

CHAPTER 4

NATURAL RESOURCES

Introduction

A significant aspect of this plan entails the collection and analysis of key environmental data. The maps in this section provide a visual display of the existing environmental features in the township. It should be noted that the maps are not meant to replace an on-site investigation by a qualified professional soils scientist or a geotechnical engineer. Additional environmental data on a county-wide basis may be found in the Geauga County General Plan (GCPC, 2003) available on-line at: www.co.geauga.oh.us/departments/planning_commission.

The following environmental variables were collected, mapped, and analyzed:

- | | |
|-------------------------------------|--|
| ■ Detailed Soils | ■ Water Basins |
| ■ Prime Agricultural Land | ■ Watersheds |
| ■ Depth to Bedrock | ■ Hydrography |
| ■ Slope | ■ Flood Plains |
| ■ Topography | ■ Generalized Wetlands |
| ■ Shrink-Swell potential | ■ Drainage |
| ■ Potential Frost Action | ■ Generalized Groundwater Availability |
| ■ Depth to Seasonal High Watertable | ■ Groundwater Pollution Potential |
| ■ Permeability | |

Detailed Soils

A detailed soils analysis provides basic insights into the limitations of the physical environment on development. Each soil type reflects distinct characteristics which can be rated according to the degree of limitation that they represent for a specified land use.

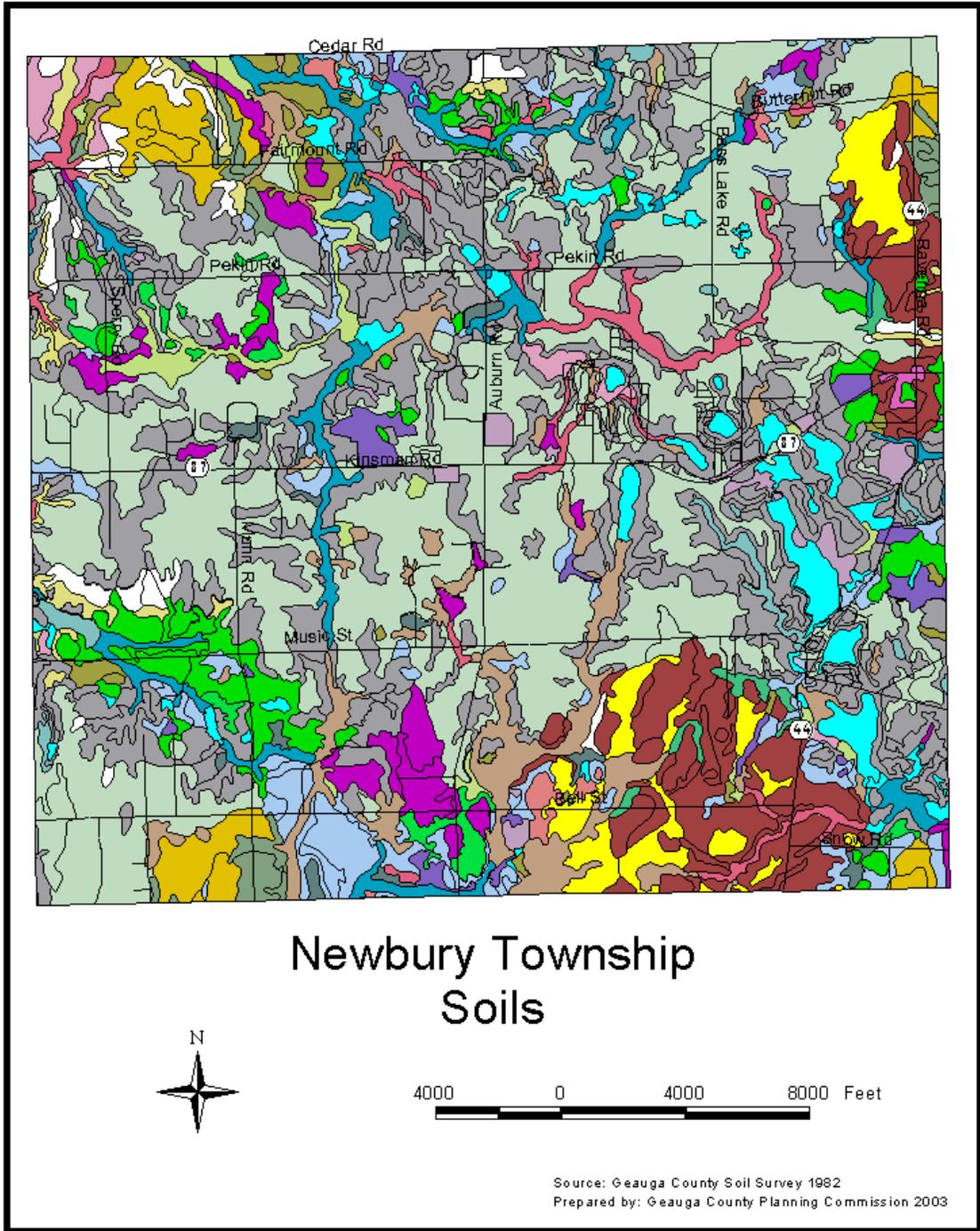
The Ohio Department of Natural Resources (ODNR), Division of Lands and Soils, conducted a soil survey of Newbury Township. Soil scientists examined the soil to a depth of three to five feet by means of an auger. The soil samples were laboratory tested to determine such properties as texture, permeability, and type of parent material. Wetlands, streams, and drainageways were also noted. Aerial base maps were utilized, following the field observations, to delineate the boundaries of the various soil types identified. A total of 33 different soil classifications were identified in Newbury Township (see Table 4.1 and Map 4.1).

The inventory and evaluation of the soils is a key element in the land use planning process. The land use plan is meant to be in harmony with the characteristics of the soil and the capability of it to support development.

Table 4.1
Soils Types
Newbury Township

	<u>Soils</u>	<u>Acreage</u>	<u>Percent of Township</u>
	Bg B - Bogart	78.2	0.41%
	Ca - Canadice	118.6	0.65%
	Cd B, C - Canfield	1,105.4	6.05%
	Cf - Carlisle Muck	153.4	0.84%
	Cn A, B, C - Chili	804.9	4.45%
	Co D - Chili Gravelly	41.5	0.25%
	Cy D, F - Chili Oshtemo	596.4	3.27%
	Da - Damascus	38.1	0.21%
	Eh B, C, D, E, F - Ellsworth	4,468.3	24.44%
	Fc A, B - Fitchville	241.0	1.31%
	Gf B, C - Glenford	27.1	0.15%
	Ho - Holly	598.0	3.27%
	Hs A, B - Haskins	450.5	2.46%
	Jt A - Jimtown	135.8	0.74%
	Lr B, C - Lordstown	73.6	0.40%
	Lx D, F - Lordstown Rock	205.7	1.12%
	Ly B, C - Loudonville	251.5	1.37%
	Mg A, B - Mahoning	5,478.1	29.98%
	Or - Orrville	318.2	1.74%
	Os B, C - Oshtemo	223.7	1.22%
	Pg - Pits, Gravel	178.0	0.97%
	Re A, B - Ravenna	449.8	2.46%
	Rm B - Rawson	144.4	0.79%
	Rs B, C, D, E, - Rittman	205.0	1.13%
	Sb - Sebring	791.4	4.33%
	Sf - Sheffield	2.0	0.01%
	Tg - Tioga	2.4	0.01%
	Ud - Udorthents	143.0	0.78%
	Ur - Urban Land	18.8	0.10%
	W - Water	374.6	2.05%
	Wb A, B - Wadsworth	443.1	2.43%
	Wc - Wallkill	45.4	0.25%
	Wu D - Wooster	66.6	0.36%
	Total	18,272.5	100.00%

Map 4.1



Prime Agricultural Land

As defined by the United States Department of Agriculture, Natural Resource Conservation Service (NRCS), prime agricultural land has the appropriate soil quality, moisture supply, and attendant growing season to produce a high crop yield when treated and managed in accordance with modern farm methods. Generally, prime agricultural soils will be more productive under intense cultivation than other soils, using the same management practices. About 72% of the soils in the township are considered prime agricultural land (see Table 4.2 and Map 4.2).

Table 4.3 reflects the prime agricultural land classification system utilized by NRCS. The numbers represent progressively greater limitations, a narrower choice of crops, and the way crops respond to management. The letters given are subclasses, which indicate the problems associated with a particular soil type. The letter “E” means that the primary limitation is the risk of erosion (unless close-growing plant cover is maintained) and the letter “W” indicates that water in, or on the surface of, the soil interferes with plant growth or cultivation.

More information concerning farmland and related agricultural activities may be found in the Geauga County Farmland Preservation Plan (GCPC, 2001) available on-line at www.co.geauga.oh.us/departments/planning_commission.

Table 4.2

Prime Agricultural Soil Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Prime	2,963.59	16.22%
Prime with Drainage	10,245.05	56.07%
Non-Prime	4,349.28	23.80%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.2

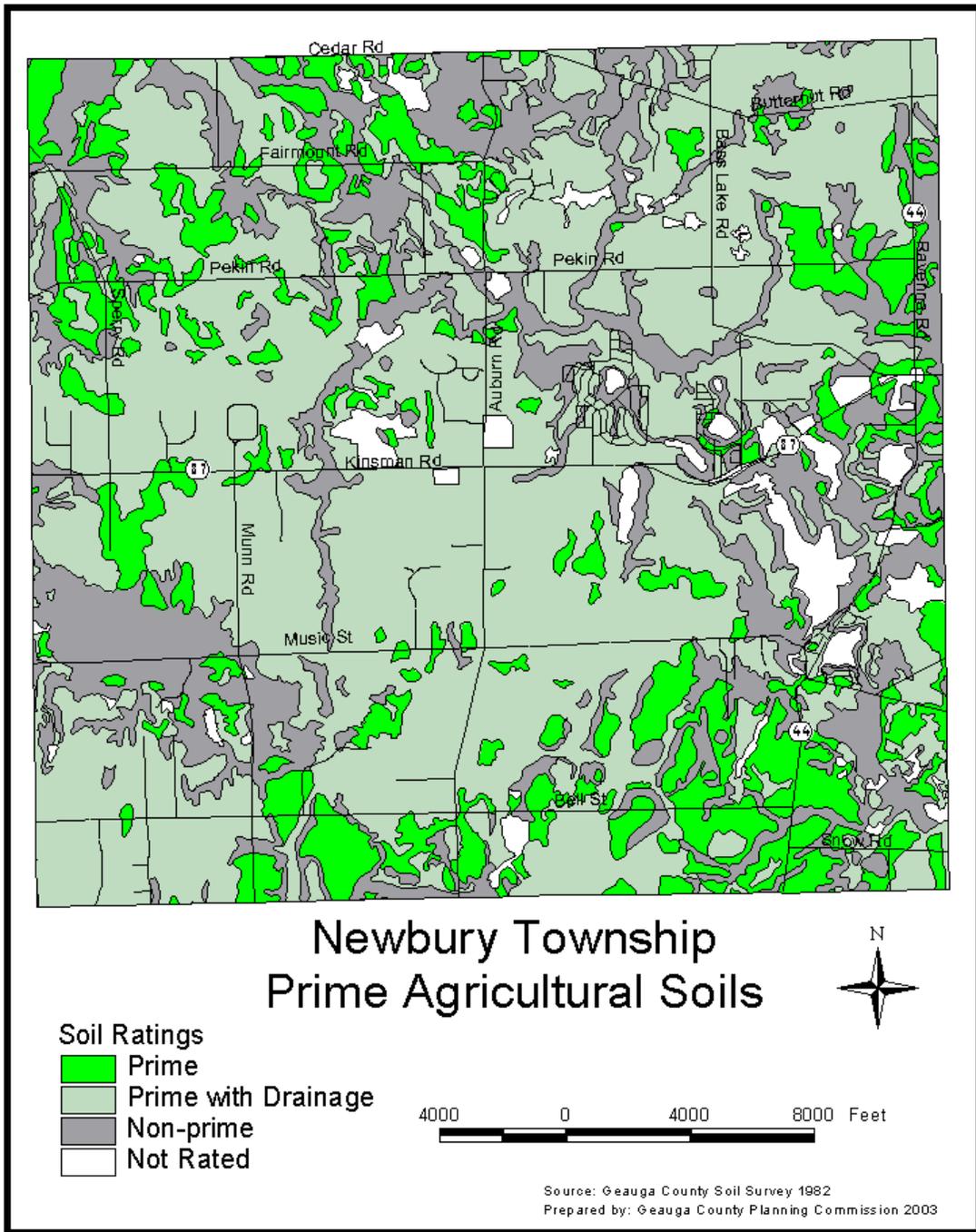


Table 4.3**Agricultural Ratings**
Newbury Township

Mapping Units	Soils	Agricultural Classification	Prime Land
Bg B	Bogart	2E	X
Ca	Canadice	3W	
Cd B	Canfield	2E	X
Cd C	Canfield	3E	
Cf	Carlisle	5W	
Cn A, B	Chili	2E	X
Cn C	Chili	3E	
Co D	Chili	4E	
Cy D, F	Chili-Oshtemo	4E	
Da	Damascus	3W	X*
Eh B	Ellsworth	2E	X
Eh C	Ellsworth	4E	
Eh D, E, F	Ellsworth	5E	
Fc A, B	Fitchville	3W	X*
Gf B	Glenford	2E	X
Gf C	Glenford	3E	
Hs A, B	Haskins	2E	X*
Ho	Holly	3W	
Jt A	Jimtown	3W	X*
Lr B	Lordstown	2E	X
Lr C	Lordstown	3E	
Lx D, F	Lordstown	5E	
Ly B	Loudonville	2E	X
Ly C	Loudonville	5E	
Mg A, B	Mahoning	3E	X*
Or	Orrville	3W	
Os B	Oshtemo	2E	X
Os C	Oshtemo	3E	
Re A, B	Ravenna	3E	X*
Rm B	Rawson	2E	X
Rs B	Rittman	2E	X
Rs C	Rittman	4E	
Rs D, E	Rittman	5E	
Sb	Sebring	3W	X*
Sf	Sheffield	3W	
Tg	Tioga	3W	
Wb A, B	Wadsworth	3E	X*
Wc	Wallkill	5W	
Wu D	Wooster	5E	

* Qualify as prime Farmland provided proper drainage measures are employed.

Source: Geauga County Soil Survey, 1982

Depth to Bedrock

About three percent of the township (see Table 4.4) is underlain by bedrock at a depth of less than five feet from the surface. As shown on Map 4.3, the areas of shallow bedrock are primarily located around the center of the township. The specific soil types which identify shallow bedrock include: Lordstown Rock Outcrop Complex, Loudonville Silt Loam, and Lordstown Loam.

