

Private Sewage Treatment Systems and Private Water Systems Protection and Operation

Within the unincorporated areas of Greene County where public water and wastewater collection systems do not occur, private sewage treatment systems and private water systems protection and operations are governed by the rules and regulations of the Greene County Combined Health District, Environmental Health Division. For private sewage treatment systems, the Environmental Health Division designs or approves submitted design plans for new or proposed sewage treatment systems. Their staff will work with homeowners that need to alter or repair existing sewage treatment systems that are not working properly. The Environmental Health Division of the Greene County Combined Health District also helps residents with private wells and other types of private water systems to ensure safe water for use by residents not using public water systems.

Transportation Networks

Since automobiles became commonplace, thoroughfares have been the unifying force in the layout of subdivisions and other developments. Existing streets provide a starting point for new streets. When developing a roadway layout, it is important to keep in mind all circulation and movement systems. Typically, the street layout determines the physical structure of the development and the location of individual lots and/or building sites.

Everyone benefits from street improvements that are functional, durable, and cost-effective. When streets are constructed with the community in mind, they provide a functional network to transport people and goods from one location to another. In some cases the carrying capacity of the roadway may be a limiting factor to potential development.

Traffic patterns in Beavercreek Township have not changed much over the years. Rural roadways provide access to farm fields, open space, home sites, and the surrounding communities. The maintenance and improvements of local roadways are the responsibility of the Township, however, Greene County is responsible for maintaining and improving county roads, which includes most of the connector and arterial roads that cross the Township. Ohio Department of Transportation (ODOT) is responsible for state routes such as U.S. 35 and I-675.

Planned Roadway Improvements

The Miami Valley Regional Planning Commission (MVRPC) develops and maintains a transportation plan for Greene, Miami and Montgomery Counties and part of Warren County. The current plan identifies projects in Beavercreek Township. These projects may include, but are not limited to:

- U.S. 35 - Eliminate the existing at grade intersections at Shakertown Road, Factory Road, Alpha Road, Orchard Lane, and Trebein/Valley Road and replace them with full access interchanges at Factory Road and Trebein/Valley Road
- New Germany-Trebein Road - Widen from 2 to 3 lanes from Golf Club Drive to Trebein Road
- Trebein Road - Widen from 2 to 3 lanes from State Route 235 to U.S 35
- Factory Road Relocation - Widen from 2 to 3 lanes from Dayton-Xenia Road to U.S. 35 and relocate to intersect with Beaver Valley Road at Dayton-Xenia Road

Access

Access is defined as any connection to a road or street which permits passage to or from the road or street by vehicles, equipment, cars, trucks, buses, motorcycles, bicycles, pedestrians, or horses or other animals, for the purpose of crossing or entering roads.

The roadways within Beavercreek Township constitute an integrated network of roadways interconnecting all areas of the community for the safe and efficient movement of people and goods. This transportation network represents an irreplaceable asset essential to the public health, safety and general welfare. Beavercreek Township and Greene County have an obligation to preserve and maintain this system, to protect the public's investment in the system, and to ensure its continued use in meeting local transportation needs.

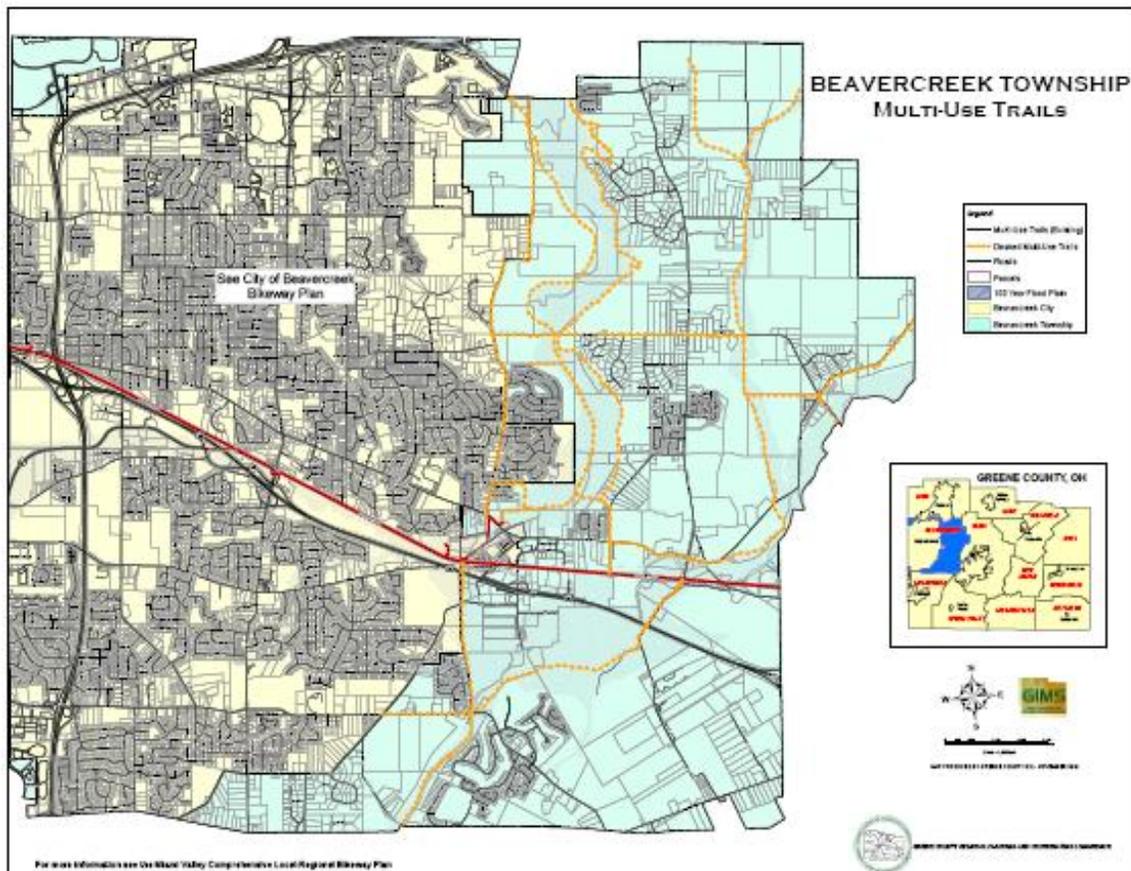
Access management and sound engineering standards that reduce roadway congestion, minimize traffic delay, improve traffic flow, preserve capacity, and reduce conflicts are key to the development, design, and operation of a roadway. Responsible roadway design planning that takes into consideration intended traffic function can preclude future public funds expenditures to correct design oversights.

Access onto roadways must be done in ways to protect the public health and safety, preserve the operational and functional integrity of the roadway system, promote the safe and efficient movement of people and goods, and provide reasonable ingress and egress to properties along those roads.

