

# CITY OF ORRVILLE

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## APPENDIX F—LAND SUITABILITY

### Introduction

This analysis of environmental conditions in Orrville the surrounding area is intended to provide a basis for decision-making regarding future development in the community. Besides playing a direct role in defining the pattern of development in a given area, natural systems also play a role in defining the character of settlement patterns on the land as much as architecture, roads, and community institutions.

For a number of reasons, certain areas of the community are better suited for development from an environmental perspective than others. Among the factors that influence land suitability are the following:

- The availability of groundwater for municipal, industrial, and residential consumption;
- The ability of the land and its soils to support various intensities of development;
- The presence of land specifically suited to agricultural production such as pasture areas and croplands;
- The land's topography and corresponding surface drainage system; and
- The presence of flood hazard and wetland areas and other elements of the surface drainage system.

The natural resources inventory presented in this section summarizes those environmental conditions in Orrville, and the Extraterritorial Jurisdiction (ETJ) that the City observes, that will impact future development in the area. This information, along with other elements of the Existing Conditions report, will provide a rational basis for plan goals, recommendations, and implementation techniques developed later in the planning process. Throughout the remainder of this analysis, the ETJ will be referred to as the study area.

### Ground Water Resources

Ground water resources play an important role in determining the pattern of urban and suburban settlement patterns of an area. The presence of a reliable supply of ground water can not only dictate the placement of towns, industrial and commercial development, farms, and individual home construction, but it can also play a critical role in determining the likelihood of a development's success or failure. With this in mind, ground water resources were analyzed for the study area as indicated in Figure F-1.

The distribution of ground water potential production rates varies greatly within the study area, however the richest ground water resource area generally underlies the Orrville corporate limits and a small area southwest of the community's corporate boundary. This area—indicated in blue on Figure F-1—generally will yield over 300 gallons per minute (GPM), and in some areas yields as high as 500 to 1,000 GPM from sand and

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gravel deposits at a depth of 200 feet. This groundwater production rate is compatible with municipal and large industrial well field development requirements.

This productive resource was not lost on Orrville's early leaders: Judge Orr lured the railroads to the community by constructing a critical water tower to serve the passing trains, as water was a critical resource during the steam engine era in railroading.

The area also represents the highest ground water resource potential within Wayne County. Similar high-yield areas are located in Wooster within the Killbuck Creek watershed and in the northern portion of the county within the Chippewa Creek watershed.

This highly productive ground water resource area is complemented by a larger area—indicated in green on Figure F-1—with a ground water resource potential of 100 to 300 GPM at 100 feet within layers of permeable sand and gravel deposits in buried valleys. This resource area also underlies much of Orrville and extends southwest of the corporate limits. This area is capable of supporting small municipal and industrial systems, however exploratory drilling would be necessary to assure productivity at higher levels. Another resource area with similar ground water resource potential—indicated in light green—extends from the north side of Orrville to the east side of the study area. Yields of 100 to 300 GPM can be expected in this area at a depth up to 300 feet. Sustained yields of 100 to 200 GPM and peak yields as high as 500 GPM can be produced in this area. Small municipal and industrial water production demands can be supported within this area.

The remainder of the study area includes ground water resource areas with substantially lower yields. These areas are described as follows:

- The area indicated in light yellow illustrates ground water yield potentials of 25 to 100 GPM, a resource capable of supporting farm and small industrial operations at depths as deep as 325 feet. The aquifer in this area is associated with the Pottsville Group and consists of valleys with interbedded and interlenses sand, gravel, silt, and clay.
- The area illustrated in yellow indicates potential yields of 10 to 25 GPM. This area is capable of supporting domestic activity levels only. Ground water is obtained from sandstone overlain by unconsolidated glacial moraine deposits of sand, gravel, and impermeable layers of clay and from buried fill valleys and glacial outwash of discontinuous bodies of sand and gravel.
- The area illustrated in brown indicates groundwater resources with potential yields of less than 10 GPM at 300 feet or more. Ground water is obtained from thin non-extensive sand and gravel deposits interbedded with a thick, clayey till. Yields may range from two to ten GPM. In

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Figure F-1

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this area storage is necessary to supply peak daily demands for domestic consumption levels.

## Soils

One of Orrville’s most valuable assets is its resource of soils that support development patterns ranging from farming to residential neighborhoods to more intensive urban commercial development. Soil characteristics and conditions are among some of the most critical factors in determining the suitability of the land to support various patterns and intensities of land development. To assist the City of Orrville in determining those land areas where soils will support development, an analysis of soil associations was conducted for incorporated areas as well as lands extending to the study area boundary. The Soil Survey of Wayne County, Ohio, published by the U.S. Department of Agriculture’s (USDA) Soil Conservation Service, was the basis for this analysis.

### General Soil Associations

There are six soil associations within the Orrville study area (USDA, 1981) each of which is comprised of several different individual soil series with their own characteristics. Due to the large number of individual soil series within the study area, individual soil series are not mapped.