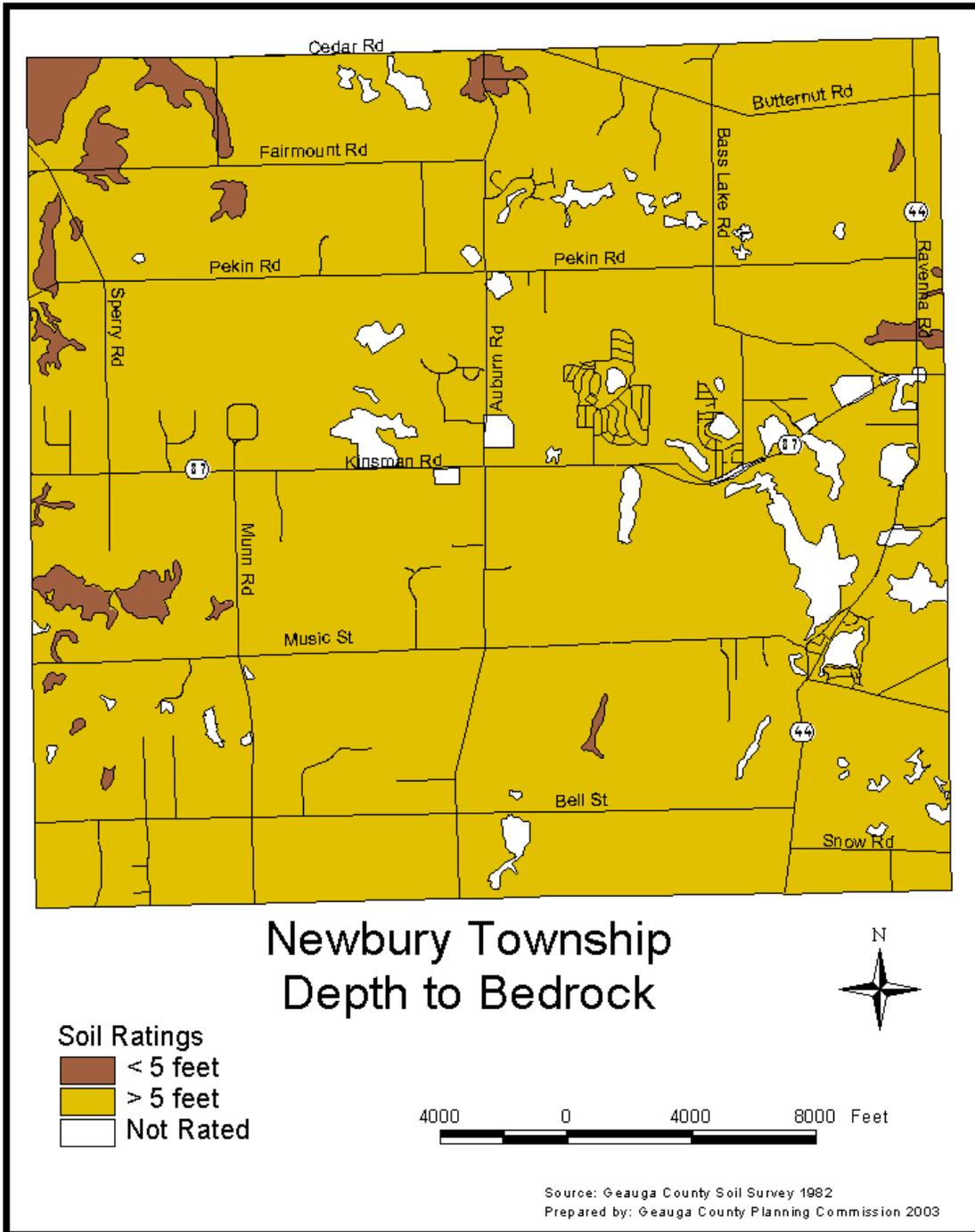
Table 4.4

Depth to Bedrock Map Legend
Newbury Township

<u>Depth to Bedrock</u>	<u>Acres</u>	<u>Percent of Township</u>
Depth to Bedrock < 5 feet	530.88	2.91%
Depth to Bedrock > 5 feet	17,027.04	93.18%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.3



Slope

Slope represents the inclination of the land surface from a horizontal plane. The percentage of slope is determined by taking the vertical distance divided by the horizontal distance, then multiplying it by 100. Consequently, a 10 percent slope is a vertical change of 10 feet in 100 feet of horizontal distance.

According to Table 4.5 and Map 4.4, over 66% of the terrain in Newbury Township is classified as level to gently rolling (0 to 6%). Slope of 6 to 12% covers over 18% of the community's land area. The highest point in the township is at an elevation of approximately 1,360 feet, which occurs along Butternut Road approximately one half mile west of S.R. 44. The lowest point is at an elevation of 1,080 feet along Silver Creek.

The degree of slope has an impact on the feasibility of placing improvements on a site. Steeply sloped areas may be unsuitable for development. Erosion and runoff of soil sediment during construction is a significant concern. On-site septic systems may not function properly on severe or very severe soil slopes.

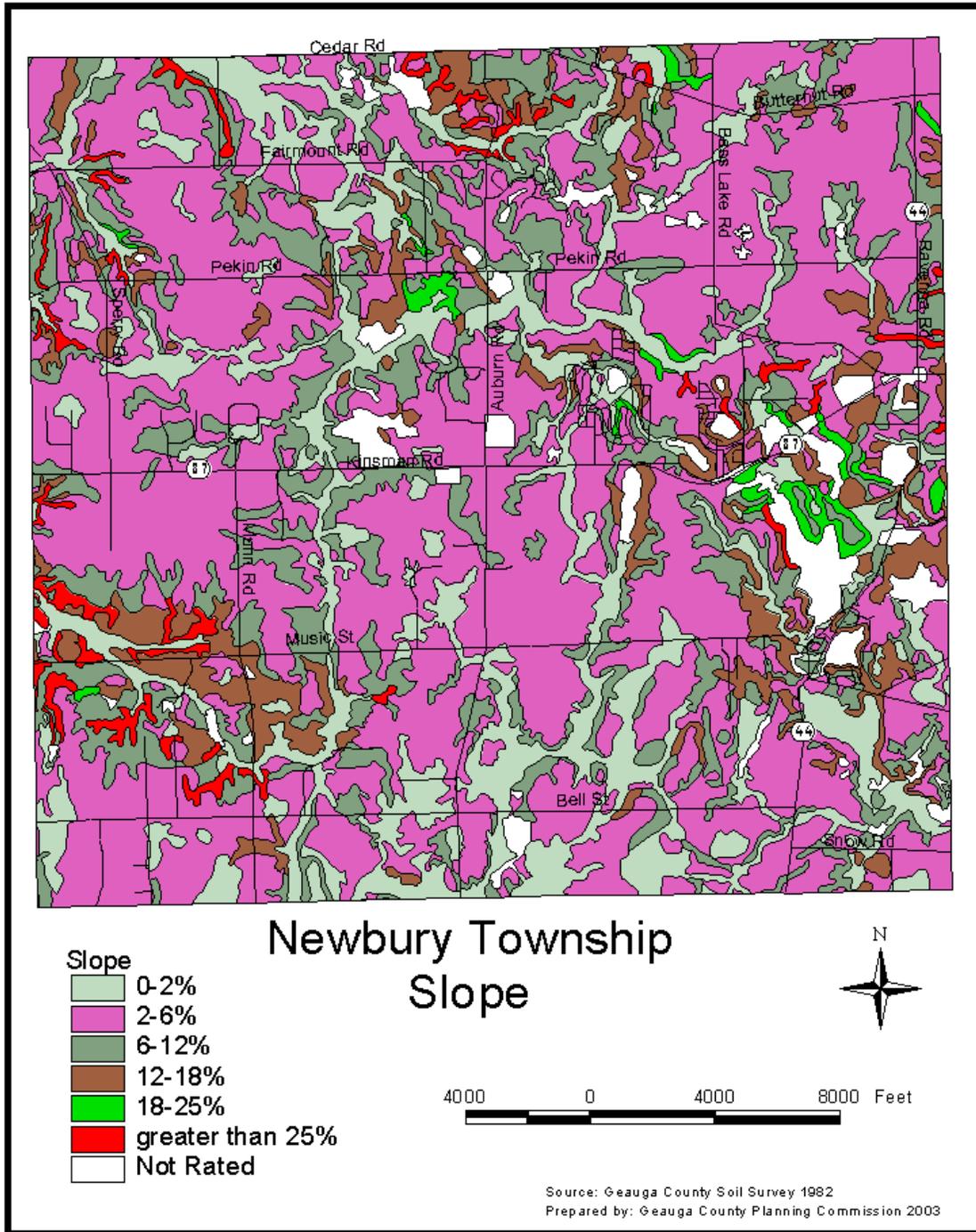
Table 4.5

Slope Map Legend
Newbury Township

<u>Percent Slope</u>	<u>Acres</u>	<u>Percent of Township</u>
0 – 2%	3,130.14	17.13%
2 – 6%	9,098.25	49.79%
6 – 12%	3,294.62	18.03%
12 – 18%	1,464.96	8.02%
18 – 25%	204.48	1.12%
Greater than 25%	365.47	2.00%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

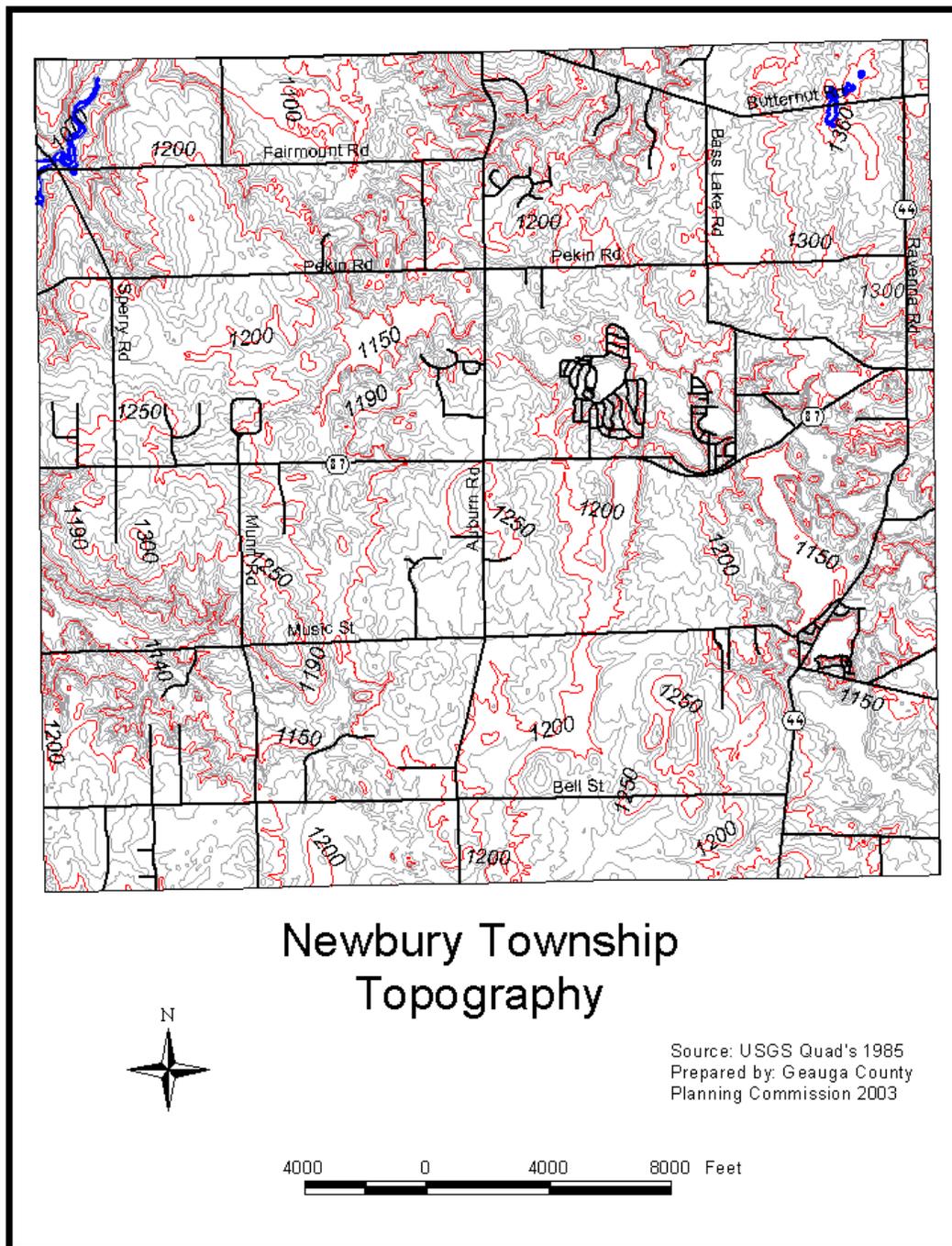
Map 4.4



Topography

The highest point in the township is at an elevation of approximately 1,360 feet located in the northeast corner of the township along Butternut Road. The lowest point is at an elevation of 1,070 feet located in the northwest corner of the township along the township border and Fairmount Road (see Map 4.5).

Map 4.5



Shrink-Swell Potential

Shrink-swell potential is a measurement of the relative change in volume of soil material, based on changes in its moisture content. The degree of swelling and shrinking of soil is also influenced by the amount of clay ingredient. Soils rated with a “high” shrink-swell potential may cause roads to deteriorate and foundations to crack and move. The majority of the township, about 63%, has soils rated “moderate” (see Table 4.6 and Map 4.6).

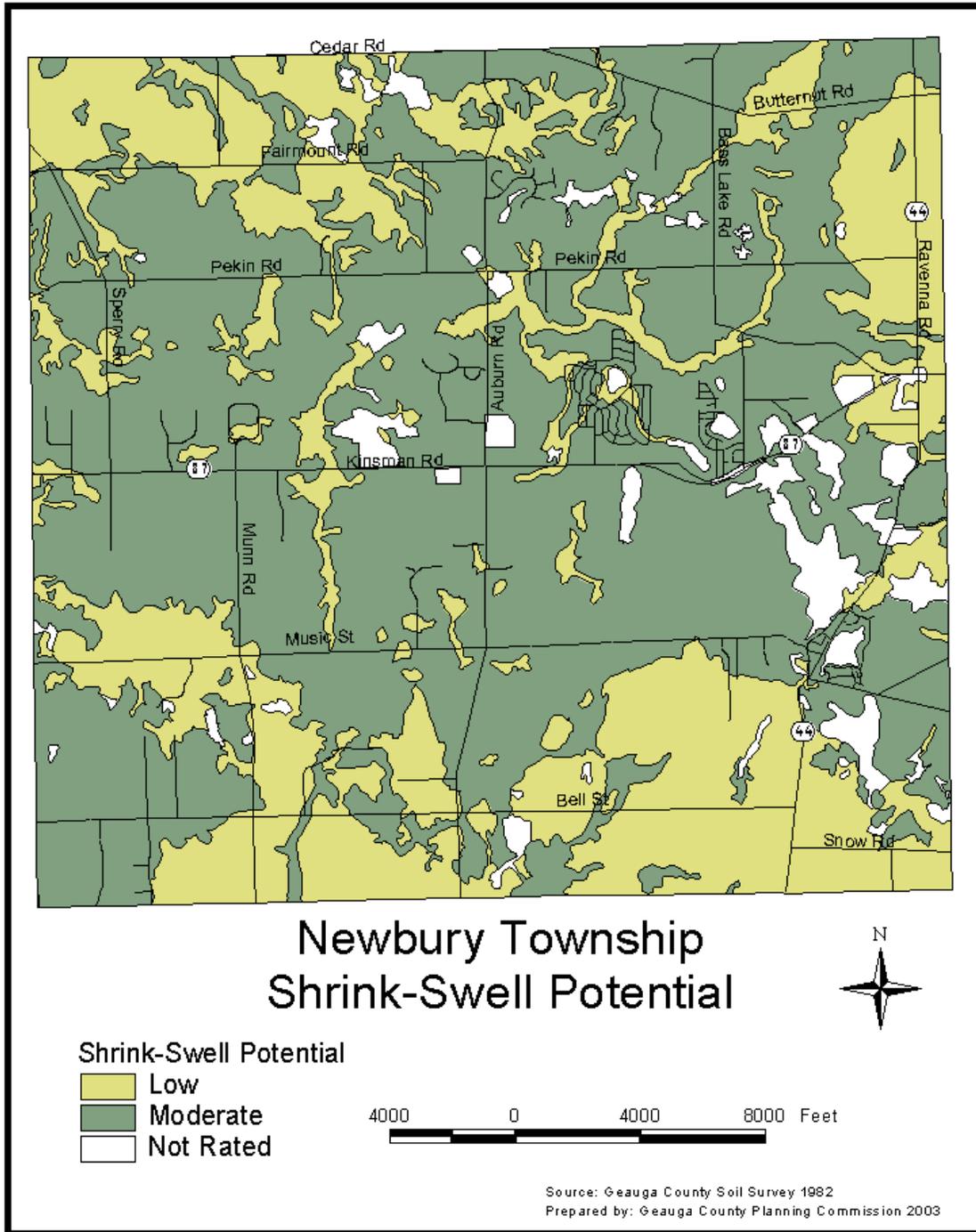
Table 4.6

Shrink-Swell Potential Map Legend **Newbury Township**

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Low	5,911.57	32.35%
Moderate	11,493.07	62.90%
Not Rated	867.86	4.75%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.6



Potential Frost Action

Potential frost action rates the possibility for damage resulting from heaving, excessive wetting, and loss of soil strength in areas where substantial ground freezing is common. Low soil strength coupled with frost heave may cause damage to roads and foundations. The majority of the township (82%) is rated “high” for potential frost action (see Table 4.7 and Map 4.7).