Multi-Purpose Trails

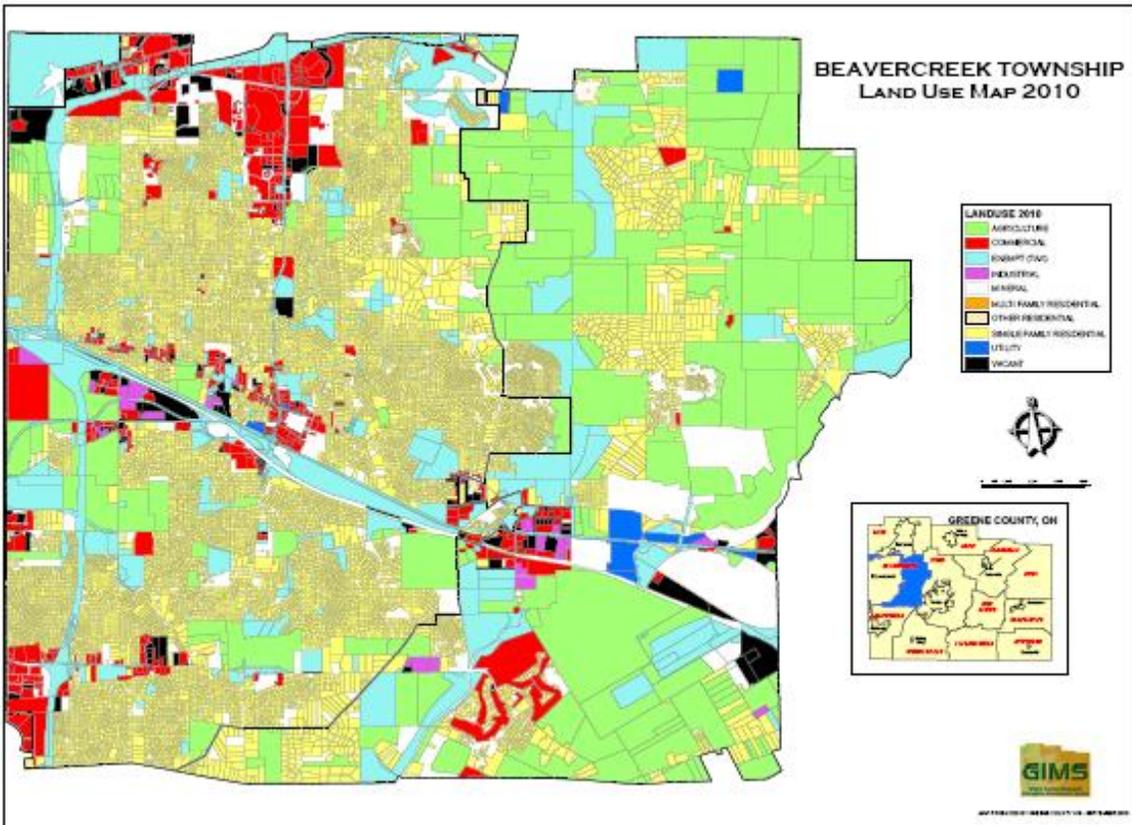
Also included as a part of the transportation network are sidewalks and multi-purpose trails for pedestrians and bicyclists. Just like with roadways, there are multiple agencies involved with the planning, improvements, operation and maintenance of sidewalks and multi-purpose trails, with only limited authority given to the Township. As with the roadway improvements, MVRPC has a long range plan for expanding bikeways and pedestrian projects.

The Creekside Trail runs east/west through Beaver Creek Township. This is a good start to the idea that places are connected and accessible throughout the Township to create better opportunities to walk and bike. Destinations within the Township and throughout the area should be safely and attractively connected. The general development patterns within the Township promote the idea of connectivity and should be reinforced in future developments.

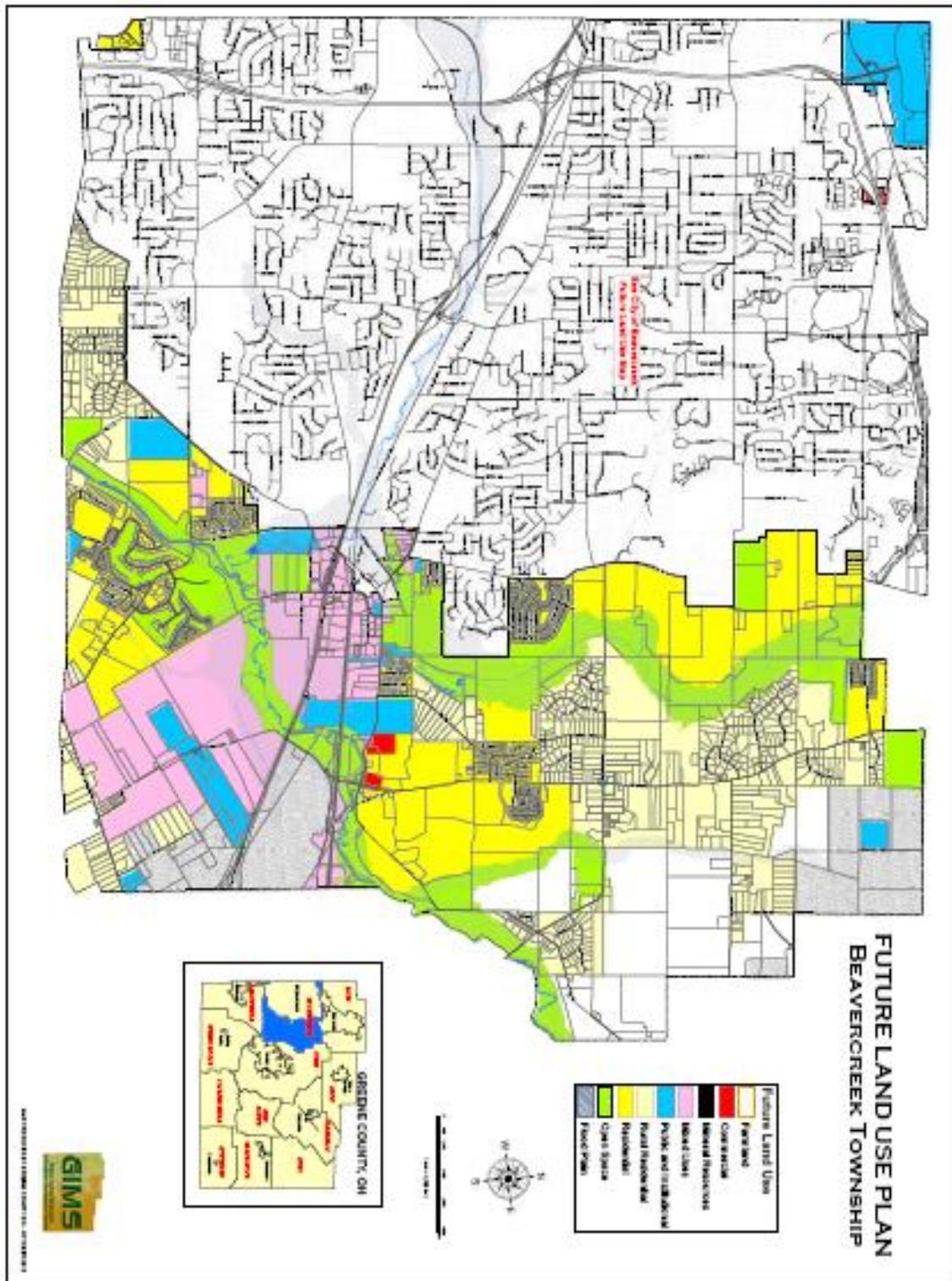


Existing Land Uses

The developed areas of Beaver Creek Township have come about as a result of its location on the outskirts of the Dayton metropolitan area. Substantial investments have been made in the transportation network, public water and sanitary sewer improvements, schools, and other improvements based upon past needs and desires. To ignore these investments and the existing well-established patterns would not be practical or fiscally responsible. How and what future land uses are designated and that interrelationship with existing land uses is important. Past concerns can be prevented from recurring through the application of sound planning practices.



The existing adjacent land uses around a site can set general guidelines for what should be developed in a particular site. It is important that new development should complement existing adjacent uses and that the character of the community be carried throughout the new development.



(Full-size maps available on file in the Zoning Office.)

Chapter Three:

Beavercreek Township Future Vision

Township Vision

Beavercreek Township has a unique countryside character - a blending of rural residential and residential developments, commercial, industrial, mineral extraction, open space, and farmland. It is a transition area from the more intensely developed City of Beavercreek to the west and the farms and villages located in the eastern portion of the county. As such, Beavercreek Township represents a microcosm of Greene County itself, bordering on the Dayton metropolitan area to the west and an agricultural basin to the east.