Each soil association is named for the soils that comprise the largest portion of the association. The associations are illustrated in Figure F-2. The range of soil characteristics within these associations are briefly described in Table F-1:

**Table F-1  
Soil Associations and Characteristics**

| Soil Association                                               | Characteristics                                                                                                                                                                                                                          |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Canfield-Wooster-Riddles                                       | Nearly level to moderately steep, moderately well drained and well drained, deep soils that formed mainly in loamy glacial till. Covering 47 percent of its land area, this is the most common soil association within the Wayne County. |
| Rittman-Wadsworth                                              | Nearly level to moderately steep, moderately well drained and somewhat poorly drained, deep soils that formed in loamy glacial till.                                                                                                     |
| Mechanicsburg-Berks                                            | Gently sloping to very steep, well drained, deep and moderately deep soils that formed in loamy glacial till and in residuum of siltstone, shale, and fine-grained sandstone.                                                            |
| Chili-Jimtown-Bogart                                           | Nearly level to very steep, well drained to somewhat poorly drained, deep soils that formed in sandy and loamy glacial outwash.                                                                                                          |
| Fitchville-Glenford                                            | Nearly level to moderately steep, somewhat poorly drained and moderately well drained, deep soils that formed in silty lacustrine deposits. Most common soil association within study area and corporate limits of Orrville.             |
| Melvin-Euclid-Orrville                                         | Nearly level, poorly drained and somewhat poorly drained, deep soils that formed in silty and loamy glacial alluvium.                                                                                                                    |
| <b>Source:</b> Soils Survey of Wayne County, Ohio, USDA, 1981. |                                                                                                                                                                                                                                          |

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Analysis of individual soil series does indicate a number of areas within the study area where soil limitations preclude or severely restrain development. These areas include the following:

- Organic soils associated with the upper portions of Little Chippewa Creek, Orrville Ditch, and Newman Creek. This large area extends from the east side of Orrville to the eastern edge of the study area. It generally corresponds with flood hazards areas within the study area; and
- A smaller area of soils—Carlisle and Linwood mucks—associated with steep slopes in the northwestern portion of the study area. This area is generally associated with the steep slopes between 12 and 18 percent in the Rittman silt loam series.

## Prime Farmland

Soil conditions in the study area are highly conducive to agricultural production due to slope, surface drainage and moisture, erosion, and soil makeup characteristics. According to Soil Survey of Wayne County, in 1981 seventy percent of the county's land area—approximately 253,000 acres—was classified as "prime farmland," or soils best suited to producing food, feed, forage, fiber, and oilseed crops. In terms of land area, farming is far and away the largest industry in Wayne County, occupying 66 percent of the county's land area (Tomorrow Together, 1997). Such soils—assuming adequate moisture and a sufficient growing season—produce the highest yields with minimal inputs of energy. According to the Soil Survey, approximately 90 percent of the study area has been designated as prime farmland (USDA, 1981). Prime farmlands within the study area are illustrated in Figure F-3.

While providing an excellent resource for agricultural production, the soil conditions in the study area also are highly conducive to development. At the time the Soil Survey was completed nearly 20 years ago, the study identified the emerging trend in Wayne County of converting farm acreage to urban uses. The loss of prime farmland places pressure to use marginal land for farming. Usually these areas are defined as marginal because they are susceptible to erosion or drought, or they are difficult to cultivate (USDA, 1981) because of factors such as excessive slope.

The problem of with the loss of farmland is not unique to Wayne County. In 1997, the American Farmland Trust (AFT), a private, non-profit organization dedicated to the protection of farmland, published *Farming on the Edge*, a report on the loss of productive farmland throughout the nation. *Farming on the Edge* identified 20 highly threatened major resource land areas (MRLAs) that are threatened due to urbanization. Wayne County lies within one such MRLA, the Eastern Ohio Till Plain, a large geographic area that includes most of Northeastern Ohio. MRLAs such as the Eastern Ohio Till Plain are characterized by relatively homogeneous patterns of soil, climate, water resources, and land use. The method of farming

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Figure F-2

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Figure F-3

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employed—pasture land, truck crops, etc.—are also homogeneous in such areas (AFT, 1997).

The Eastern Ohio Till Plain's ranking as a highly threatened MRLA is due to a combination of factors: the value of agricultural production, development pressure, and quality of the land resource. At the county level, *Farming on the Edge* noted that portions of Lorain, Medina, and Wayne Counties were particularly threatened because these counties possess highly productive farmland and were particularly threatened by urbanization rates exceeding state levels (AFT, 1997).

The loss of prime farmland is also being studied at the state and local level. In April 1996, Governor George Voinovich created a task force to study farmland protection. This effort spurred preservation efforts at the local level, including the creation of the Wayne County Farmland Preservation Task Force in 1998. The county's comprehensive land use plan, *Tomorrow Together*, also addressed farmland protection on a countywide scale. All three reports will be considered and referenced throughout the development of the Orrville Comprehensive Plan.