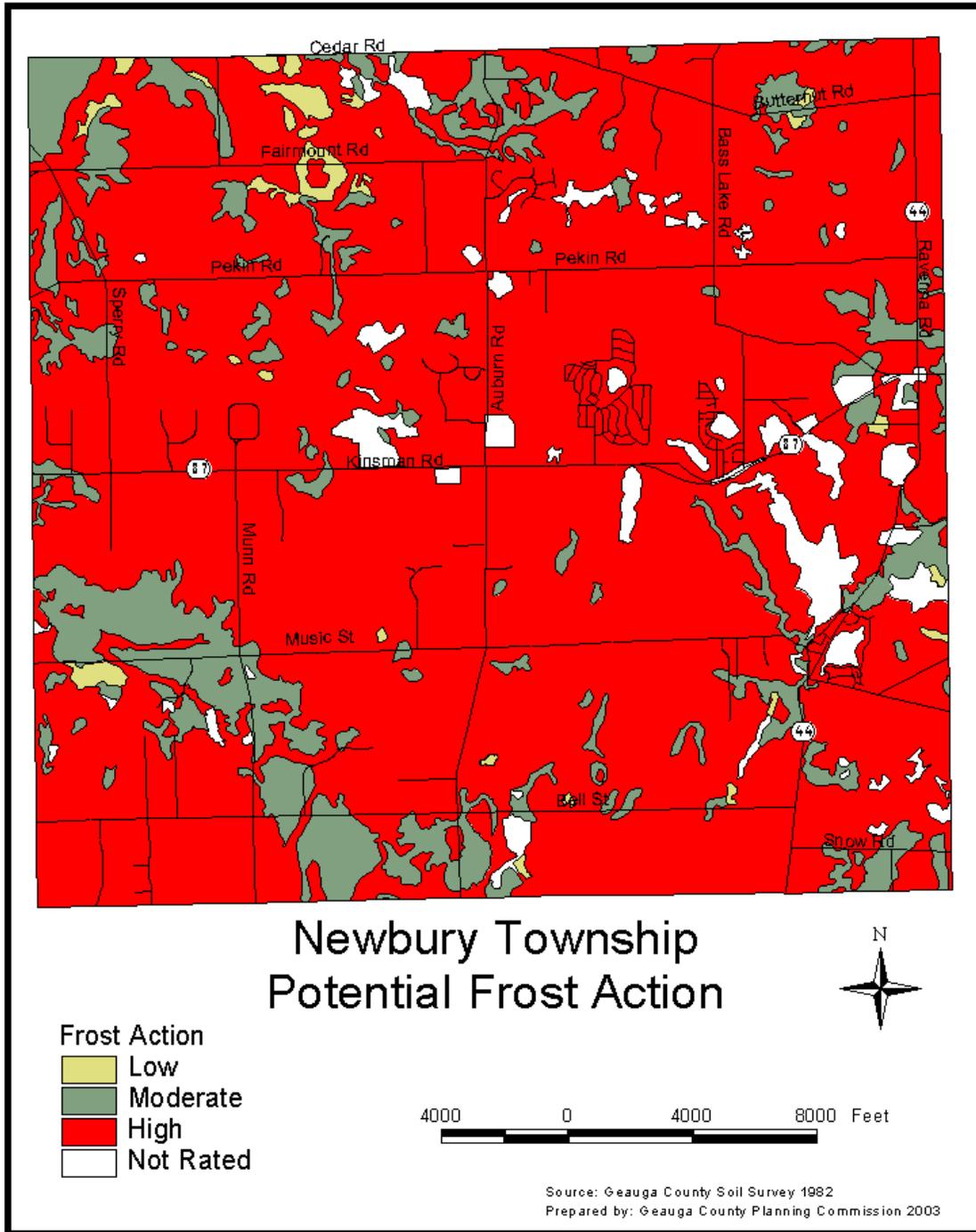
Table 4.7

Potential Frost Action Map Legend **Newbury Township**

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Low	223.75	1.22%
Moderate	2,305.85	12.62%
High	15,028.32	82.25%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.7



Depth to Seasonal High Water Table

Depth to seasonal high water table indicates the shallowest depth at which the soil is saturated in a zone more than six inches thick for a continuous period of more than two weeks. A high seasonal water table may cause the improper operation of on-site sewage disposal systems, wet or flooded basements, and cracked or damaged foundations. Specially designed drainage systems and foundations may be required. About 32% of the township is in the 24-36 inch category (see Table 4.8 and Map 4.8).

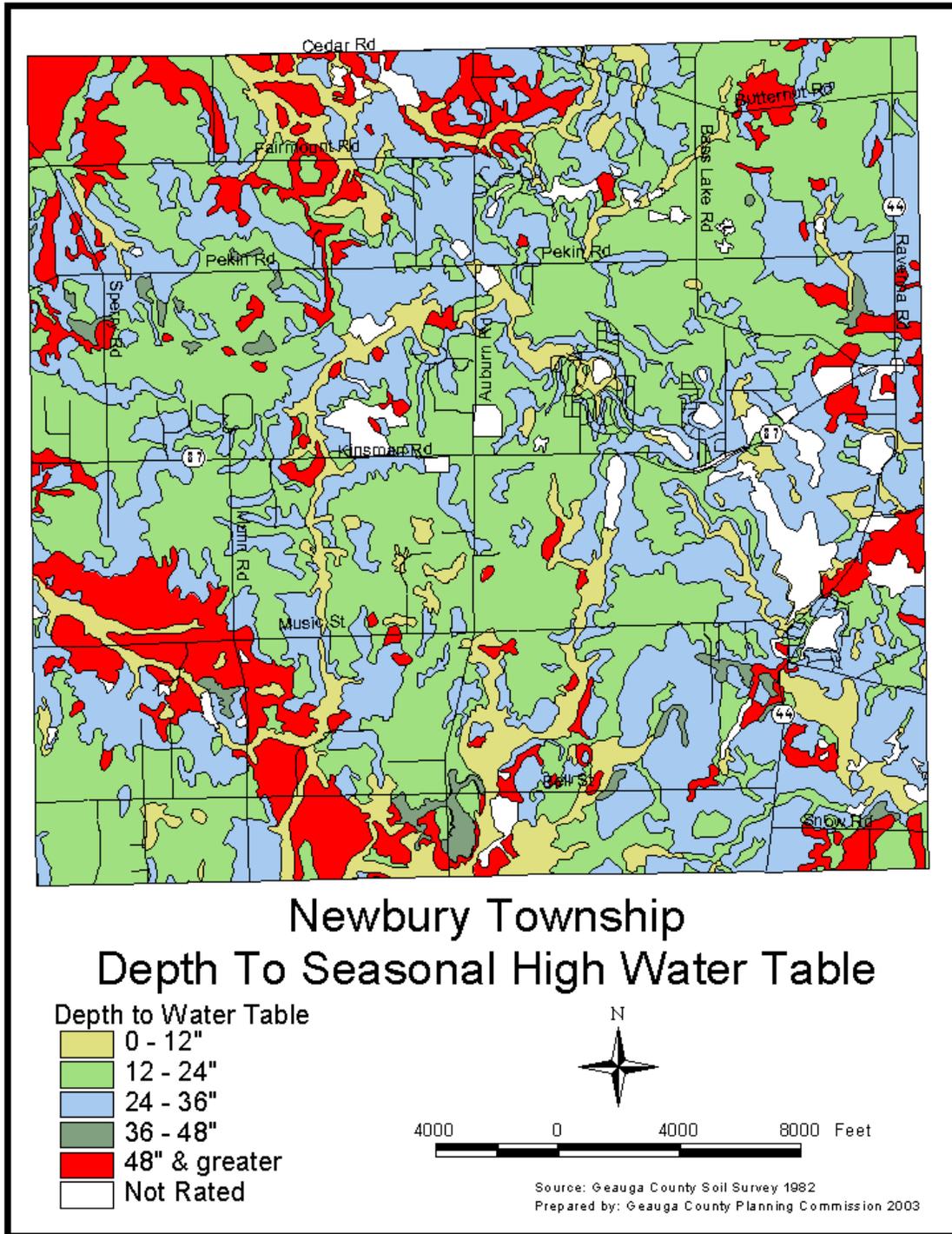
Table 4.8

Depth to Seasonal High Water Table Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
0 – 12 inches	1,746.05	9.56%
12 – 24 inches	7,516.40	41.13%
24 – 36 inches	5,884.50	32.20%
36 – 48 inches	213.38	1.17%
Greater than 48 inches	2,197.59	12.03%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.8



Permeability

Permeability is an estimate of the rate of downward water movement in a soil horizon when it is saturated but allowed to drain freely. It is typically expressed in inches per hour (iph). The rate of permeability is primarily determined by the soil texture, structure, porosity, and infiltration tests. It is an important variable in the successful operation of septic tank leach fields. The majority of the township (70%) is rated “very slow” to “slow” for permeability (see Table 4.9 and Map 4.9).

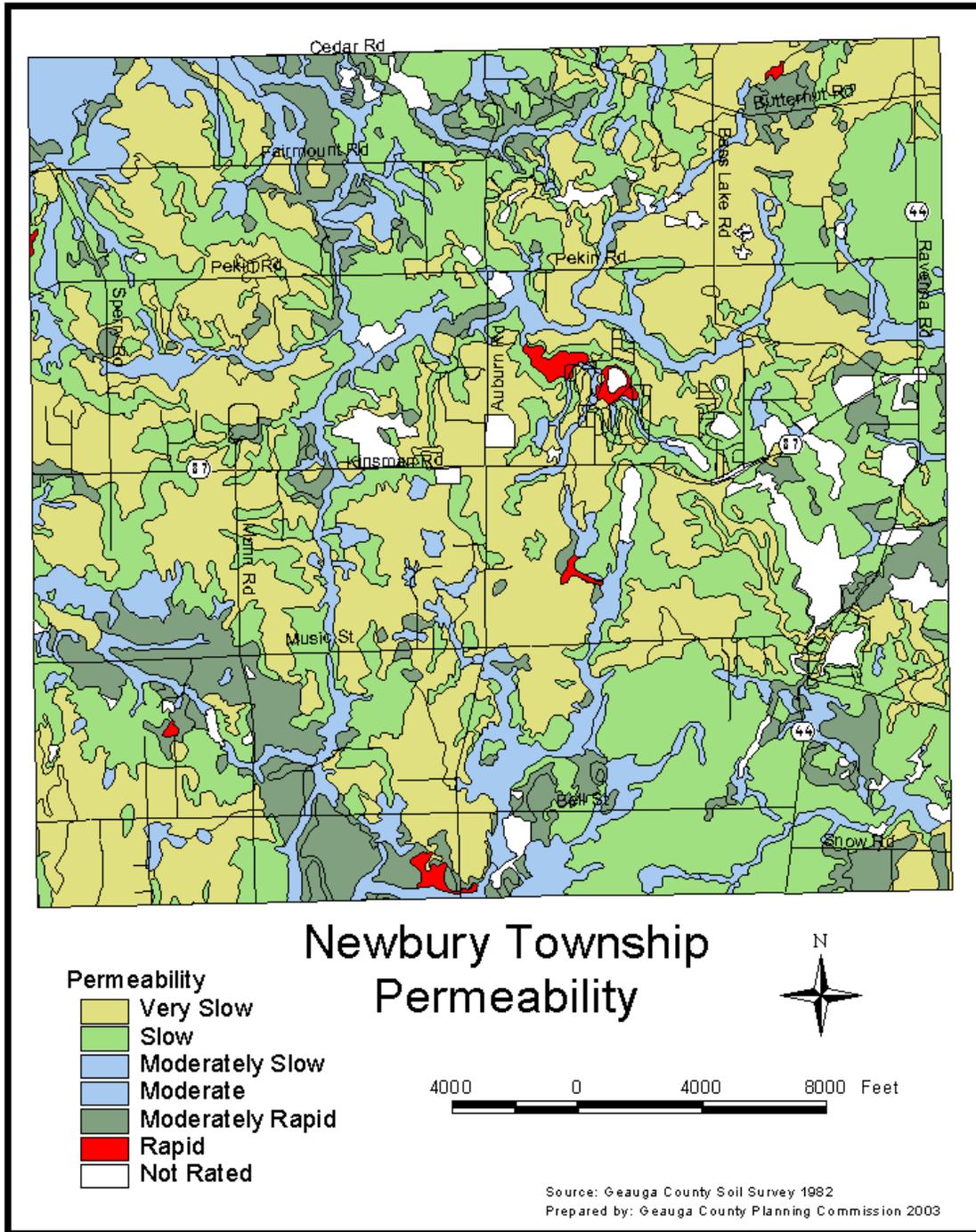
Table 4.9

Permeability Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Very Slow: < 0.06 iph	6,634.66	36.31%
Slow: 0.06 to 0.20 iph	6,230.08	34.09%
Moderately Slow: 0.2 to 0.6 iph	1,099.15	6.02%
Moderate: 0.6 to 2.0 iph	1,474.13	8.07%
Moderately Rapid: 2.0 to 6.0 iph	2,033.99	11.13%
Rapid: 6.0 to 20.0 iph	85.91	0.47%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.9



Water Basins and Watersheds

Newbury Township is part of two major water basins (the Cuyahoga and Chagrin Rivers) and six watersheds (see Table 4.10, Map 4.10, and Map 4.11).

During periods of precipitation, all of the excess water that is not absorbed into the ground is called runoff. Eventually, the runoff travels through a watershed and into a stream, which in turn flows through downstream watersheds.

Runoff often produces soil erosion and soil sediment that is regarded to be a pollutant. It degrades water quality and can disrupt sensitive ecological conditions. In recognition of the problems associated with soil erosion and water pollution, the Geauga County Board of Commissioners adopted water and soil sediment pollution control regulations in 1979. The regulations are enforced by the Geauga Soil and Water Conservation District (SWCD). The township has adopted zoning regulations concerning stormwater runoff and soil sediment pollution as well.