Open space is a prominent feature of the Township. The floodplains of the Little Miami State, National Scenic River, Beaver Creek, and the Little Beaver Creek account for a majority of the open space. The public and private open space within the Township provides environmental protection, recreational opportunities, visual beauty, educational possibilities, and countless other benefits. Agriculture is also a significant land use with approximately 60 percent of the Township being zoned for agriculture.

Over the years, there has been a surge of residential Planned Unit Developments (PUDs) where both public water and wastewater collection are available. These single family residential developments adjoin similar density developments within the Township or are adjacent to the cities of Beavercreek or Fairborn. Another significant residential type is the countryside rural home sites, with single-family dwellings on acreage tracts along existing roadways. Countryside rural home sites provide a spacious rural living environment with secondary agricultural uses.

The comprehensive plan recognizes that it is critical to manage growth within the Township while protecting both the man-made and natural environment. To accomplish this task, the Township's growth management vision is to further the welfare of the people of Beavercreek Township by creating an increasingly more healthful, convenient, efficient, sustainable, and attractive community environment in which to live, work and recreate. This plan provides guidelines to help with the orderly and efficient conversion of land to appropriate uses within the Township in order to protect environmental, energy, economic and social resources, and to prepare for the orderly provision of public facilities and services to accommodate and serve existing and future residents.

As the Township develops, it will be important to coordinate transportation planning with the county and surrounding jurisdictions' land use or comprehensive plans. New developments should plan for pedestrian and bicycle

friendly trails. Balancing the need for additional transportation capacity with land use will help to maintain the character of the Township.

The residents and elected officials of Beaver Creek Township must wisely manage its growth. The future is not set in stone. This plan will help shape the future development patterns of the unincorporated areas of the Township. More specifically, it is intended to reflect five (5) factors that will guide future decision-making:

- The need to conserve and enhance sensitive biological resources and rural lands
- The need to create places that contribute to the community's identity and vitality
- The need to protect and utilize public investment in infrastructure
- The need to balance land use with the availability of utilities and services
- The need to ensure places are connected and accessible throughout the Township by sidewalks and/or multi-purpose trails

Land Use Location Requirements

The principle question facing those responsible for land use decisions is how should we organize for sustainable development in order to control and coordinate the process in a way that protects what we value most in our community. We must consider environmental, cultural and aesthetic characteristics of the land while meeting the essential needs of our changing population for new housing, roads, shopping centers, businesses, parks, and industrial facilities.

Land itself is a finite resource that must be used wisely. It is therefore critical to understand the interdependence between economic development and the environment. Through this understanding we strive to achieve sustainable development. The following location requirements have been established as tools to help define development options within Beaver Creek Township. The guiding principle behind the location requirements is that some land is better suited for development because of variations in the natural as well as man-made environment.

An understanding of existing land use patterns is a prerequisite to the establishment of land use location requirements. It is the base from which future development will occur. This understanding is necessary because one cannot afford to ignore the substantial social, cultural, and economical investment that has been made by both the public and private sectors in the development of the Township.

Beavercreek Township contains approximately 48 square miles in four Sub-Districts:

	<u>Square miles</u>
Unincorporated Beavercreek Township	21.71
City of Beavercreek	26.38
City of Fairborn	0.24
Wright-Patterson Air Force Base	0.49

Although the City of Beavercreek contains 54% of the land area and in excess of 90% of urban development, this analysis focuses on the unincorporated portion of Beavercreek Township. A detailed analysis of the City of Beavercreek and Fairborn may be found in their respective plans.

**Beavercreek Township Unincorporated
Existing Land Use by Acres as Classified by the Greene County Auditor
February 9, 2012**

Agriculture	5,887.9
Commercial	580.2
Exempt	2,144.6
Industrial	150.4
Mineral	373.9
Multi-Family Residential	30.7
Other Residential	41.9
Single-Family Residential	2,730.4
Utility	172.8
Vacant	1,168.5
<u>Other</u>	<u>599.4</u>
Total	13,880.7

Using existing land use as a basic foundation, the future land use plan is a tool to communicate how a defined area is envisioned in that planning period. Therefore, land use plans require a universal language in order to allow for the effective communication of land development concepts. This chapter will define eight (8) generalized land use categories and discuss their respective location requirements relative to the future vision of Beavercreek Township. These categories are:

- Open Space
- Farmland
- Residential Development
- Commercial
- Industrial
- Public and Institutional
- Mineral Resource Management
- Mixed Use

The location requirements are based in part on the continuation of desirable existing land uses and patterns of development that prevail within the Township and adjacent cities. These development and site guidelines are designed to encourage new development to be consistent with existing surroundings. The location requirements provide tools to create a practical community offering employment, housing, recreation, commerce opportunities, and amenities for its citizens.

Open Space

For the purposes of this plan, Open Space means any land or water area in which the preservation in its present use would:

- Conserve and enhance natural or scenic resources
- Protect streams, rivers, lakes, shorelines, or water supplies
- Protect public access
- Promote conservation of soils, wetlands, riparian corridors or woodlands
- Protect or restore ecological functions
- Protect plant and wildlife diversity
- Enhance the value to the public of adjoining or neighboring parks, woodlots, wildlife preserves, nature reserves, natural areas or other open space
- Enhance recreational opportunities
- Provide room for outdoor recreation
- Preserve historic sites
- Conserve and protect cultural resources
- Preserve visual quality along roadways, street corridors, the Little Miami River, or other scenic vistas

Open space may include: privately owned farmland, areas encumbered by utility and/or roadway easements, grass medians or planting strips within the road right-of-way, or front, rear or side yards of private property. Open space may be considered for retention and detention ponds if they are designed as community assets and/or gathering spaces. However, easements for overhead power lines are not considered open space for the purpose of calculating density.

Providing for open space within the Township requires a collective effort on the part of the Township, concerned citizens, and governmental agencies. Planning for this category is not something that is realized over a few years; rather, it occurs over an extended period of time. It is critical that the planning is ongoing and does not lose momentum due to small setbacks or lack of direction. “Persistence” is the keyword in measuring the success of an open space initiative. This can best be achieved by maintaining a proactive approach that meets the goals of the community.

The quality of the natural environment in and around the community is an obvious indicator of the quality of life in the community. A community that fits into its environment well is often visually pleasing. It is important to be aware of the characteristics of the natural environment in and around the Township, including the areas that have been developed. Life in the Township should not only be sensitive to the environment but also respond to it. This plan assigns a high priority to the ongoing recognition of the importance for environmental stewardship and strives for its continued priority as an important part of the community.

When considering open space within the Township, one of the most recognized elements is the wetlands area of Beaver Creek. This wetlands corridor is very important because when wetlands filter pollutants, act as groundwater recharge areas, and support the food chain, there is a direct relationship to the health of the community. The wetlands act as flood control areas and stabilize shorelines and directly contribute to the safety of the community. The wetlands provide recreational opportunities for people, provide habitats for plants and animals, act as a buffer to separate different levels of land use, and provide educational and scientific research opportunities. There is a definitive connection between the wetlands and the general welfare of the community.

Another recognized open space feature of Beavercreek Township is the Little Miami River. As stewards of the land, it is in the public's interest to protect the Little Miami River against development that will adversely affect its national and state designation as a scenic river. Areas of natural beauty, such as the Little Miami River Corridor and Beaver Creek Wetlands, should be preserved in their natural state.

Open space should be located as determined by the specific function of the unique land use. All new and proposed expansions of open space should be considered only after studies have been conducted relative to their specific needs. The *Master Plan for Parks and Open Space in Greene County, Ohio* and *A Physical Study for Greene County, Ohio*, are intended to supplement this plan and emphasize the areas within the county that are prime for conservation and recreation with respect to the natural features of the land.