## Surface Drainage Issues

### Watersheds

Orrville, the comprehensive plan study area, as well as the eastern third of Wayne County all lie within the Tuscarawas River watershed, a multi-county watershed for much of eastern Ohio. In Coshocton the Tuscarawas River joins the Muskingum River which eventually joins the Ohio River at Marietta.

As indicated in Figure F-4, the study area divides into three distinct drainage areas:

- The Newman Creek watershed that encompasses most of the east side of the study area. Newman Creek eventually joins the Tuscarawas in Massillon 15 miles east of Orrville.
- The Sugar Creek watershed that drains the southern half of the study area as well the portion of Orrville south of High Street. Sugar Creek joins the Tuscarawas at Dover 30 miles southeast of Orrville.
- The Little Chippewa Creek watershed that drains the northern portion of the study area and most of the land area within Orrville's corporate limits. After flowing to the northwest, Little Chippewa Creek turns to the east just south of Rittman, then later joins the Tuscarawas in Canal Fulton.

The implications of this drainage pattern greatly influences growth, development, and land use decision-making in Orrville. With the urbanized portion of the study area effectively divided into two drainage basins, sanitary and storm sewer becomes problematic. The community's wastewater treatment plant is located on the Little Chippewa Creek on the northeast side of

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the city. As a result, wastewater from the south side of Orrville must be pumped out the Sugar Creek watershed to that of the Little Chippewa. A more-detailed analysis of the community's utility infrastructure system is discussed in greater detail in the utility section of this report.

## Floodplains

Floodplains function in many capacities—as storage areas for flood waters, as filtration and recharge basins for groundwater, and as habitat for flora and fauna. As part of a national program to identify flood prone areas, the Federal Emergency Management Agency (FEMA) has delineated flood hazard areas through the publishing of Flood Insurance Rate Maps (FIRM) for Wayne County. Portions of the study area that lay within the 100-year floodplain have been identified in Figure F-4. Most of the flood hazard areas identified on Figure F-4 are used for agriculture, woodlots, or are undeveloped open space.

Development in flood hazard areas pose a serious threat to the safety of residents, property, and has the potential to create additional hazards from flood waters by inhibiting flow during flood conditions. Generally, flood hazard areas are protected by state and local standards that limit development to low-intensity activities such as farming, woodlots, wildlife habitat, and park development. Other more-intensive land uses may be permitted so long as they do not pose the potential to damage property on site or elsewhere within the floodplain.

The flood prone areas within the study area are generally narrow in scale. This is largely due to favorable topography, soil conditions, and the fact that the study area lies at the headwaters of three separate drainage systems. One exception to this pattern is Sugar Creek on the south side of the study area. Several small feeder streams—including Little Sugar Creek—converge with the main drainageway near Kansas Road, creating the potential for floodwater to backfill into the drainage basin.

## Wetland Areas

Wetlands are land areas that are subject to frequent inundation, resulting in the creation of habitat for flora and fauna that thrive in saturated soil conditions. As with flood hazard areas, wetlands also serve as a natural means of filtering and storing surface water for eventual absorption into the groundwater system. Wetland areas are regulated by the U.S. Army Corps of Engineers (COE) under authority of Section 404 of the Clean Water Act. While on-ground comprehensive studies of wetland areas are necessary to specifically identify actual wetland areas, for planning purposes wetland mapping provided by the National Wetlands Inventory (NWI) mapping prepared by the U.S. Fish and Wildlife Service is sufficient to identify potential wetland sites.

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Figure F-4

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Using NWI mapping, potential wetland areas are indicated on Figure F-4. NWI mapping indicates that the majority of potential wetlands generally correspond to the flood hazard areas along the Little Chippewa, Newman, and Sugar Creeks. A small number of additional wetland areas are scattered throughout the remainder of the study area, however these wetlands tend to be smaller in size than those that are associated with the flood hazard areas.

## Summary of Land Suitability

There are a variety of natural features within the study area that serve as both opportunities and constraints to development. The resources that influence development include groundwater resources, soils, prime farmland, floodplains, and wetlands.

Groundwater resources in the study area do not present a serious constraint to community development. The area in the immediate vicinity of Orrville contains adequate ground water resources for municipal and industrial well field development. The remainder of the study area includes groundwater resources that can support less intensive land use patterns without considerable difficulty. One exception is a small area in the northwest corner of the study area where water storage systems should be adequate to meet peak domestic demand in outlying areas.

Most of the study area is conducive to agricultural production. Most soils in the study area are considered to be prime farmland. Prime farmlands are those areas where due to slope, surface drainage and moisture, erosion, and soil makeup characteristics, agricultural activities are most productive. The same characteristics that make the land compatible with farming also make it compatible with urbanization. For this reason, farmland protection efforts—including efforts in Wayne County—have been undertaken throughout the nation to address localized threats caused by sprawl and leapfrog development.

Besides portions of the Sugar Creek watershed south of town, the study area is relatively unconstrained by threats caused by flood hazard and wetlands, although more-detailed wetland analysis will be necessary on a site-by-site basis. The community's location at the convergence of three watersheds, well-drained soils, and favorable topography all contribute to the absence of widespread problems related to surface drainage.

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