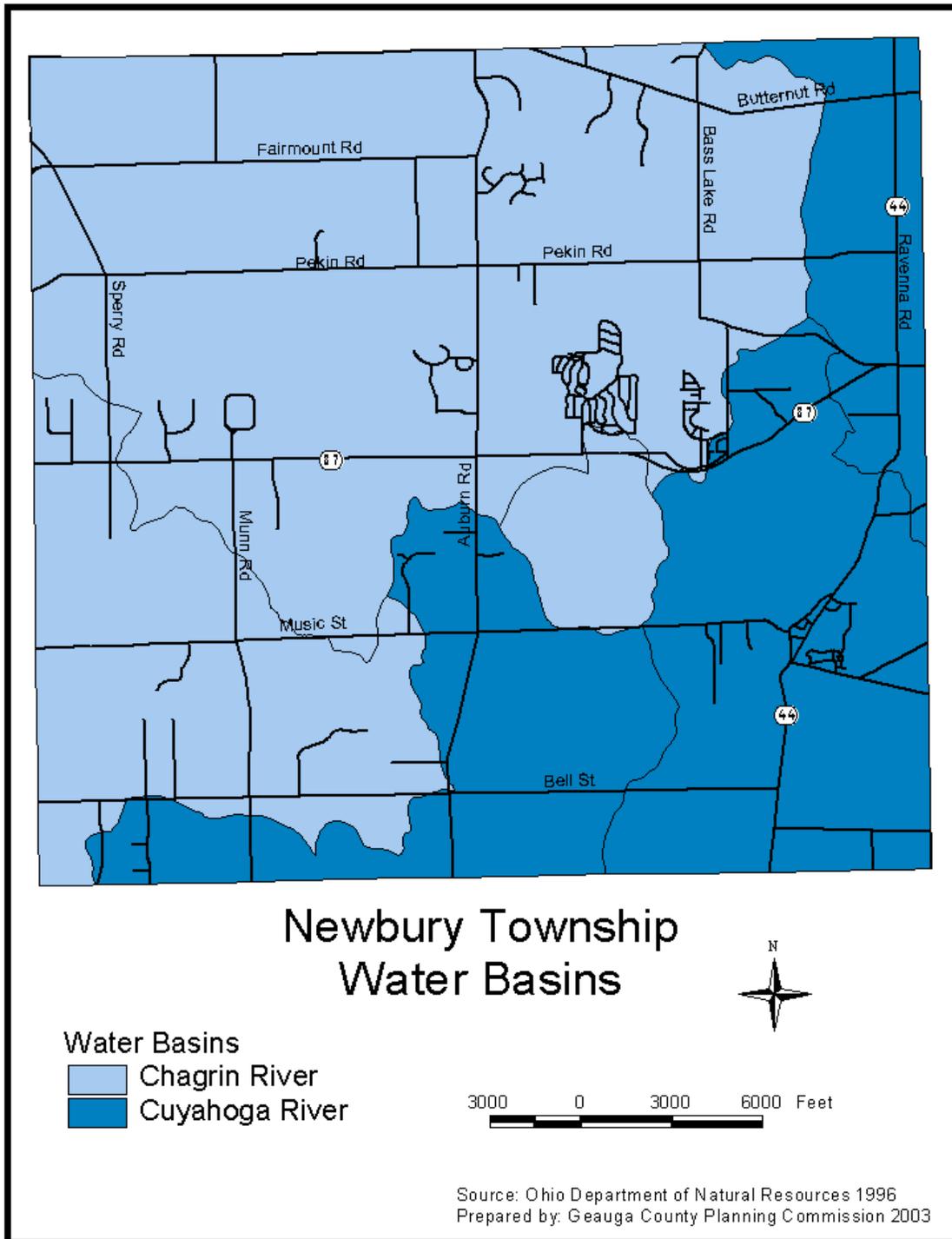
Table 4.10

Water Basins and Watersheds Map Legend
Newbury Township

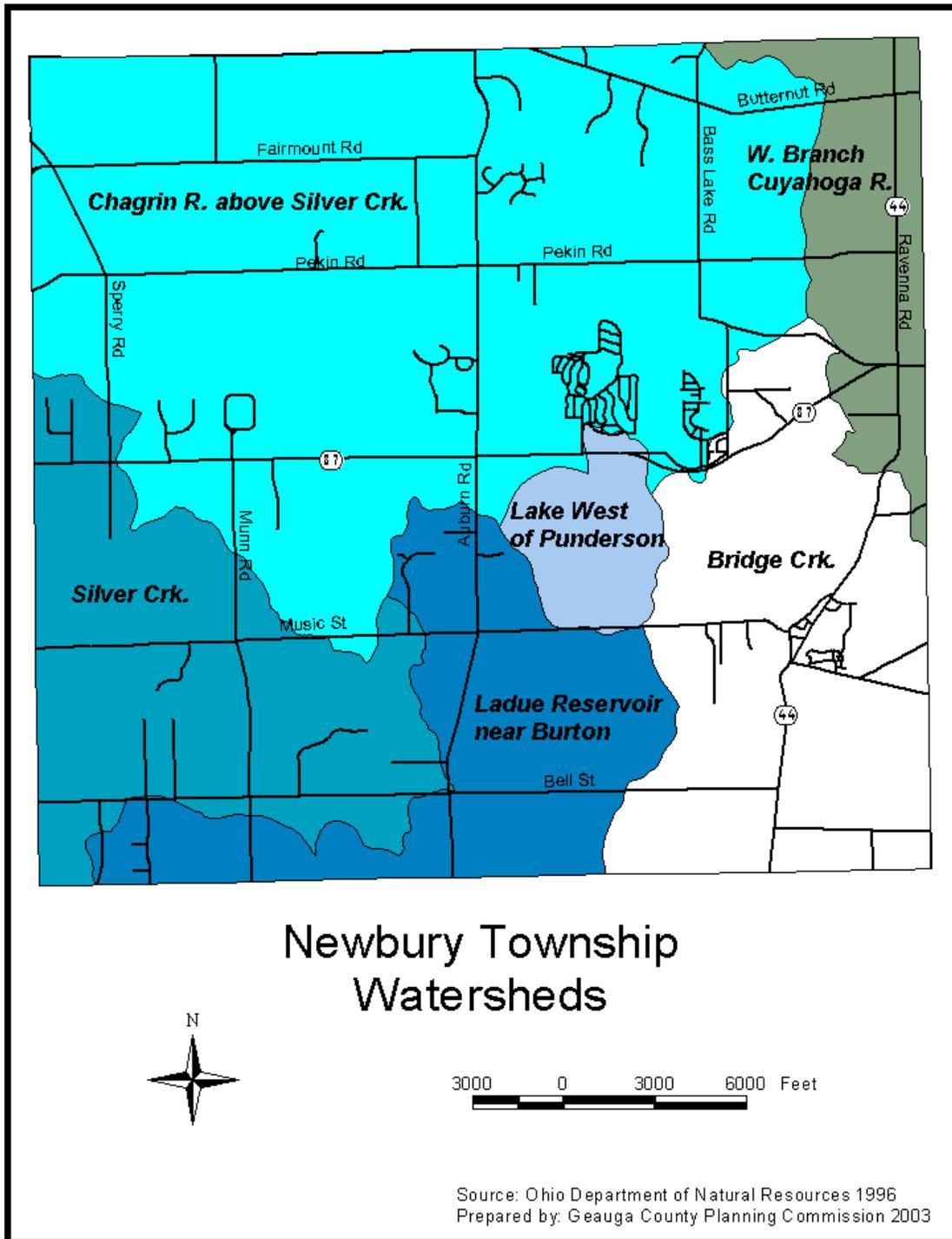
<u>Water Basins</u>	<u>Watersheds</u>	<u>Area (acres)</u>	<u>Percent of Township</u>
Cuyahoga River	West Branch-Cuyahoga River	1,199.93	6.57%
Cuyahoga River	Bridge Creek	3,110.67	17.02%
Cuyahoga River	LaDue Reservoir near Burton	2,179.49	11.93%
Chagrin River	Chagrin River above Silver Creek	8,372.49	45.82%
Chagrin River	Silver Creek	2,837.87	15.53%
Chagrin River	Lake West of Punderson	572.05	3.13%
	Total	18,272.50	100.00%

Source: Ohio Department of Natural Resources, 1979

Map 4.10



Map 4.11

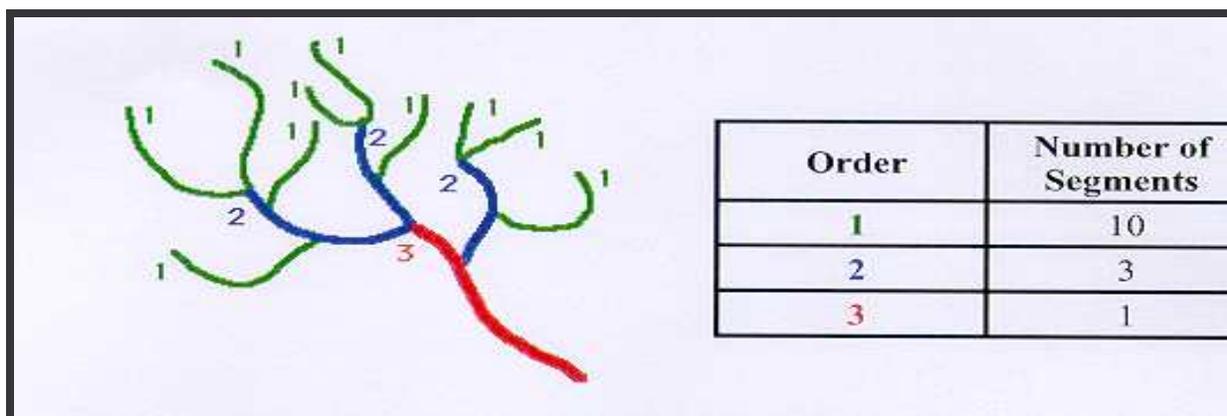


Generalized Hydrography

A hydrography map of the township was created through an analysis of the topography (see Map 4.12). The first attributes to be quantified were the hierarchy of stream segments according to a classification system. In this system, channel segments were ordered numerically from a stream's headwaters to a point down stream. Numerical ordering begins with the tributaries at the stream's headwaters being assigned the value "one." A stream segment that resulted from the joining of two first order segments was given an order of "two." The second order streams formed third order streams, and so on. An example is shown in the following figure.

Figure 4.1

Stream Segmentation Newbury Township



As shown in Table 4.11, Newbury Township contains a majority of fourth order streams, based on the linear footage of its stream ordering. The first, second, and third order streams are not shown due to the sheer number of stream segments they contain. The stream ordering lengths get smaller as the ordering number gets larger. The larger the segment number, the larger the drainageway. For example, the stream "nine" category includes the drainageways with the most tributaries flowing into them.

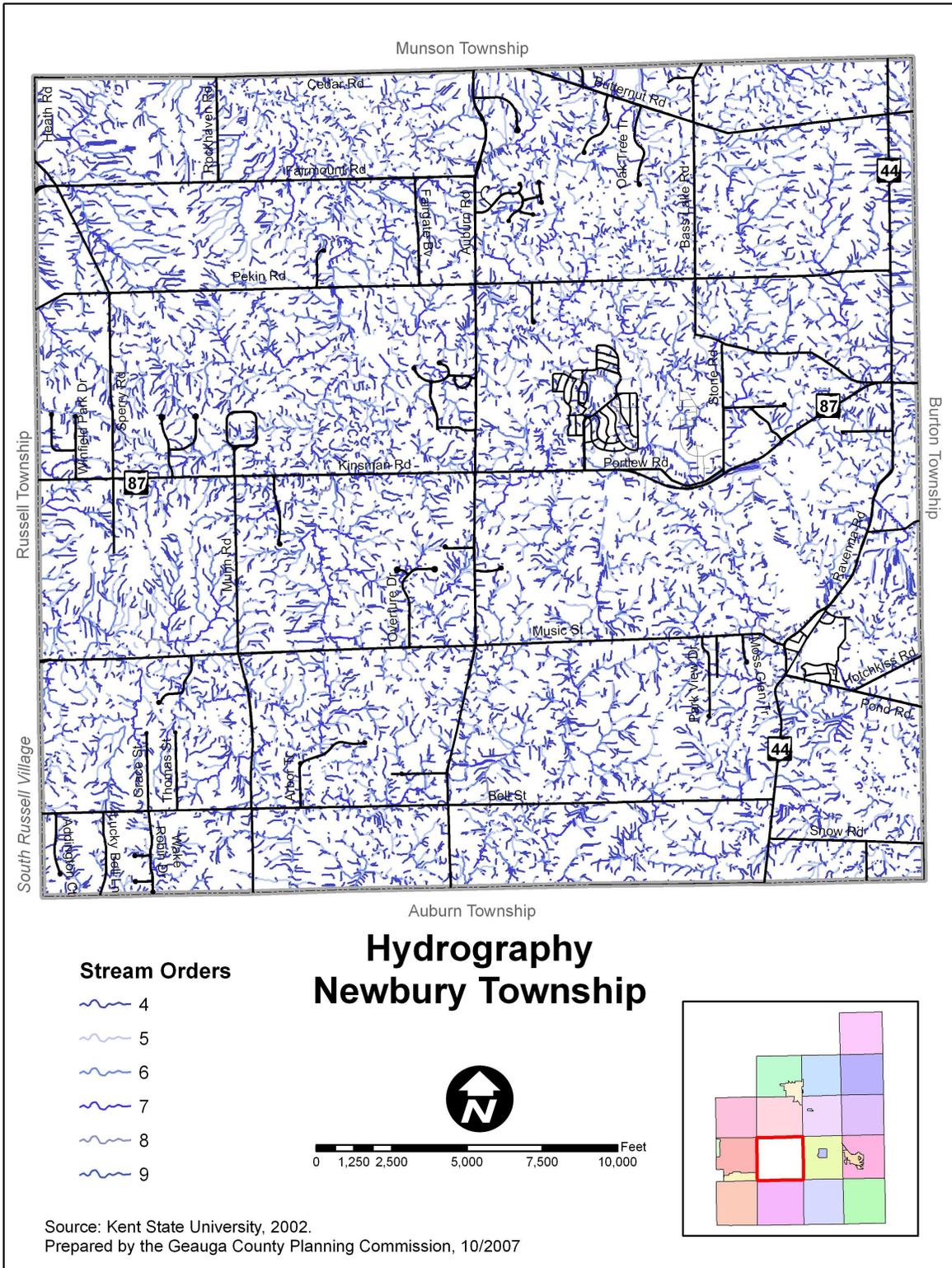
Table 4.11

Hydrography Newbury Township

<u>Stream Orders</u>	<u>Total Linear Feet</u>
4	1,916,500.69 feet
5	894,977.73 feet
6	483,885.26 feet
7	167,504.34 feet
8	30,958.90 feet
9	595.01 feet
Total	3,494,421.92 feet