Farmland

This plan recognizes that farmland is one of the county's and state's most important resources. However, within Beavercreek Township the issue of agriculture is more of an issue of time. With the landscape of cities, suburbs, rural housing, other community needs, and their impacts on land, agriculture as an industry within Beavercreek Township is more of landowner desire rather than public policy (see *Greene County Farmland Preservation Plan, 2000*).

Farmland designated on the future land use plan is located outside of areas expected to be developed or receive public utility services within the planning period. Agricultural uses, of course, would be recommended and encouraged as an interim use in areas planned for development until the required utility services are provided.

Residential Development

The residential development classification is intended to encourage a wide range of housing types that accommodate single-family residential dwellings with a variety of lot sizes. Residential development is generally considered as a function of density. There are two (2) types of residential density found within the Comprehensive Plan. This plan delineates these as “Rural Residential Development” and “Residential Development.”

Rural Residential Development

Rural residential development is home sites on acreage tracts that range between two and a half (2.5) and five (5) acres per dwelling unit on land outside the Urban Service Area. These lots are rural and spacious in nature and must provide for an adequate potable water supply (public or on-site), and have sufficient area for the long-term use of individual on-site leaching devices for wastewater disposal. A soil evaluation for septic tanks and leach fields, should be completed by the Greene County Combined Health District prior to the approval of any rural residential development in order to insure public health and safety. The average density of this type of development should follow guidelines for rural residential development.

With few exceptions, the proliferation of rural residential lots has been stimulated not only through market demand, but also by a lack of public utilities necessary to support denser development. Some of the rural residential development that has taken place within the Township includes:

<u>Development</u>	<u>Year</u>	<u>Acres</u>	<u># of lots</u>
Beaver Hill Estates	1976	137.5	57
Historical Estates	1976	88.7	18
Hickory Hollow Estates	1986	161.8	62
Woodland Hills Estates	1986	130.9	43
Ludlow Creek Estates	1987	14.7	10
The Conservancy	1990	168.5	64
Wolf Ridge	1991	13.4	5
Narrows Pass	1991	39.7	15
J.R. Harley	1991	21.3	6
Rolling Meadows	1993	61.9	24

<u>Development</u>	<u>Year</u>	<u>Acres</u>	<u># of lots</u>
The Knolls	1994	21.1	8
Stone Farm	1994	51.3	27
Dorset Downs, Sect 1	1996	52.9	28
Dorset Downs, Sect 2	2004	41.8	15

Note: These developments average approximately 2.6 acres per unit.

Our fundamental challenge is that we must build on our early successes and take more comprehensive and decisive steps in the future. To meet the challenge of directing rural residential development, we must require that future rural residential development be consistent with the character of the surrounding area, and ensure that it is of a proper scale for the proposed development. Rural residential development is viewed as a way to allow for residential development to occur while maintaining the rural character of the countryside. It is understood that the idea/concept of rural character is different for everyone, but the definition of rural character is an important beginning. For the purpose of this document, rural character is defined as areas with a mixture of farms, woodlands, varying topography, undeveloped open space, clean waterways, wildlife, and the absence of suburban amenities such as street lights and sidewalks.

The location of future rural residential developments within the Township should be considered on an individual, case-by-case basis. Specifically, each case should consider the physical capability of the site to accommodate the proposed density, as well as the existing patterns of surrounding land uses. Rural residential development should be located in areas outside of the Urban Service Area, and should not be permitted within any area where building sites are subject to periodic flooding and/or within the regulatory floodplain. Clustering of rural residential developments along an existing thoroughfare should limit curb cuts to the thoroughfare. Only newly created local roadways designed and built to the appropriate standards should provide access to the existing thoroughfare.

Rural residential developments are intended to provide areas for residential use for those persons who desire rural living environments. They contain a range of lot sizes consistent with desired rural character. This development type goes through the major subdivision review process where review agencies can mitigate potential impacts, take into account natural resources and environmentally sensitive areas (Conservation Design) provide for public review of the proposed development to balance the public's interest in the management of community growth with the protection of individual property rights, and manage the extension of public services. Rural residential developments usually include the development of an entire parcel or several parcels.

In rural residential development, the layout within the development is a critical factor. Although a given property can theoretically be developed at greater densities without considering physical and environmental conditions, a distinction must be made between “carrying capacity,” the maximum amount that can be supported by a given environment, and an “appropriate planning capacity.” The mere fact that a tract can be developed at a given density does not mean that it should. Regardless of the methodology to establish rural densities, there is a consensus that permissible rural densities should remain relatively low.

Residential Development

Residential development has generally been at 1.8 units per acre gross within the Urban Service Boundary where both water and wastewater collection is available. With recognition that market demand for different types of housing products may justify variation, future residential developments should strive to conform to that density.

The predominant dwelling type will be the single-family dwelling unit with possible multi-family dwelling units at appropriate locations. Cluster development that maintains an overall density, generally not to exceed 1.8 dwelling units per acre gross, may be considered.

Residential uses include single family, multi-family (two-, three- and four-family dwellings), condominiums, townhouses, and apartments.

Gross density, which accounts for all of the land within the development, will be used to define the residential densities described in this section. Within a given development a multitude of densities can be utilized as long as the overall development density is not exceeded.

Future residential growth in the next planning period should be guided by residential requirements listed. The density to be administered to a specific site will be determined by:

- Surrounding adjacent densities and land use(s)
- Capacity of existing and proposed utilities
- Capacity of the existing/affected thoroughfares
- Consistent with community goals
- Characteristics of the site:
 - ◇ Topography
 - ◇ Natural buffers
 - ◇ Flood plains
 - ◇ Wetlands;
 - ◇ Unique geologic features
 - ◇ Unique/threatened/endangered plant and animal species
 - ◇ Groundwater sensitivity, etc.

The above list of criteria will help guide the decision making process to determine the appropriate density of a specific parcel on a case by case basis, with the overall understanding that natural features and resources are preserved and/or conserved.

Future residential development should be located on sites offering a diversity of both man-made and natural physical features. The development of any residential area is dependent upon the existence of approved public utility service or the installation of such service as part of the development. These services should possess adequate capacity, flow, and pressure for the type and density of the potential residential development. They should:

- Preserve or create a completely unified neighborhood having safe, convenient access to school(s), churches, park sites, and other community activity centers, by providing pedestrian and bike access within the development through the utilization of multi-purpose trails/bikeways
- Be located in close proximity to existing thoroughfares to provide direct access to employment, shopping and recreation centers
- Allow traffic circulation design in residential developments to provide adequate ingress and egress to neighborhoods without encouraging through traffic
- Be adequately buffered from incompatible land uses such as industry, commercial centers, agricultural areas, or other potentially incompatible activities, including residential areas of substantially different densities which should be adequately buffered by open space, or transitional residential uses of an intermediate density

Commercial

All residents have consumer needs that should be met locally. A major issue in terms of consumer opportunity is the matter of convenience. A well-balanced system of planned commercial sites is an integral element in the development of a community. The establishment of such a system is dependent upon certain location requirements respecting both the general needs of commercial development and the specific needs of various types of commercial establishments as identified in the Beavercreek Township Zoning Resolution.

Commercial development provides both opportunity and challenges for the Township. Residents have the opportunity for close, convenient shopping with a diverse variety of goods and services. The commercial sites provide a variety of job opportunities, both full-time and part-time. On the other hand, commercial development is an intense land use, which adds traffic and can stress nearby residential areas. Maximizing the benefits and minimizing the

problems associated with commercial development requires understanding and controlling the scale of development. By encouraging and providing for various levels of development, the Township can ensure that a full range of consumer goods and services will be provided locally.