Source: Kent State University, 2000

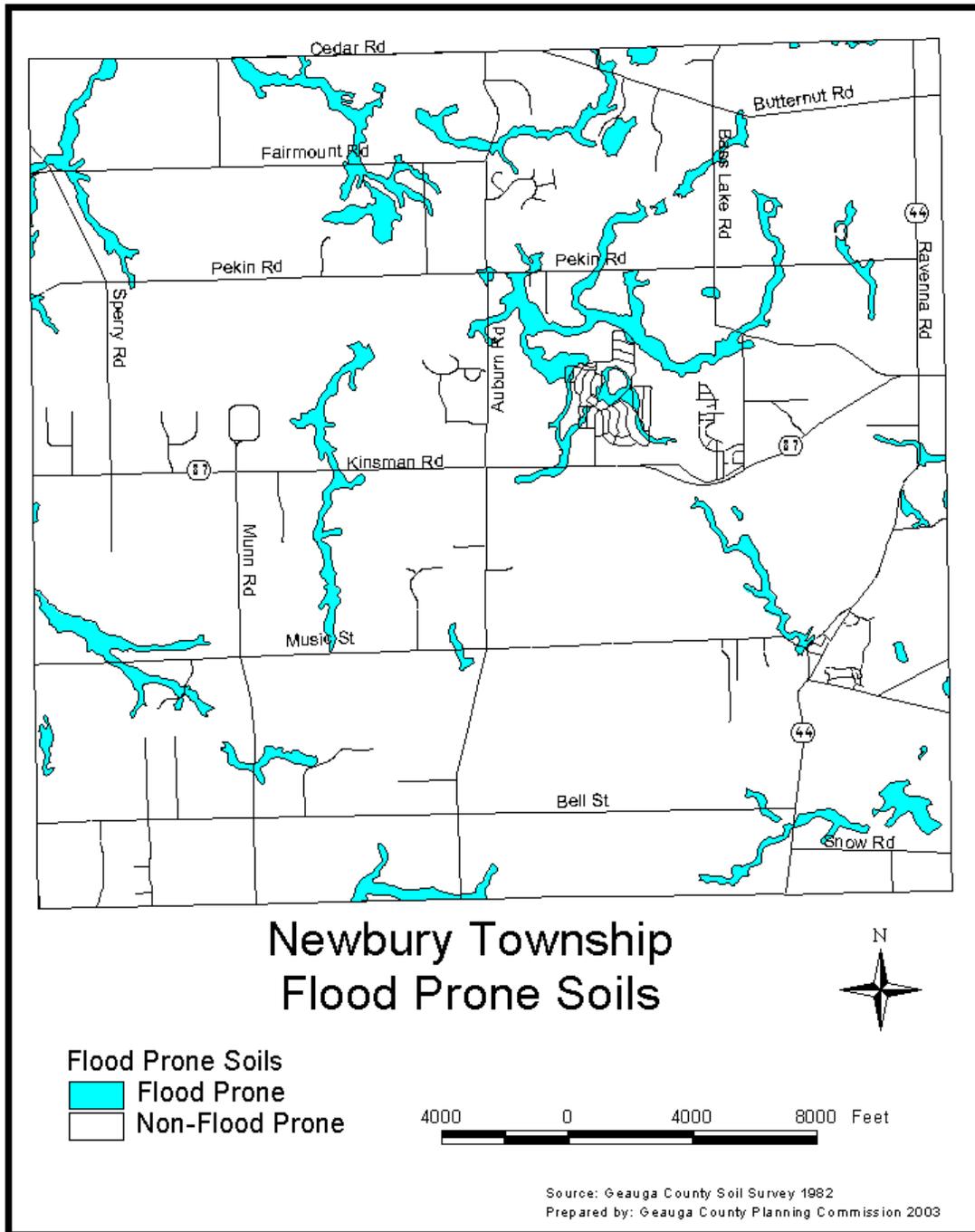
Map 4.12



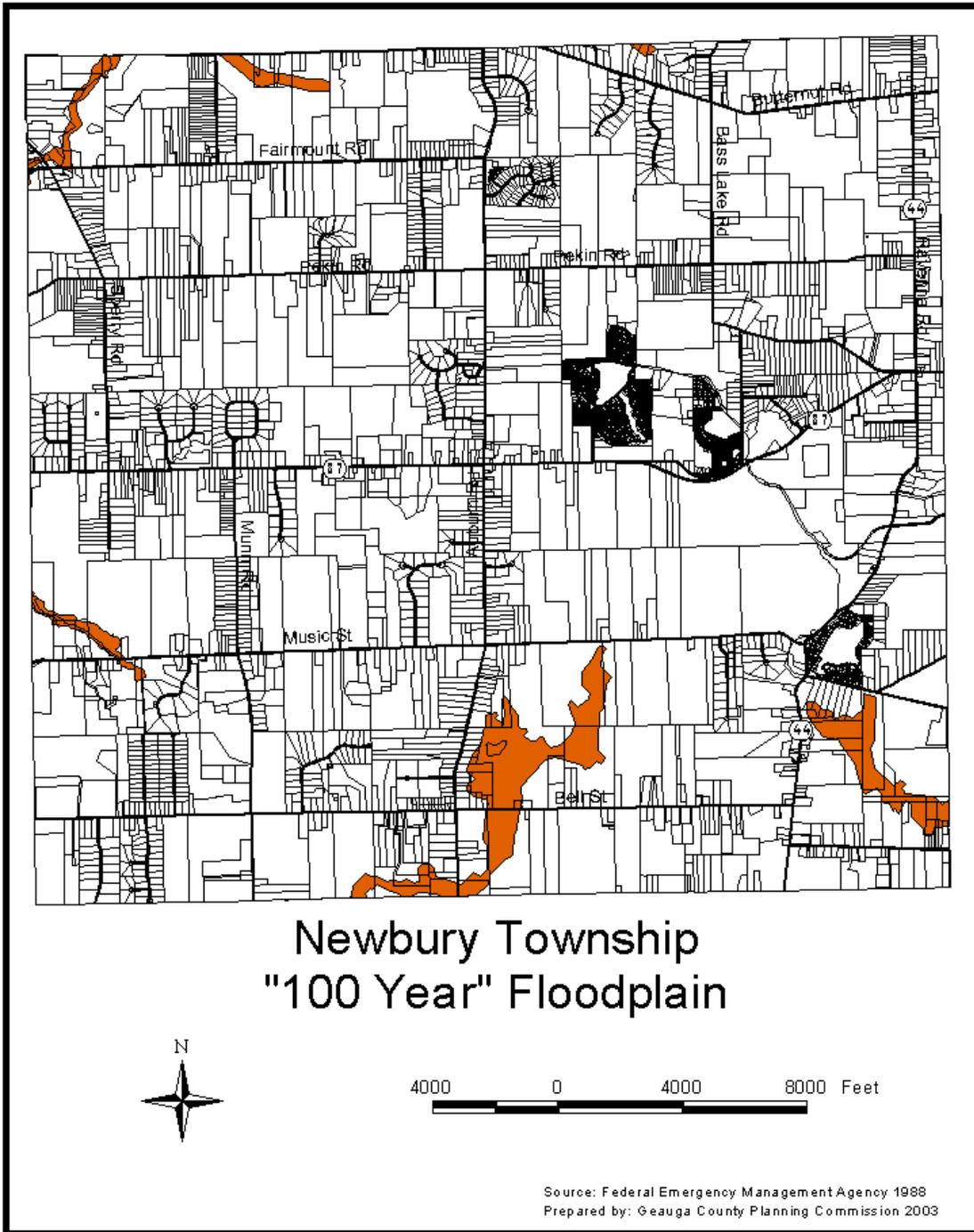
Flood Plains

Within Newbury Township, 1,082.51 acres or 6% of the township are considered flood prone or hydric soils (see Map 4.13). However, 517.38 acres (3%) are designated as a “100 year” flood plain by the Federal Emergency Management Agency or FEMA (see Map 4.14).

Map 4.13



Map 4.14



Generalized Wetlands

The U. S. Department of the Interior, Fish and Wildlife Service (FWS), prepared a wetlands inventory of the township. The generalized map on the following page is meant to represent the areas identified as wetlands through the FWS inventory and the soils map of Newbury Township (see Table 4.12 and Map 4.15).

These areas were delineated by the FWS through the use of stereoscopic analysis of high altitude aerial photographs. Under the FWS classification system, wetlands must have one or more of the following three attributes:

1. Hydrophytic Vegetation: plant life which grows in water, soil or a substrate that is at least periodically deficient in oxygen as a result of excessive water content.
2. Hydric Soils: soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions (absence of free oxygen) in the upper part of the horizon.
3. Wetland Hydrology: permanent or periodic inundation, or soil saturation to the surface, at least seasonally.

Wetlands merit protection due to the array of useful functions they perform. They improve water quality by serving as a natural filtration system. The vegetation traps sediment and other pollutants from the water. Wetlands retain large quantities of water, thereby providing downstream protection during periods of heavy rainfall and, conversely, supplementing streams during periods of dry weather and low flow. Finally, wetlands serve as havens for some rare plant species as well as breeding, nesting, and feeding grounds for a variety of wildlife. The U.S. Army Corps of Engineers is involved with regulation of wetlands under Section 404 of the Clean Water Act as well as the Ohio EPA. Newbury Township has 2,067.38 acres in wetlands, which is 11% of its total area.

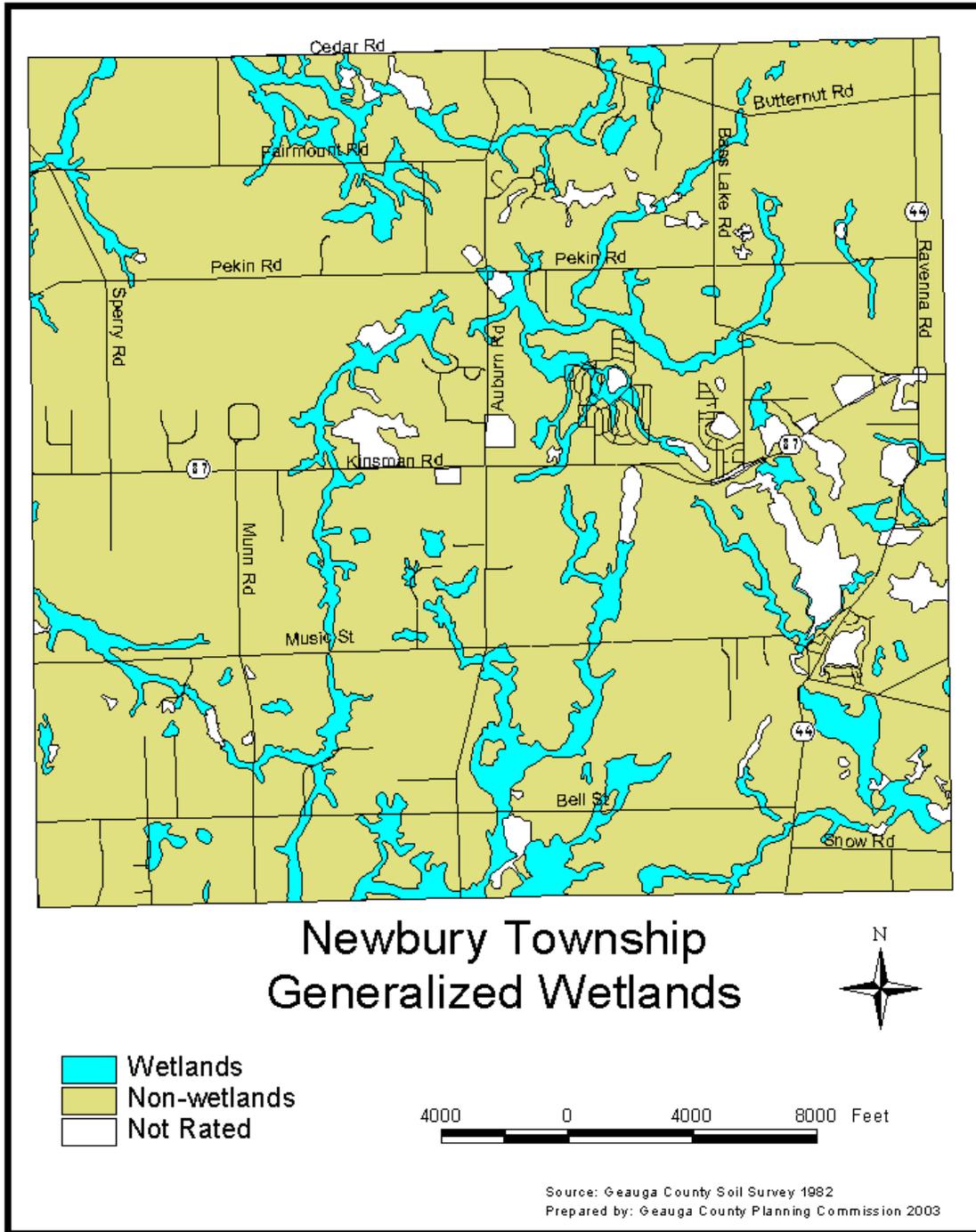
Table 4.12

Generalized Wetlands Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Wetlands	2,067.38	11.31%
Non-Wetlands	15,490.54	84.78%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.15



Drainage

Drainage describes the rapidity and the extent of the removal of water from the soil (see Table 4.13 and Map 4.16). The definitions below relative to drainage are from the Ohio Department of Natural Resources, Division of Lands and Soil:

Very Poorly Drained (VPD) - Water is removed so slowly that the soil is saturated for an extended length of time.

Poorly Drained (PD) - Water is removed from the soil so slowly that it remains wet for long periods of time. The water table is commonly at or near the surface during a considerable part of the year.

Somewhat Poorly Drained (SPD) - Water is removed from the soil so slowly that it remains wet for significant periods, but not all of the time. Somewhat poorly drained soils commonly have a slow permeable layer within the profile, a high water table, additions through seepage, or a combination of these conditions.

Moderately Well Drained (MWD) - Water is removed from the soil somewhat slowly so that the profile is wet for a small but significant part of the time. Moderately well drained soils commonly have a slow permeable layer within or immediately beneath the surface soil and subsoil layers, a relatively high water table, additions of water through seepage, or some combination of these conditions.

Well Drained (WD) - Water is removed from the soil readily, but not rapidly. Well-drained soils are commonly loamy textured, although soils of other texture may also be well drained.

Approximately 41 percent of the township is “somewhat poorly drained.”

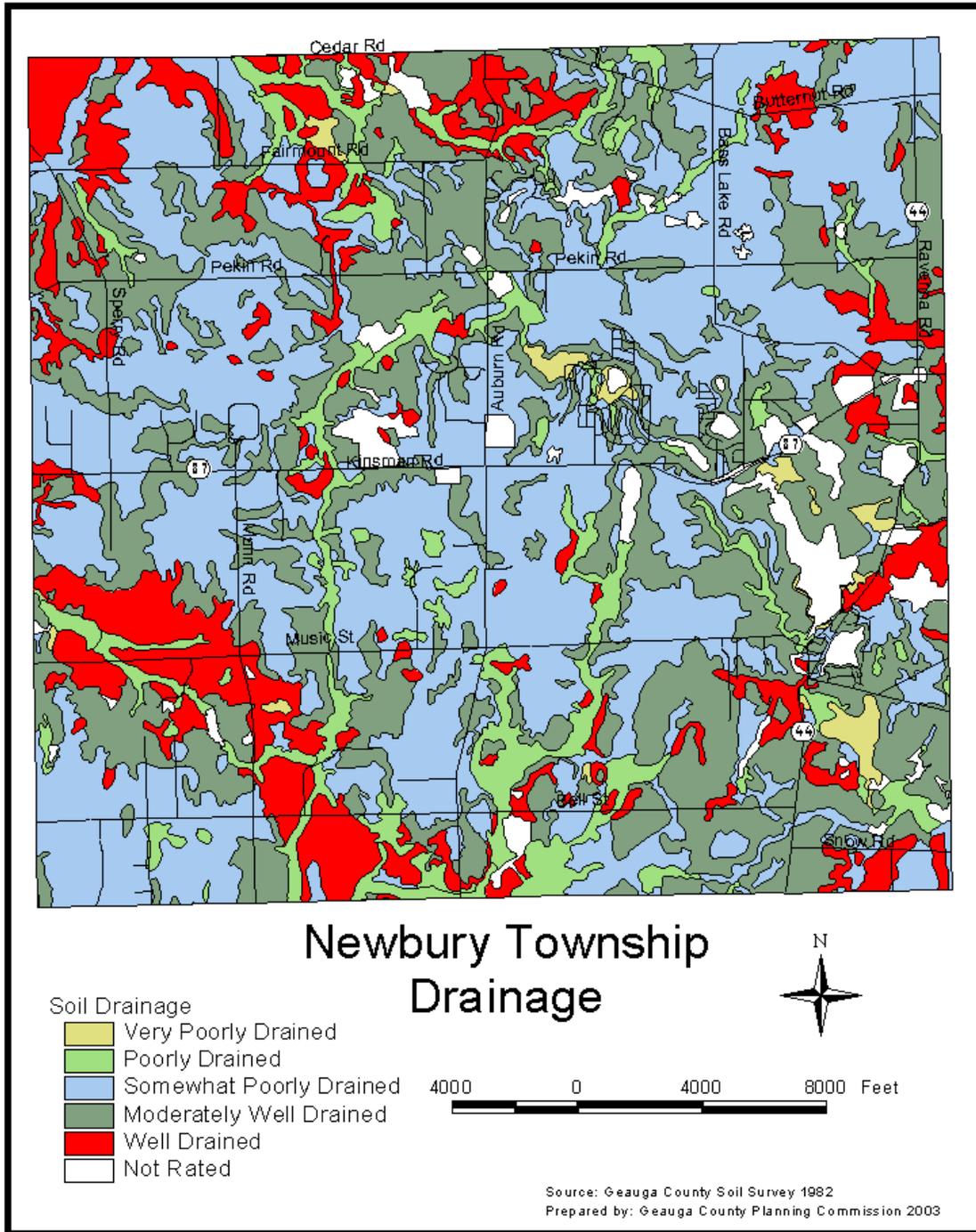
Table 4.13

Drainage Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Very Poorly Drained	198.70	1.09%
Poorly Drained	1,548.22	8.47%
Somewhat Poorly Drained	7,515.53	41.13%
Moderately Well Drained	6,028.88	32.99%
Well Drained	2,266.59	12.41%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.16



Generalized Ground Water Availability

According to the Division of Water, Ohio Department of Natural Resources, about 33% of the township has a ground water potential of 5-15 gallons per minute (gpm) and about 65% of the township area can expect yields greater than 25 gpm (see Table 4.14 and Map 4.17). There are no public central water supply systems in Newbury Township. As a result, the management of ground water resources is a paramount concern in order to maintain quality and quantity. Potential pollution hazards should be minimized. Such hazards may include malfunctioning septic systems, improper brine disposal from oil and gas wells, as well as runoff from inappropriately applied fertilizer, herbicides, pesticides, and animal wastes.

An initial countywide groundwater study was conducted by the United States Geological Survey (USGS) in 1978 which included water level measurements in 77 wells. The study found that most of the groundwater in the county is withdrawn from sandstones of the Pottsville and Cuyahoga Formations. No discernible effects from residential development were evident. The ground water was deemed to be generally of good quality. The groundwater levels measured in wells completed in the various geologic units indicated that the groundwater moves within local flow systems from topographically high recharge areas to topographically low discharge areas. Generally, groundwater flows radially away from the highlands towards adjacent streams and river valleys. A comparison of water levels measured in 1978, 1979, 1980, 1985, and 1986 by USGS indicates that no long-term regional water-level changes have occurred in the county.

The most recent USGS study for Geauga County was completed in 1995. It examined groundwater flow and changes in groundwater levels since 1986 within the major aquifers of the county. Water levels in 219 wells were measured and about 80% of the wells showed changes in the range of plus or minus five feet. The study concluded that an increase in population and groundwater pumpage did not correlate with the decline in water levels. The predominant reason for the decline seemed to be a decrease in recharge from 1986 to 1994. The USGS has initiated a program to create a well network in the county. Recording devices have been placed on selected wells to obtain continuous output of data.

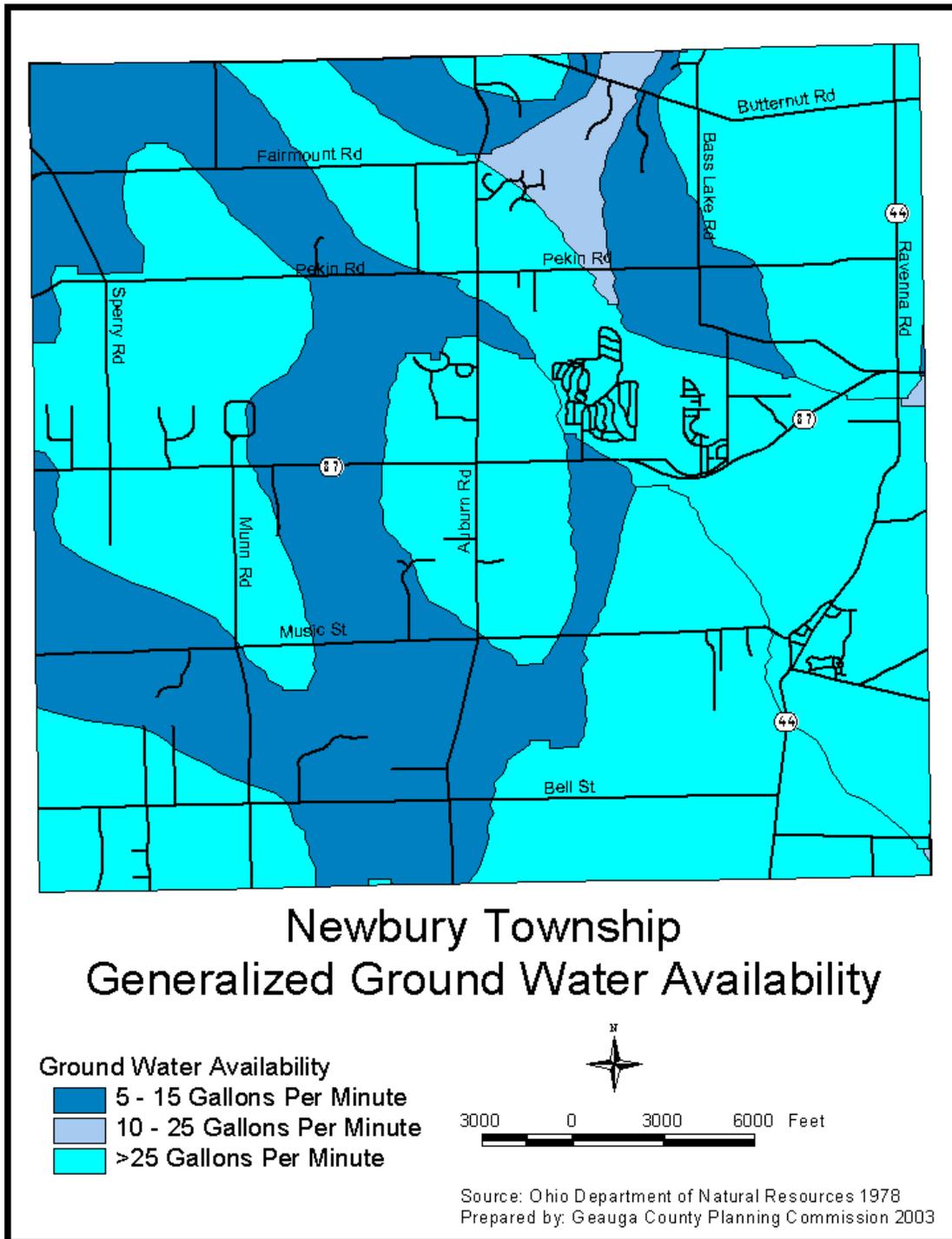
Table 4.14

Generalized Ground Water Availability Map Legend **Newbury Township**

<u>Expected Gallons Per Minute (GPM)</u>	<u>Acres</u>	<u>Percent of Township</u>
5 – 15 gpm	6,003.03	32.85%
10 – 25 gpm	388.46	2.13%
> 25 gpm	11,881.01	65.02%
Total	18,272.50	100.00%

Source: Geauga County Soil Survey, 1982

Map 4.17



Groundwater Pollution Potential

The Division of Water, Ohio Department of Natural Resources has developed a ground water pollution mapping program using the DRASTIC mapping process. This process is comprised of two major elements: designated mapping units called hydrogeologic settings and a rating system for pollution potential.

Hydrogeologic settings form the basis of the system. Inherent within each hydrogeologic setting are the physical characteristics that affect ground water pollution potential. The following factors have been identified during the development of the DRASTIC system: depth to water (D), net recharge (R), aquifer media (A), soil media (S), topography (T), impact of the vadose zone media (I), and hydraulic conductivity of the aquifer (C). These variables form the acronym DRASTIC and are used in a ranking scheme that uses a combination of weights and ratings to establish a numerical value called the ground water pollution potential index (GWPP) that are contained in the document titled Ground Water Pollution Potential of Geauga County Report No. 12 prepared by the Ohio Department of Natural Resources, Division of Water, Ground Water Resources Section (1994). These factors incorporate concepts and mechanisms such as attenuation, retardation and time or distance of travel of a contaminant with respect to the physical characteristics of the hydrogeologic setting. Broad consideration of these factors and mechanisms coupled with existing conditions in a setting provide a basis for determination of the area's relative vulnerability to contamination.

Map 4.18 represents the pollution potential as calculated from the hydrogeologic settings. Generally, a higher number means a greater potential for ground water contamination. The color codes are part of a national color scheme, with warm colors (red, orange, and yellow) representing areas of higher vulnerability and cool colors (greens, blues, and violet) representing areas of lower vulnerability to contamination. The computed ground water pollution index for Newbury Township ranged from 106 to 207 (see GWPP Index). The majority of Newbury Township is in the higher vulnerability range.

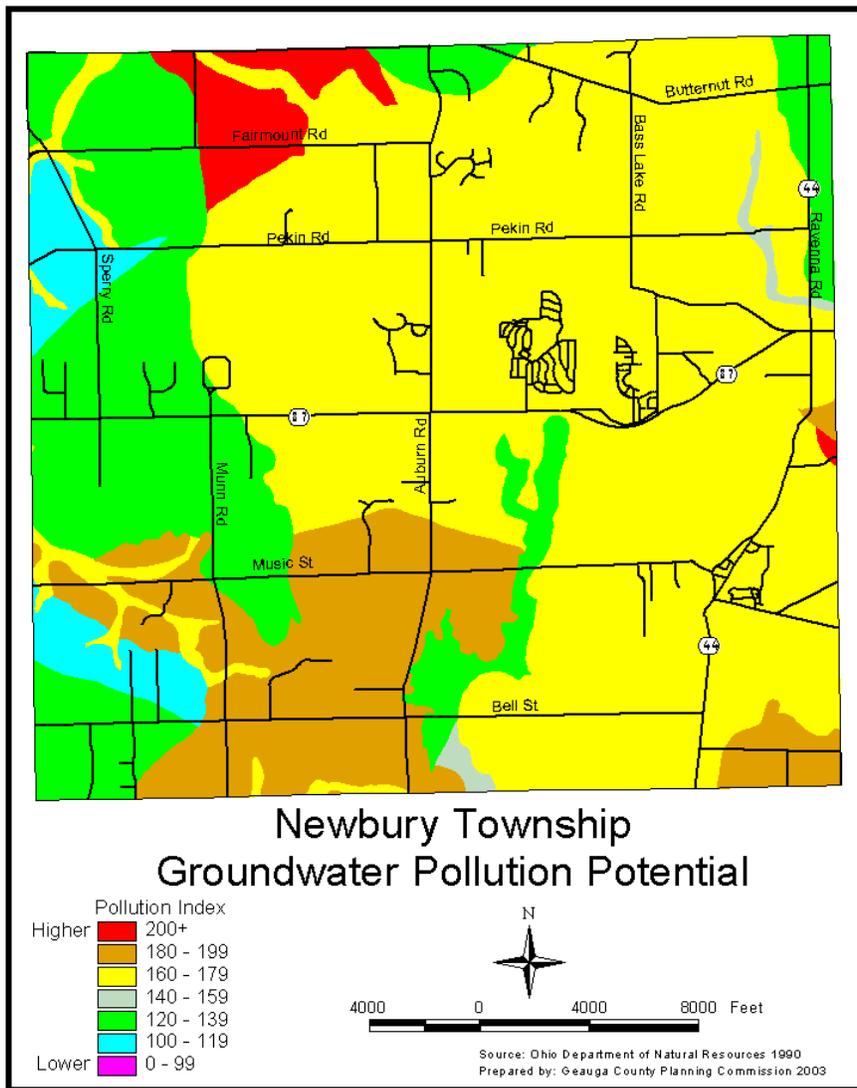
In the development of the DRASTIC system, a set of assumptions must be recognized. The pollution potential evaluation of an area assumes a contaminant with the mobility of water, introduced at the surface, and flushed into the ground water by precipitation. DRASTIC cannot be applied to areas smaller than one hundred acres in size, and is not intended or designed to replace site-specific investigations.

Table 4.15

Ground Water Pollution Potential Map Legend
Newbury Township

<u>Pollution Index</u>	<u>Acres</u>	<u>Percent of Township</u>
200+	503.88	2.75%
180 – 199	2,462.32	13.47%
160 – 179	10,717.89	58.66%
140 – 159	105.16	0.58%
120 – 139	3,851.09	21.08%
100 – 119	632.16	3.46%
0 – 99	0.00	0.00%
Total	18,272.50	100.00%

Map 4.18



Land Capability Analysis

The physical data previously identified and mapped can be rated in relationship to various land uses. This process is known as a land capability analysis.

The following types of land uses were selected for a capability analysis because they represent historical and current development trends in the township. It must be stressed that the capability maps are not site specific and, therefore, are not meant to replace an on-site investigation.

Single Family Dwellings Without Basements: The foundation is assumed to be spread footings of reinforced concrete built on undisturbed soil to a maximum frost penetration depth. The ratings include the soil characteristics affecting strength, settlement, excavation and construction. Soil settlement and strength are influenced by drainage, seasonal water table, flooding, shrink-swell, and potential frost action. Soil properties relative to the ease of excavation and construction are depth to bedrock, flooding, slope, and seasonal water table.

Single Family Dwellings With Basements: The ratings considered the soil characteristics affecting strength, settlement, excavation and construction. Soil strength and settlement are influenced by drainage, seasonal water table, flooding, shrink-swell, and potential frost action. Soil properties relative to the ease of excavation and construction are depth to bedrock, flooding, slope, and seasonal water table.

Commercial and/or Light Industrial Buildings: Represents buildings of less than three stories without basements. The foundation is assumed to be spread footings of reinforced concrete built in undisturbed soil to the maximum frost penetration depth. The ratings include soil attributes affecting soil strength, settlement, excavation, and construction. The variables affecting the amount and ease of excavation are slope, depth to bedrock, and seasonal water table.

In addition, the following items were chosen to be a part of the capability analysis because they are closely related to the above uses.

Septic Tank Absorption Fields: Represents areas in which effluent from a septic tank is distributed into the soil through an approved subsurface system. The soil is evaluated between the depths of 24 to 72 inches. Soil adequacy for on-site sewage disposal is based upon permeability, flooding, seasonal water table, and depth to bedrock, all of which influence the absorption of the effluent. Other variables such as slope and depth to bedrock may affect the installation of an on-site septic system as well.

Local Roads: Represents the use of soils for the construction of improved local roads that have all-weather surfacing (commonly asphalt or concrete) and are expected to carry vehicular traffic year round. Such roads are assumed to have a subgrade of cut and fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. The variables rated which affect grading and excavation include slope, depth to bedrock, flooding, and a high seasonal water table. Other soil attributes that affect the construction of local roads include: drainage, shrink-swell, frost action, and seasonal water table.

Underground Utilities: Represents the installation of below-grade utilities such as sewer and water pipelines, telephone lines, and electrical lines. The ratings measure the soil attributes affecting corrosion, compactness, and ease of excavation. Compactness and the rate of corrosion are influenced by drainage, shrink-swell, seasonal water table, and corrosion of both steel and concrete. The ease of excavation is influenced by slope, depth to bedrock, and seasonal water table.

Each subsequent land capability map was produced based upon the ratings which accompany it (see Table 4.29). The ratings list the variables used, the parameters, and how each of the characteristics were categorized with regard to the specified land use. The following is a description of each rating category.

- SLIGHT (SL): The rating provided when conditions for the given use are suitable. The degree of limitation is insignificant and can be easily overcome.
- MODERATE (M): The rating provided when conditions for the given use are suitable, yet a degree of limitation exists which may be surmounted with proper engineering, design, and maintenance.
- SEVERE (S): The rating provided when conditions exist which are unfavorable for the specified use. However, such conditions do not preclude the given use. Generally, appropriate engineering, design, and maintenance are required.
- VERY SEVERE (VS): The rating provided when conditions are very environmentally sensitive or unsuitable for the given use due to highly restrictive characteristics. In most instances, it is very difficult and possibly not cost-effective to attempt to overcome these limitations.
- NOT RATED (NR): This designation includes disturbed areas that were not categorized such as quarries and cut and fill.

Table 4.16

Limitations for Dwellings Without Basements
Newbury Township

<u>Variables</u>	<u>Slight</u>	<u>Moderate</u>	<u>Severe</u>	<u>Very Severe*</u>
Drainage	WD, MWD	SPD	PD	VPD
Depth to Seasonal Water Table	> 60"	36 – 60"	12 – 36"	0 – 12"
Shrink-Swell	Low	Moderate	High	N/A
Potential Frost Action	Low	Moderate	High	N/A
Depth to Bedrock	0 – 60"	N/A	N/A	N/A
Slope	0 – 6%	6 – 12%	12 – 18%	> 18%
Flooding	None	N/A	N/A	Frequent

*Results in an automatic “unsuitable” rating

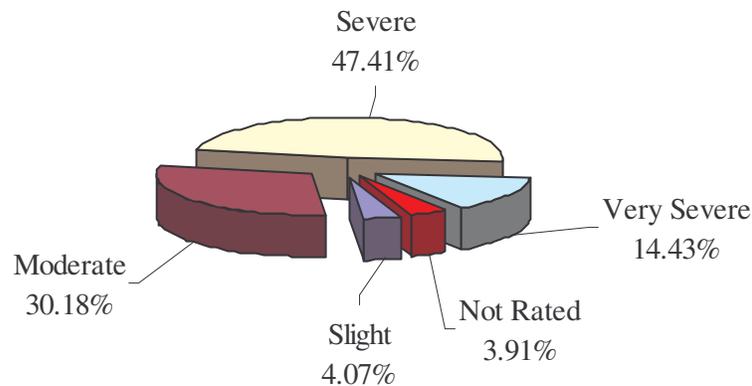
Table 4.17

Capability for Dwellings Without Basements Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Slight	743.77	4.07%
Moderate	5,513.55	30.18%
Severe	8,663.26	47.41%
Very Severe	2,637.34	14.43%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Figure 4.2

Capability for Dwellings Without Basements
Soil Rating Percentages
Newbury Township