Commercial development should occur at strategic locations along existing transportation networks which provide direct access to and from their respective trade areas. Proper care must be used in the spacing of such developments to insure economic health and avoid detrimental overlap of the functions of each center. Commercial development should be located in fairly level or gently sloping areas which can be graded without excessive costs and environmental impact. Commercial land uses should not be located within the regulatory floodplain or in any area subject to periodic flooding. Sites possessing poor drainage, shallow depth to bedrock, and/or soils with poor load-bearing capacity should also be avoided since they carry increased development costs. Public water supply and sanitary sewer service must be available to commercial sites prior to development, or as a function of development, since commercial development often stimulates additional commercial activity and residential development.

As a function of service and market demand, commercial land uses in Beaver Creek Township do not stand independently, as community and regional commercial opportunities are also found within the City of Beaver Creek. The prime commercial activities found in Beaver Creek Township are located within the U.S. 35 Corridor, with other neighborhood commercial opportunities planned in Stonehill Village. It is not anticipated that any major commercial land use will occur outside of existing areas in the next planning period.

Industrial

Industrial land uses often include research and office-type developments as well as general manufacturing operations, industrial parks, and warehouses. These uses lend themselves to the development of industrial employment centers which possess similar location requirements.

Lands to be considered for industrial uses should be reasonably level, with slopes of six (6) percent or less and capable of being graded at reasonable cost. The area should be well-drained, possess soils capable of bearing heavy loads, and located outside of the regulatory flood plain or areas subject to periodic flooding. Industrial areas should possess adequate acreage for individual industrial lots which are capable of accommodating modern facilities with off-street parking areas, loading areas, and landscaping. Adequate acreage for future expansion should also be available. Industrial development requires public utilities such as electric power, water supply, gas, and wastewater disposal.

This designation provides the Township with a wide range of employment opportunities in locations relatively close to its residents. This category also provides an opportunity to diversify and strengthen the economic base of the Township. This plan will continue to encourage industrial uses to locate in the Township in designated areas. These designated areas are located in large consolidated zones to accommodate modern practices and are located to minimize their impacts on residential areas. The area already designated as industrial is sufficient to accommodate the future needs of the Township.

The major industrial concentration (including office and research) along State Route 35 near Orchard Lane will remain the focus of the Township's industrial activities in the near future. A few sites remain for development and some existing buildings are not at full occupancy. The other locations for industrial (including office and research) are the Russ Research Center, and along the south side of Dayton-Xenia Road west of the Little Miami River and adjacent to the Greene County Lewis A. Jackson Regional Airport.

Each of these areas are favorable to the Township because they are close to U.S. Route 35 and they do not send employee and/or commercial truck traffic through existing residential neighborhoods. As with all intense land uses they should be monitored for potential future development activities to make sure that they are sensitive to surrounding land uses.

Public and Institutional

The public and institutional category includes land uses such as schools (primary and secondary), seminaries, churches, places of worship, public or governmental libraries, airports, medical facilities, museums, governmental services, military installations, governmental institutions, cemeteries, utilities and/or uses of a similar nature.

Location requirements for each type of public and institutional land use should be determined by the specific function of each unique land use. All new and proposed expansions of public and institutional land uses should be considered only after special studies have been conducted relative to their specific needs.

Mineral Resource Management

The development of mineral resources has been a significant land use in Beavercreek Township during the past planning period and is expected to continue in current locations throughout the next planning period. The existing mining areas are found at the east end of Heller Drive, at the northern terminus of Haines Road, on the south side of Dayton-Xenia Road at

Trebein Road, and in the northeast corner of the Township on the east and west side of Linebaugh Road. Expansion of these sites should comply with mineral resource management requirements and best management practices.

Beavercreek Township's approach to mineral resource management is to plan and preserve, regulate and reclaim. The long term benefit of this approach is to protect mineral resources for future generations, provide economic development, and ensure reclamation to a desirable subsequent use (see *Perspectives 2020: A future Land Use Plan for Greene County Ohio*, Chapter 2, Coordinated Land & Water Management Program, Mineral Resource Management).

The mineral resource management category of the land use plan is a designation of lands within Beavercreek Township that are:

- Lands with approvals or currently being excavated/mined for their mineral resources
- Parcels which are owned by a quarry/mining operation

Other potential mineral resource areas of Greene County have been identified in *A Physical Study for Greene County, Ohio* (page 44, map 3).

In this land use classification, it is recognized that the use of the land is an intense use but not the ultimate use. This interim use could last generations. Once the minerals are removed and the land is reclaimed other uses of the site can take place.

Mixed Use

Mixed use developments should provide for a blend of any of the following land uses: Open Space, Residential Development, Commercial, Industrial and Public and Institutional. This serves to create a diverse destination environment that provides residential, retail, and employment opportunities, as well as recreational opportunities within the Township. Land uses within the mixed use development should be lively, active and versatile environments where people can enjoy a wide range of fulfilling experiences in one place. The integration of uses can occur within individual structures, as well as across the site.

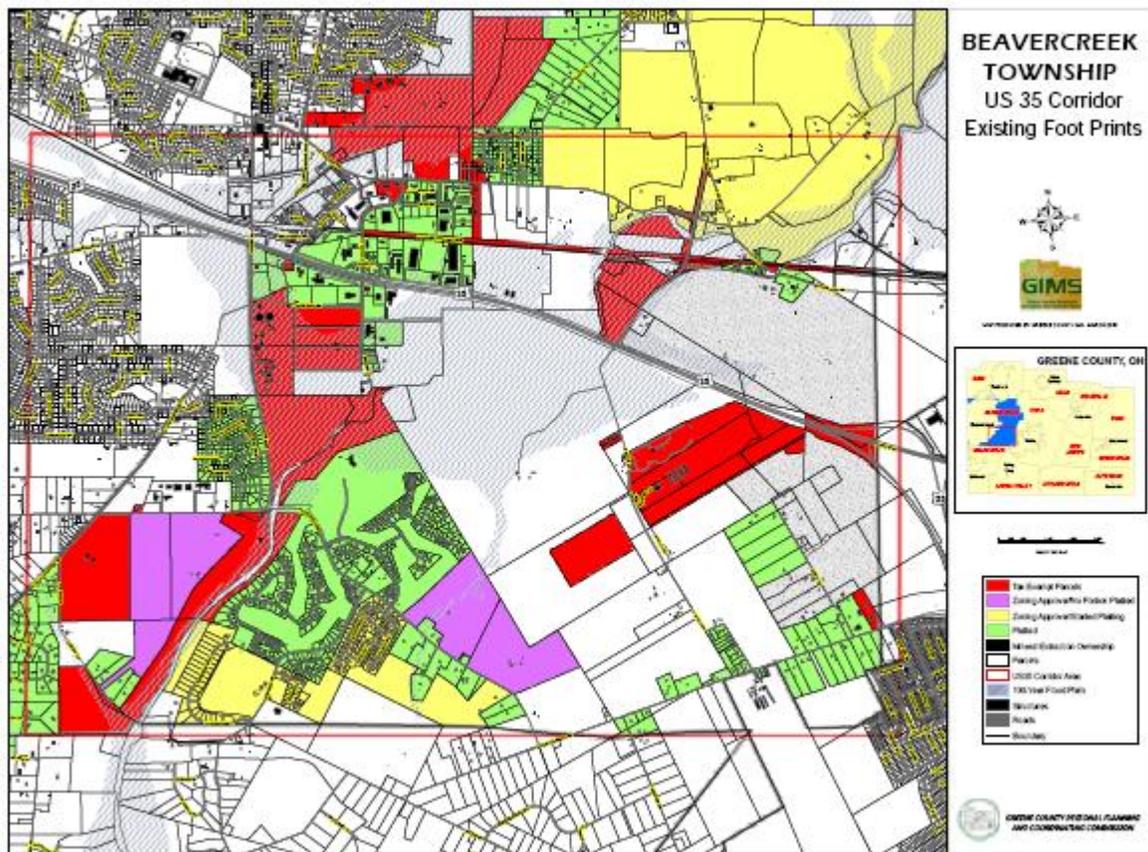
A condition of a mixed use development must be the accessibility of a public water supply and public sanitary sewer service prior to development or as a function of development.

Quality should be stressed in mixed use developments, including open space, landscaping, and a safe, attractive pedestrian and bicycle friendly environment.

A special zoning district or overlay zoning district should be implemented to provide standards in order to maintain a scale compatible with the community.

Planning Area: U.S. Route 35 Corridor

The U.S. Route 35 Corridor area contains approximately 3,773 acres in 620 parcels. It is bounded on the east by Xenia Township and the City of Xenia, on the north by Dayton-Xenia Road, on the west by the City of Beavercreek and on the south by Indian Ripple Road. The corridor is comprised of a mosaic of mixed uses including commercial, industrial/warehouse, mining activity, farmland, residential, and recreation.



Planning Area Outline

Information provided by the Greene County Geographic Information Management System Department utilizing the Greene County Auditor's data, identifies that the U.S. Route 35 Corridor Planning Area comprises approximately 3,773 acres or 27.4 percent of the Township's land area.

Existing Land Uses:

Farmland	1,702.05 acres	or	45.1% of the planning area
Tax Exempt	559.90 acres	or	14.8% of the planning area
Mineral Extraction	486.68 acres	or	12.9% of the planning area
Residential	401.62 acres	or	10.6% of the planning area
Commercial	291.16 acres	or	7.7% of the planning area
Vacant(*)	137.87 acres	or	3.7% of the planning area
Utilities	111.90 acres	or	3.0% of the planning area
Industrial	81.83 acres	or	2.2% of the planning area

(*) Note: includes properties as commercial vacant, industrial vacant and agriculture vacant

Existing Conditions

- Residential uses in this area are located along Indian Ripple Road and are currently developed or being developed as Planned Unit Developments:
 - Arlington Place - 151 single family residential lots
 - The Brooks -117 single family residential lots
 - Windemere - 177 single family residential lots
 - River Reserve - 186 single family residential lots
 - Estates at Country Club of the North - 286 single family residential lots and a golf course
 - Indian Walk -121 single family residential lots
- The northern, western and southern portions of this planning area have access to both public water and wastewater collection
- There is an extensive designated floodplain within this planning area - the identified floodplains are associated with the Beaver Creek, Little Miami River and Indian Ripple Brook
- The western State Route 35 area between Factory Road and each side of Orchard Lane, including Beaverpark Drive, Distribution Drive and Space Drive, is almost completely built out with only a few small parcels still considered to have some development potential
- Mineral extraction occupies a majority of the eastern portion of this planning area
- Greene County's Valley Springs well field is located south of U.S. Route 35, west of the Little Miami River
- The Greene County Lewis A. Jackson Regional Airport is located on the south side of U.S. Route 35 east of the Little Miami River
- Miami Valley Memorial Gardens Cemetery is located to the west of the Greene County Lewis A. Jackson Regional Airport
- The Estates at Country Club of the North is located on the east side of the Little Miami River on both sides of Indian Ripple Road
- The Greene County Beavercreek Wastewater Treatment Facility is located on the east side of Factory Road south of U. S Route 35
- Little Miami River designated as Scenic River by state and as National Wild and Scenic River by federal government

Planning Area Recommendations

- Conservation of the Little Miami River riparian corridor is strongly tempered with a desire to see the corridor used as open space or for recreational uses
- The Township's outstanding natural resource base will be continually protected from the impacts of development - the natural resource base includes surface and ground water, open space, sand and gravel, floodplains, wetlands, natural areas and preserves
- The Township needs a clear and concise understanding of what is planned for U.S. Route 35 and its at-grade intersections from the Ohio Department of Transportation before additional development is contemplated in U.S. Route 35 Corridor
- Any land use along the U.S. Route 35 corridor must provide adequate noise mitigation measures or be noise compatible land uses
- Direct new development to areas served by public water and wastewater collection or which can be efficiently and economically served
- Protect underground water resources and aquifer recharge areas from inappropriate and possibly harmful land use activities
- Adopt and enforce wellhead protection regulations to ensure clean and plentiful water sources
- Encourage development of all available and appropriate existing commercial, office and industrial sites
- Areas west of the Little Miami River to Factory Road on the north side of U.S. Route 35, north to Dayton-Xenia Road and south to the floodplain of the Little Miami River, should continue to be a mosaic of mixed uses with the principal use being commercial focused along the frontage of U.S. Route 35, with Industrial and Office to the rear of the commercial uses
- Mixed use development (commercial, industrial, open space, residential and institutional) may be appropriate in this planning area south of U.S. Route 35 and in proximity to the airport
- Create appropriate zoning district(s) (mixed-use/multi-use PUD) for the existing and proposed future uses along the U.S Route 35 Corridor Planning Area
- Provide a specialized zoning district for the Greene County Regional Airport and environs
- The Township and/or county should evaluate creating north/south multi-purpose trail connections to the Creekside Trail

Chapter Four: Implementation Program

Introduction

The Comprehensive Plan is provided for in ORC 519.02 and provides the foundation for decisions about the Township's future. The purpose of this chapter is to establish a connection between the goals and guiding principles of the Comprehensive Plan and other actions that will enhance and improve the quality of life of Township residents.

The preparation of this plan is a step toward creating a more sustainable, manageable, and desirable living environment for the residents of Beavercreek Township. While the planning document is necessary and basic to any planning program, it has no value unless its concepts, goals, guiding principles, and policies are systematically considered by all parties involved in the development process. A community can only expect to receive benefits from the planning process in direct proportion to efforts made in plan implementation.

Being a community plan in scope, the Comprehensive Plan provides a general framework within which the Township can engage in planning and zoning. Much of the development that occurs is local in scale and it is important that the local governments carry out their responsibilities to guide this development.

There is a great deal to be accomplished if Beavercreek Township is to achieve the stated goals of the plan. The greatest challenge, however, is for private individuals and enterprise to have faith in the long range future of Beavercreek Township and to make private investment in cooperation with public efforts. With continuing assistance and the support of collaborating jurisdictions and other public agencies, the ingenuity and initiative of private investment will be able to meet the challenges presented in this plan.

Use of the Plan

The comprehensive plan is an element of Beavercreek Township's development regulations and strategies. It envisions land use 20 years or so into the future, and provides a framework to manage growth and development during that period. The graphic plan does not show sufficient detail to permit strict adherence to its land use type and the associated requirements (it is not intended to be a site plan). The plan is meant as a guide to assist the

Township, developers, and citizens with decisions about the future. It establishes Township-wide goals and recommends guiding principles to achieve those goals. It sets direction against which development proposals may be measured.

The plan is intended as a guide for development decisions such as requests to change zoning classifications and utilize community and man-made resources. Any rezoning request or development proposal should be evaluated for conformity within the goals of the plan. Should changes in zoning be proposed, the rezoning should be in accordance with the goals and the guiding principles of the comprehensive plan. This may mean that amendments to the plan need to be considered. Any zoning change or land use proposal that is not consistent with the goals and guiding principles of the comprehensive plan should set in motion a procedure to consider amending the comprehensive plan or provide reasons to deny a request. This will assure that any change to the land use provisions of the plan are given due consideration prior to or at the same time as the review of the specific rezoning or development proposal. The Beaver Creek Township Zoning Commission should review and act upon the comprehensive plan amendment prior to or simultaneously with the specific rezoning or development proposal that is being acted upon. The time line is set forth in Section 24 of the Beaver Creek Township Zoning Resolution.