Source: Geauga County Soil Survey, 1982

Map 4.19

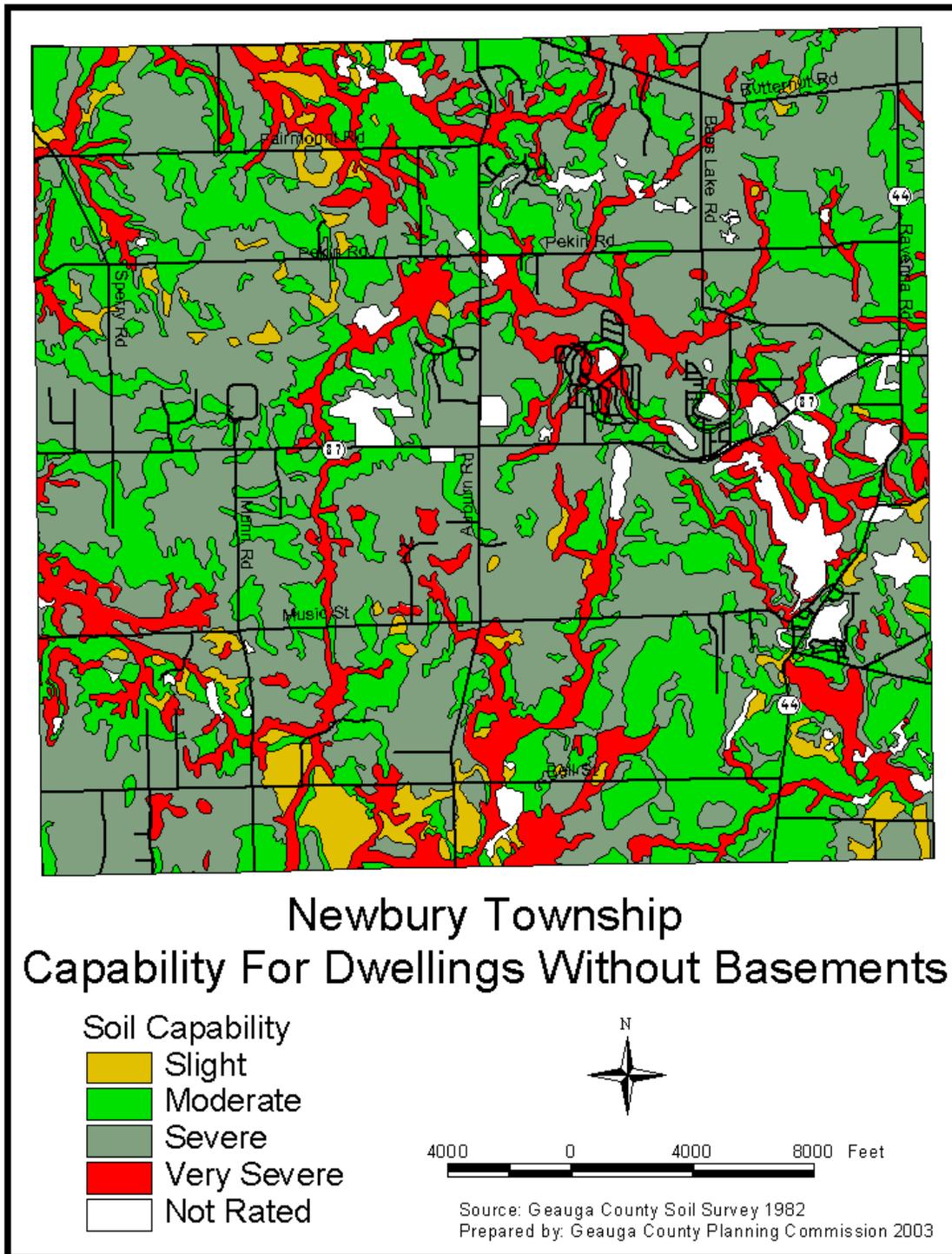


Table 4.18

Limitations for Dwellings With Basements
Newbury Township

<u>Variables</u>	<u>Slight</u>	<u>Moderate</u>	<u>Severe</u>	<u>Very Severe*</u>
Drainage	WD	MWD	SPD, PD	VPD
Depth to Seasonal Water Table	> 60"	36 – 60"	12 – 36"	0 – 12"
Shrink-Swell	Low	Moderate	High	N/A
Potential Frost Action	Low	Moderate	High	N/A
Depth to Bedrock	> 60"	N/A	40 – 60"	0 – 40"
Slope	0 – 6%	6 – 12%	12 – 18%	> 18%
Flooding	None	N/A	N/A	Frequent

*Results in an automatic “unsuitable” rating

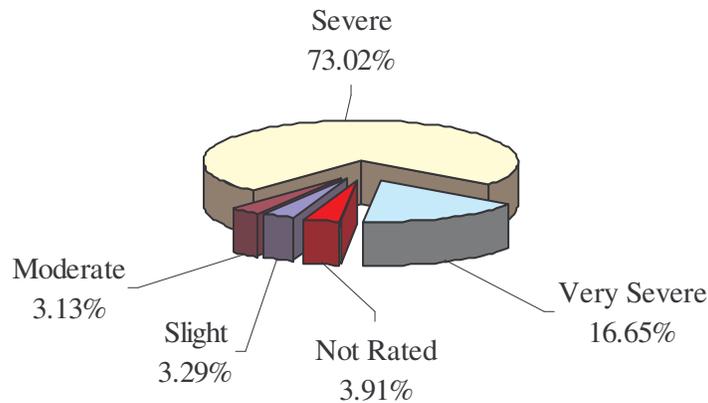
Table 4.19

Capability for Dwellings With Basements Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Slight	600.27	3.29%
Moderate	572.76	3.13%
Severe	13,343.18	73.02%
Very Severe	3,041.71	16.65%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Figure 4.3

Capability for Dwellings With Basements
Soil Rating Percentages
Newbury Township



Source: Geauga County Soil Survey, 1982

Map 4.20

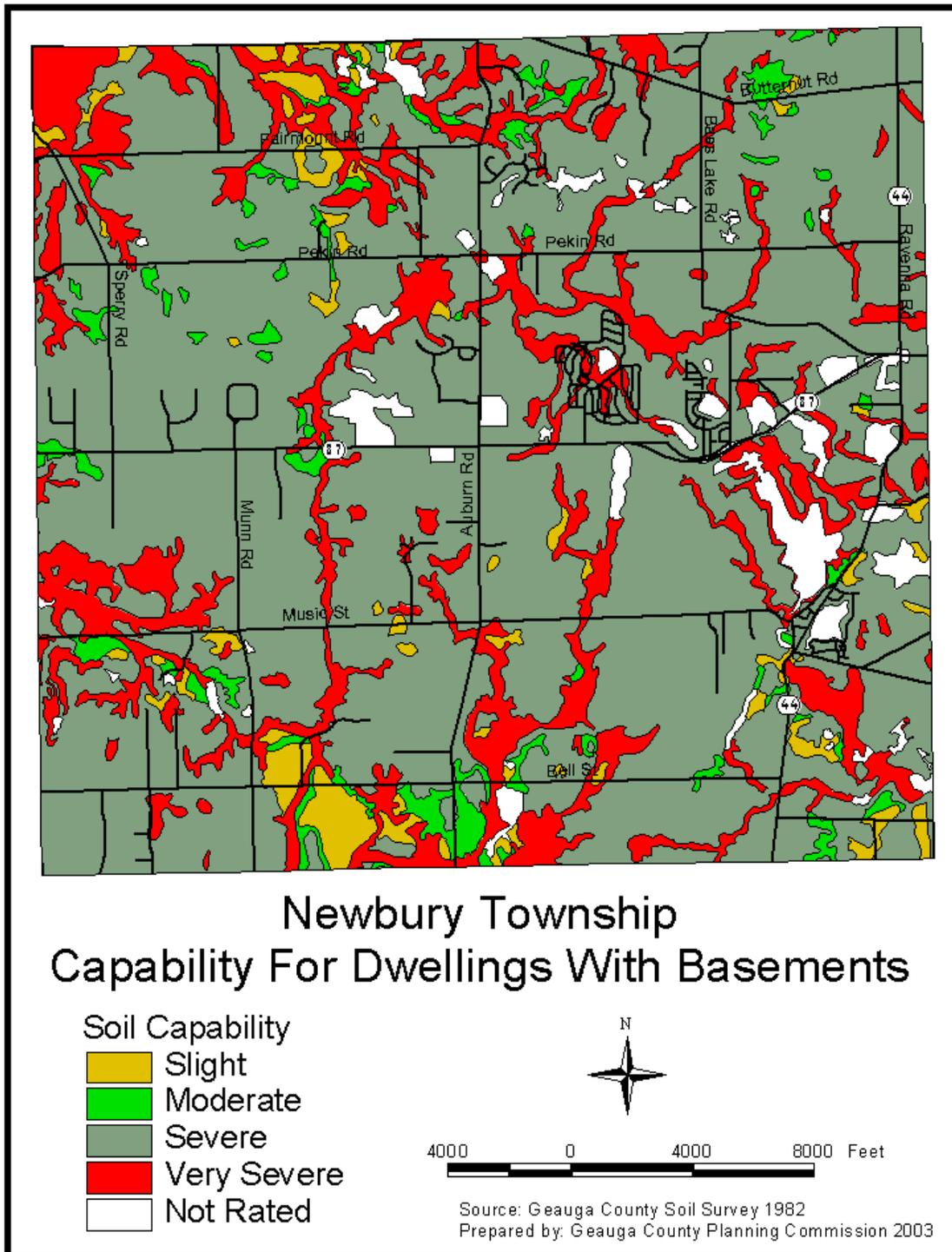


Table 4.20

Limitations for Commercial and/or Light Industrial Buildings
Newbury Township

<u>Variables</u>	<u>Slight</u>	<u>Moderate</u>	<u>Severe</u>	<u>Very Severe*</u>
Drainage	WD, MWD	SPD	PD	VPD
Depth to Seasonal Water Table	> 60"	36 – 60"	12 – 36"	0 – 12"
Shrink-Swell	Low	Moderate	High	N/A
Depth to Bedrock	> 60"	N/A	N/A	N/A
Slope	0 – 6%	N/A	6 – 18%	> 18%

*Results in an automatic “unsuitable” rating

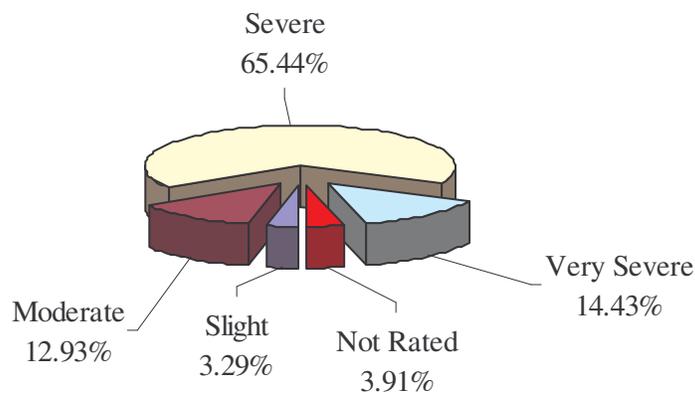
Table 4.21

Capability for Commercial and/or Light Industrial Buildings Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Slight	600.27	3.29%
Moderate	2,363.31	12.93%
Severe	11,957.00	65.44%
Very Severe	2,637.34	14.43%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Figure 4.4

Capability for Commercial and/or Light Industrial Buildings
Soil Rating Percentages
Newbury Township



Source: Geauga County Soil Survey, 1982

Map 4.21

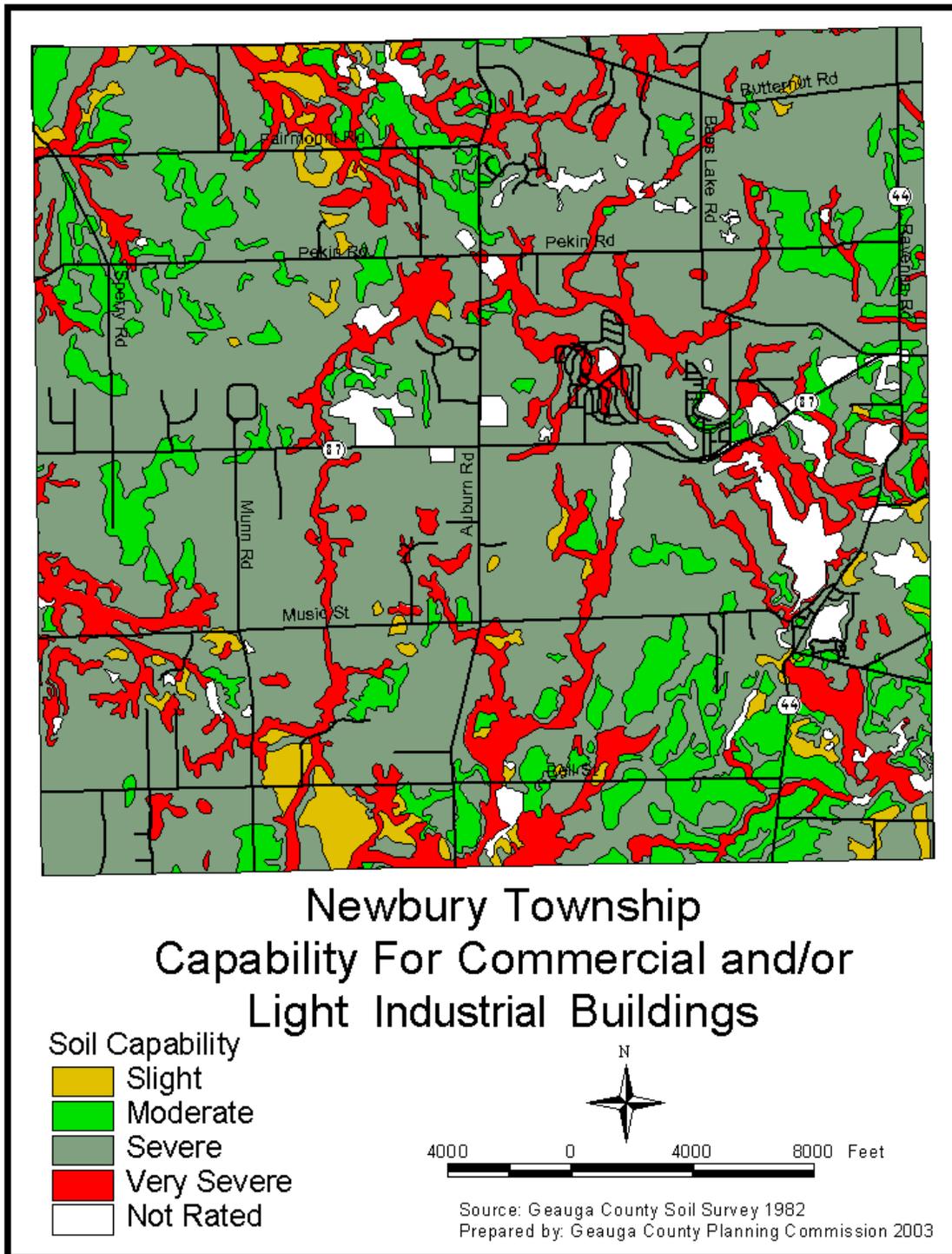


Table 4.22

Limitations for Septic Tank Absorption Fields
Newbury Township

<u>Variables</u>	<u>Slight</u>	<u>Moderate</u>	<u>Severe</u>	<u>Very Severe*</u>
Permeability	MR, R	M	MS, S, VS	N/A
Flooding	None	N/A	N/A	Frequent
Slope	0 – 6%	6 – 12%	12 – 18%	> 18%
Depth to Bedrock	> 60"	N/A	N/A	0 – 60"
Depth to Seasonal Water Table	>60"	36 – 60"	12 – 36"	0 – 12"

*Results in an automatic “unsuitable” rating

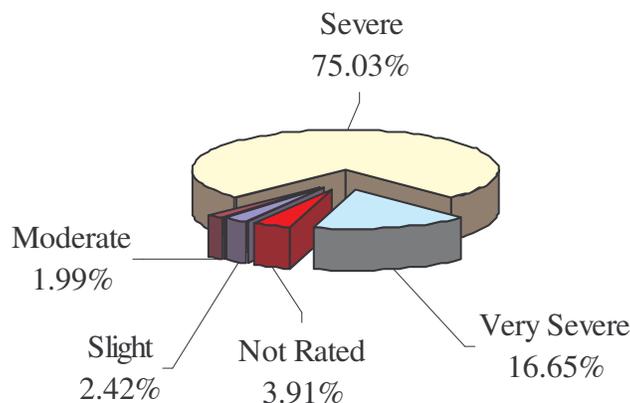
Table 4.23

Capability for Septic Tank Absorption Fields Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Slight	441.30	2.42%
Moderate	363.61	1.99%
Severe	13,711.30	75.03%
Very Severe	3,041.71	16.65%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Figure 4.5