General Amendment Process

Modification refers only to the comprehensive plan and would include the future Land Use map and the Comprehensive Plan text. Modifications are triggered by, but not limited to, the addition of a new land use to an area, the extension of public utilities (water and wastewater collection) beyond the identified urban service boundary, or a significant increase to an existing land use that will impact an adjoining area, etc. Modifications to the Official Zoning map follow the procedures outlined in the Zoning Resolution and ORC section 519.

Any proposed modification to the comprehensive plan should be resolved prior to the processing of any amendment to the zoning resolution or consideration of planned unit development (PUD) site plan either of which may be in conflict with the Comprehensive Plan. However, the approval of any such modification shall not be a prerequisite to the approval of any such site plan or amendment to the zoning resolution. The submission of an application to amend the township's zoning resolution or to adopt a site plan as part of a planned unit development shall serve as an application to modify the Comprehensive Land Use Plan. The approval of a PUD site plan or amendment to the zoning resolution not in conformity with the Comprehensive Plan shall concurrently result in the modification of the Comprehensive Plan.

If a modification to the Comprehensive Plan is proposed independent of an amendment to the zoning resolution or adoption of a site plan, a hearing shall be conducted by Township Zoning Commission. Notice of that hearing shall be posted on the Township's website.

Within thirty (30) days after completion of the Public Hearing the Zoning Commission shall by resolution, provide its recommendations concerning the proposed modifications to the Township Trustees.

Within fourteen (14) days after the receipt of the Zoning Commission recommendations and Resolution, the Township Trustees shall set a date for a Public Hearing. This Hearing shall be held within thirty (30) days. Notice of that hearing shall be posted on the Township's website not less than ten (10) days prior to the hearing.

Within twenty (20) days after completion of the Public Hearing the Trustees shall vote to accept, reject or modify the recommendation of the Township Zoning Commission.

Monitoring the Comprehensive Plan

The concept of monitoring progress towards the desired future and evaluating tools for implementation are integral to the planning process. A well-designed monitoring and evaluation program can help the Township and citizens understand both progress and setbacks in achieving the plan's goals. More importantly, the program can direct staff and decision makers towards revisions of the plan and more effective ways of obtaining desired goals. Most importantly, the monitoring program can provide citizens with the means to hold government accountable for its actions.

Developing a meaningful monitoring and evaluation program is an important tool in itself and should be given high priority among the many action items necessary to implement the plan.

The monitoring and evaluation program should focus on key indicators such as the plan's goals and guiding principles. Each indicator should be analyzed using the following criteria:

- Uses readily available data
- Measurable over a specific length of time
- Provide meaningful information
- Be sensitive to change
- Be easily interpreted

The results of this monitoring and evaluation program should be presented to the Township Trustees for their review with any recommendations. The report should include proposed changes to the plan's goals and guiding principles. Review of the report and consideration of proposed amendments should include citizen input. These changes and revisions should become part of a regular review process to promote the viability of the plan.

The Township should conduct a major review of the plan's themes, principles and strategies. The timing of this review effort will be dependent upon change in the Township, but no less than every five (5) years.

What Can Be Done?

- Track all development proposals and the outcome of their review
- Provide an annual report that states the effectiveness or ineffectiveness of the development decisions made compared to the plans goals, guiding principles
- Annually identify any area of the plan that should be considered for revision
- Have annual joint meetings with the Board of Township Trustees, Zoning Commission and Board of Zoning Appeals to make sure development decisions are being made in compliance with the intent, goals, and guiding principles of the plan

Transforming the Plan Into Public Policy

The first step to insure the effectiveness of the land use plan is to transform it into public policy. The concepts, goals, and guiding principles of the plan are transformed into official policy through public hearings and subsequent adoption by the Trustees.

What Can Be Done?

- Through public meeting process, the Zoning Commission vote to recommend the plan to the Township Trustees
- Township Trustees formally review and approve the plan following a public hearing
- Submit a copy of the approved plan to the Regional Planning and Coordinating Commission of Greene County for incorporation into the Greene County Land Use Plan

Zoning Amendments

The comprehensive plan is not self-enforcing. Once the plan is officially adopted, steps must be taken to carry it out. There are a wide range of implementation mechanisms to achieve plan goals. Most of these mechanisms are already in place and include zoning resolutions, subdivision regulations,

urban service boundaries and other land development regulations, building codes, capital improvement programs, land acquisition, use and conservation easements, land use plans and maps, eminent domain, and nuisance laws. The potential complementary role of private investment actions (e.g. easements, deed restrictions, and plat covenants and restrictions) in furthering plan objectives is essential if the plan is to be realized. The role of the Beaver Creek Township Zoning Commission to provide sound administration, coordination and communication on a continuing basis cannot be over-emphasized. Once the comprehensive plan is adopted, some zoning amendments may need to be modified to help carry out the stated goals and guiding principles. From the review of the Land Use Plan, the following are items for possible future consideration:

- Make sure the relationship between the district's purpose and/or intent statement reflects the function and uses permitted in the district
- Protect existing residential neighborhoods from the conversion of single-family homes into multi-family units or businesses
- Concentrate intense land uses such as businesses and commercial uses together - zoning can help by guiding these uses into areas of the Township best suited for such uses due to adequate public facilities and infrastructure
- Create an appropriate zoning district for the existing and proposed future uses along U.S Route 35 between Factory Road and the City of Xenia
- Provide a specialized zoning district for the Greene County Regional Airport and its environs
- Provide a specialized zoning district to protect the public wellfields
- Provide a specialized zoning district to protect the aquifer recharge areas

Collaboration and Partnership

We encourage and nurture the community spirit when ordinary citizens, civic and business groups, institutions and local governments come together to identify the shared values and common vision of what we want our community to be. We strengthen our community even further when we work cooperatively to realize a shared vision. Community spirit, built on the pride of association and the sense of civic responsibility, creates strong and cohesive bonds.

State, local government and regional organizations should support the use of indicators to show interdependence of jurisdictions within regions. They should work to develop a rapport to help benchmark the performance of the area on a number of economic, environmental, and social levels, partnering with local civic, business, and community groups and institutions to compile indicators that show the interrelationships of regional concerns and the effectiveness of regional cooperation.

Local government, the private sector, community groups, and foundations should develop and support a series of working sessions to build local capacity for sustainable community development. These working sessions would bring together community leaders and key agencies to build local capacity for decision making and collaboration by (1) ensuring access to good information, (2) providing a range of technical assistance, (3) helping communities acquire analytical tools, and (4) training local individuals and organizations on best practices. Such working sessions could also provide a mechanism for regional collaboration. The sessions could lay the foundations for a permanent forum between communities and other agencies and groups that have an interest in community problem-solving.

What Can Be Done?

- Use strong public participation models for planning processes
- Encourage outreach before applications for development are finalized
- Use mediation processes on controversial developments
- Identify benchmarks for performance in the areas of economic, environmental, and social factors

Low Impact Development (LID)

With technology and research constantly changing or impacting future developments and regulatory changes by the Federal, State, and County Government, the Township is attempting to address all the current known areas that could impact future development. The following Low Impact Development guidelines are being provided for developers and landowners of Township property who may wish to consider future development within the Township.

Traditionally, stormwater management has involved the rapid conveyance of water to an engineered pond or surface water body. Low Impact Development (LID) is an innovative stormwater management approach that manages rainfall where it lands by modifying developments to try to maintain some natural hydrologic function. The goal is to mimic a site's pre-development landscape by using site design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. Low impact development encourages the use of small, cost-effective management practices on each individual lot.

Almost all components of the urban environment have the potential to serve as a management practice. This includes open space, rooftops, streetscapes, parking lots, sidewalks, driveways and medians. LID is a versatile approach that can be applied equally well to new development, urban retrofits, and commercial and industrial projects. Some management practices associated with LID include:

- Infiltration of rainwater through vegetated trenches and basins with some filtration devices
- Landscaping methods that include rain gardens, bioswales, and native vegetation
- On-site capture and storage of rainwater
- Minimization of impervious area by using narrower streets, porous pavement, concave medians, and landscaped traffic-calming areas
- Protecting and restoring soil quality by minimizing land disturbing activities and avoiding compaction, and by increasing organic matter content through the use of compost application and strategic use of native vegetation

Rain Barrels are designed to hold rainwater collected from residential rooftops. Water is retained in the barrel and can be used for yard watering of vegetation. The barrels are designed with overflow options to allow water to infiltrate beneath the barrel or be redirected to such features as a rain garden.

Rain Gardens are shallow depression areas planted with native vegetation that absorb and infiltrate runoff from impervious surfaces, and which may discharge to groundwater, a storm drain, or surface outlet. Depending on site conditions, a sub-grade tile system may be recommended to enhance infiltration, especially where a high water table exists. Rain gardens reduce the volume of stormwater runoff pollutant loads delivered to surface water. Rain gardens can be used on individual lots, no matter what the use is, to mitigate impervious surface runoff.

Bioswales are vegetated swales which are an alternative to standard below ground storm water sewers. They intercept or receive impervious surface runoff and blend infiltration with slow conveyance of storm water. The soil matrix of the swale can be amended to enhance infiltration and percolation. These systems can be engineered to absorb the high frequency, low intensity storms but can convey the large storm events while providing vegetative filtering. Bioswales can discharge to groundwater, storm sewer intakes, or directly to surface water.

Permeable Paving Alternative surfaces are those surfaces that provide reduced site runoff by increasing infiltration into the soil. There are a number of permeable paving surfaces available from paver blocks to geoweb reinforced glass surfaces. These systems can be designed to infiltrate virtually all design storms including the 100-year storm, or they can be used strategically with impervious surfaces to capture the high frequency, low intensity storms.

Low Impact Grading is among the most harmful development practices to site grading. Grading is the process of clearing the site of vegetation and redefining the land's topography. Grading is harmful because it reduces species habitat by clearing vegetation and reduces water quality by introducing sediment into

local bodies of water. It also compacts soil (increasing imperviousness) and damages root systems. Techniques such as minimizing disturbance and the grading footprint can reduce the impacts on a site caused by grading.

Benefits to using Low Impact Development techniques in your community

Low Impact Development principals have many benefits and advantages over conventional development, including:

- Enhancing the local environment and protecting public health while saving developers' and local governments' time and money
- Addressing nonpoint source pollution and stormwater management regulatory challenges in a simple and economical manner
- Protecting surface water and groundwater from the impacts of runoff and groundwater contamination that can come from urban neighborhoods
- Helping local governments to better balance conservation, growth, and economic development objectives by having more effective and flexible technology choices
- Reducing stormwater conveyance and management infrastructure and the associated construction, maintenance and enforcement costs
- Reducing water pollution and improving wildlife habitat more effectively than conventional best management practices (BMPs) because LID uses multiple systems
- Using technologies that universally apply to greenfields, brownfields, and urban redevelopment in any climatic or geological region
- Enjoying increased quality of life, fiscal stability, reduced air pollution, water conservation, better habitat protection, and increased property values

What can be done?

- Beaver Creek Township should evaluate the zoning resolution and how it addresses water resources in order to identify areas that can be changed
- Development and subdivision regulations can be altered to allow innovative LID site design techniques
- Encourage developers to use LID techniques in our community

Smart Growth

Smart growth is a set of principles that guides development into more compact, interconnected, mixed use patterns. This produces more vibrant developments and healthier land, and has proven to be more sustainable. Smart growth development has been shown to reduce the number of miles people travel by vehicle every day and has also proven to use less energy overall than more sprawling communities. Smart growth developments feature a mix of land uses,

strong population and employment centers, interconnected streets, and both structural and public designs on a human scale. The following smart growth examples are being provided for developers and landowners of Township property who may wish to consider using them in future development.

These smart growth best practices will concentrate on land use that can lead to responsible developments:

- Provides a variety of transportation choices
- Mixes land uses
- Creates walkable spaces
- Encourages community and stakeholder collaboration
- Fosters distinctive, attractive developments with a sense of place
- Makes development decisions predictable, fair and cost effective
- Preserves open space, farmland, natural beauty and critical environmental areas
- Strengthens and directs development towards existing developed areas
- Adopts compact building patterns and efficient infrastructure design

What can be done?

- The Township should consider evaluating smart growth best practices and try to incorporate them into the Beaver Creek Township Zoning Resolution
- Development and subdivision regulations can be revised to allow Smart Growth best practices in site design techniques
- Encourage developers to use Smart Growth best practices

Alternative Energy

Opportunities for energy conservation are increasingly available in almost every application and setting. Home, school, office, and industrial environments can all benefit from cost-saving and energy-saving innovations.

Solar Energy

A variety of technologies convert sunlight to usable energy for buildings. The most commonly used solar technologies for homes and businesses are solar water heating, passive solar design for space heating and cooling, and solar photovoltaics for electricity.

Businesses and industry also use these technologies to diversify their energy sources, improve efficiency, and save money. Solar photovoltaic and concentrating solar power technologies are being used by developers and utilities to produce electricity on a massive scale to power cities and small towns.

Passive Solar. Today, many buildings are designed to take advantage of this natural resource through the use of passive solar heating and day-lighting.

Solar Photovoltaic Technology. Solar cells, also called photovoltaic (PV) cells by scientists, convert sunlight directly into electricity. Today, thousands of people power their homes and businesses with individual solar PV systems. Utility companies are also using PV technology for large power stations.

Solar panels used to power homes and businesses are typically made from solar cells combined into modules that hold about 40 cells. Many solar panels combined together to create one system is called a solar array. For large electric utility or industrial applications, hundreds of solar arrays are interconnected to form a large utility-scale PV system.

Solar Hot Water. Most solar water heating systems for buildings have two main parts: a solar collector and a storage tank. The most common collector is called a flat-plate collector. Mounted on the roof, it consists of a thin, flat, rectangular box with a transparent cover that faces the sun. Small tubes run through the box and carry the fluid – either water or other fluid, such as an antifreeze solution – to be heated. The tubes are attached to an absorber plate which is painted black to absorb the heat. As heat builds up in the collector, it heats the fluid passing through the tubes.

Biomass Energy

We have used biomass energy, or "bioenergy", the energy from plants and plant-derived materials, since people began burning wood to cook food and keep warm. Wood is still the largest biomass energy resource today, but other sources of biomass can also be used. These include food crops, grassy and woody plants, residues from agriculture or forestry, oil-rich algae, and the organic component of municipal and industrial wastes. Even the fumes from landfills (which are methane, a natural gas) can be used as a biomass energy source.

Geothermal Energy

Many technologies have been developed to take advantage of geothermal energy—the heat from the earth. This heat can be drawn from several sources: hot water or steam reservoirs deep in the earth that are accessed by drilling; geothermal reservoirs located near the earth's surface, mostly located in the western continental United States, and the shallow ground near the Earth's surface that maintains a relatively constant temperature of 50° -60° F.

Geothermal heat pumps. The shallow ground, the upper 10 feet of the earth, maintains a near constant temperature between 50 degrees and 60 degrees F. Like a cave, this ground temperature is warmer than the air above it in the winter and cooler than the air in the summer. Geothermal heat pumps utilize this resource to heat and cool buildings.

Wind Energy

Wind turbines, like windmills, are mounted on a tower to capture the most energy. Turbines catch the wind's energy with their propeller-like blades. Usually, two or three blades are mounted on a shaft to form a rotor.

Appendix A

Attached as Separate Document