Capability for Septic Tank Absorption Fields
Soil Rating Percentages
Newbury Township



Source: Geauga County Soil Survey, 1982

Map 4.22

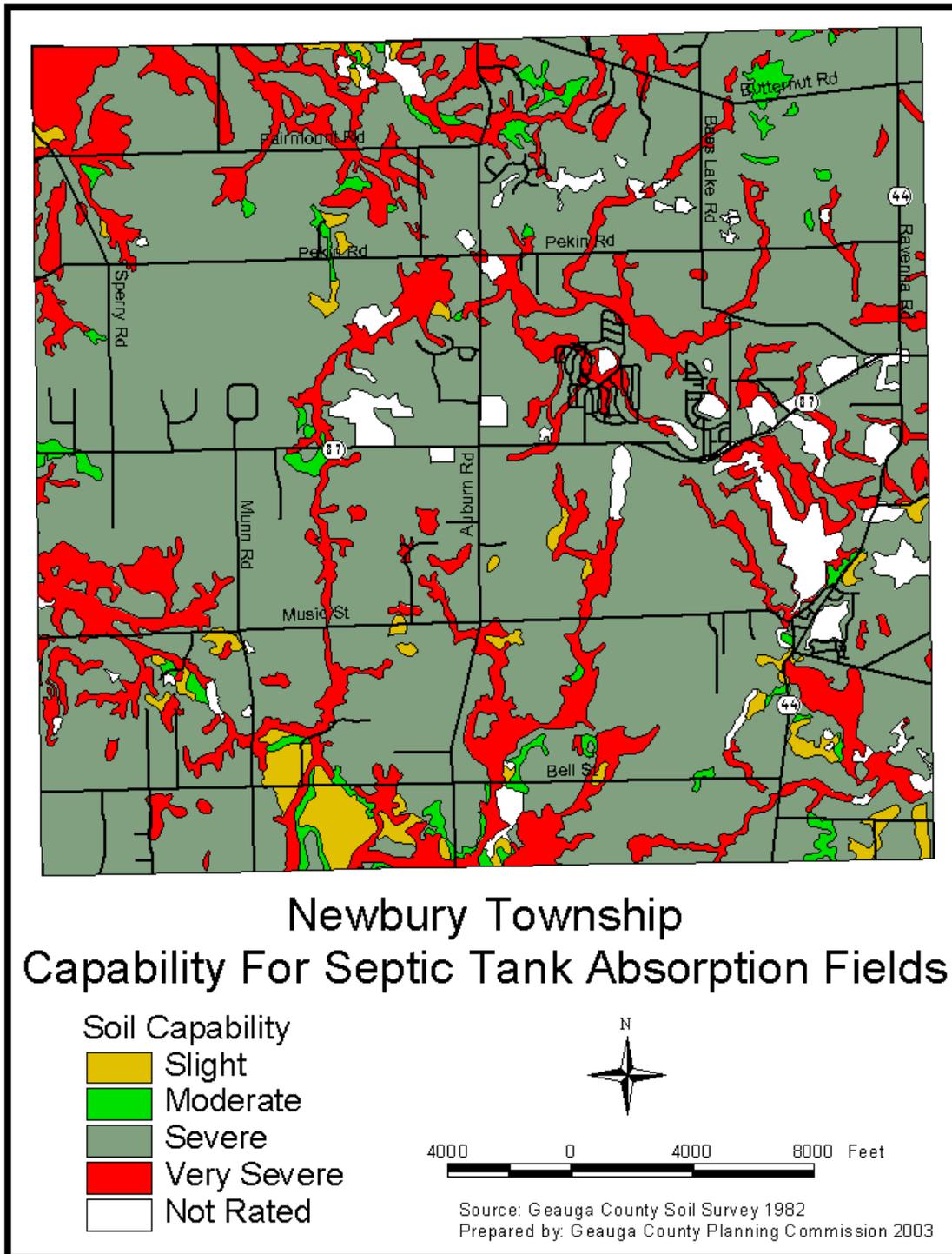


Table 4.24

Limitations for Local Roads
Newbury Township

<u>Variables</u>	<u>Slight</u>	<u>Moderate</u>	<u>Severe</u>	<u>Very Severe*</u>
Drainage	WD, MWD	SPD	PD	VPD
Flooding	None	N/A	N/A	Frequent
Slope	0 – 6%	6 – 12%	12 – 18%	> 18%
Depth to Bedrock	>60"	0 – 40"	N/A	N/A
Shrink-Swell	Low	Moderate	High	N/A
Potential Frost Action	Low	Moderate	High	N/A
Depth to Seasonal Water Table	> 60"	36 – 60"	12 – 36"	0 – 12"

*Results in an automatic “unsuitable” rating

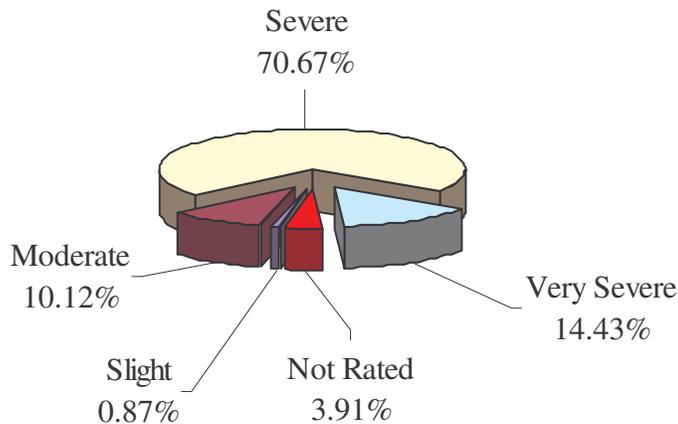
Table 4.25

Capability for Local Roads Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Slight	158.97	0.87%
Moderate	1,848.52	10.12%
Severe	12,913.96	70.67%
Very Severe	2,636.47	14.43%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

Figure 4.6

Capability for Local Roads
Soil Rating Percentages
Newbury Township



Source: Geauga County Soil Survey, 1982

Map 4.23

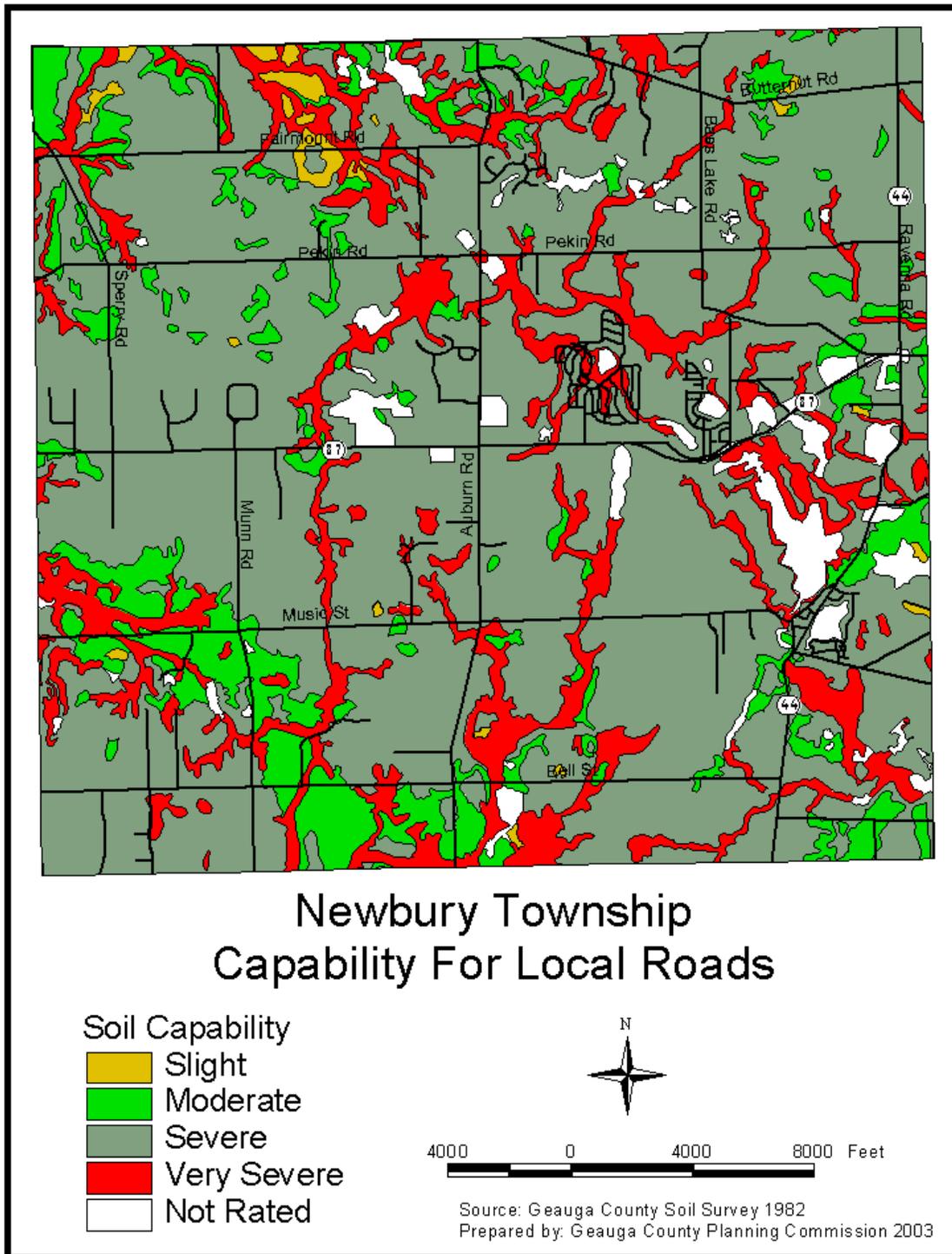


Table 4.26

Limitations for Underground Utilities
Newbury Township

<u>Variables</u>	<u>Slight</u>	<u>Moderate</u>	<u>Severe</u>	<u>Very Severe*</u>
Drainage	WD	MWD	SPD, PD	VPD
Depth to Seasonal Water Table	> 60"	36 – 60"	12 – 36"	0 – 12"
Shrink-Swell	Low	Moderate	High	N/A
Depth to Bedrock	> 60"	N/A	40 – 60"	0 – 40"
Slope	0 – 6%	6 – 12%	12 – 18%	> 18%

*Results in an automatic “unsuitable” rating

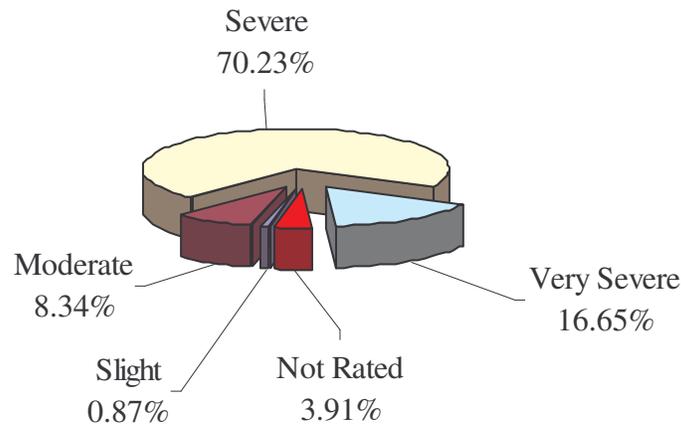
Table 4.27

Capability for Underground Utilities Map Legend
Newbury Township

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Slight	158.97	0.87%
Moderate	1,523.33	8.34%
Severe	12,833.91	70.23%
Very Severe	3,041.71	16.65%
Not Rated	714.58	3.91%
Total	18,272.50	100.00%

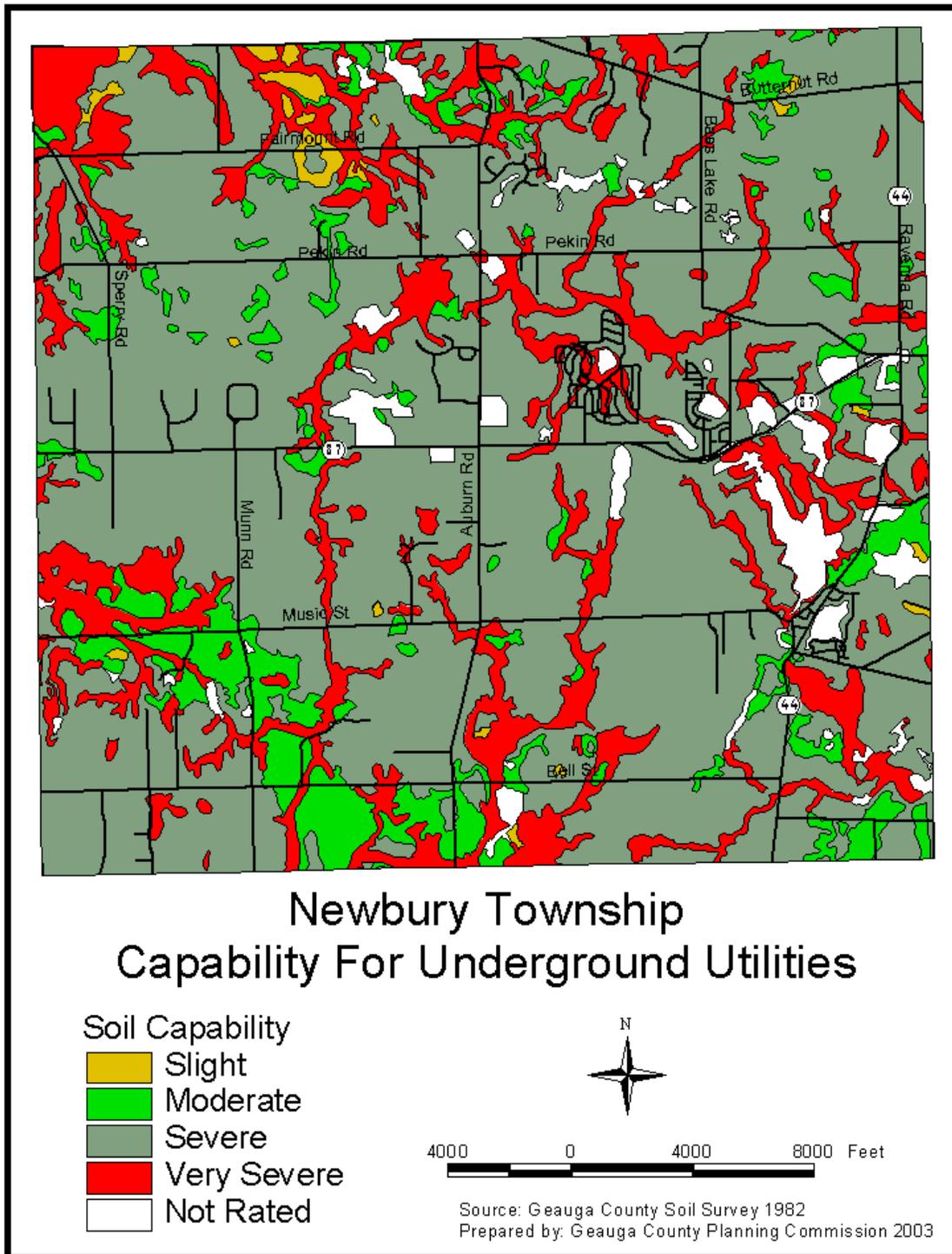
Figure 4.7

Capability for Underground Utilities
Soil Rating Percentages
Newbury Township



Source: Geauga County Soil Survey, 1982

Map 4.24



Composite Capability

The following composite capability map provides an overview of the township. The map reflects all of the physical features that were discussed earlier in this portion of the plan (see Map 4.26).

A rating system (see Table 4.29) has also been devised. Generally, the areas rated “slight” have the best potential to support development; and, cover a very small percentage of the township. The next category is “moderate.” Areas rated “moderate” have a fair potential to support development and are limited and scattered throughout the community. The “severe” category encompasses 67% of the township (see Table 4.28). Although there are more limitations relative to this category, it does not preclude development provided appropriate engineering, design, and maintenance mechanisms are employed. The rating “very severe” is reserved for those areas with environmentally sensitive conditions. About 17% of the township is in this rating. The “not rated” category applies to disturbed areas, lakes, and ponds.

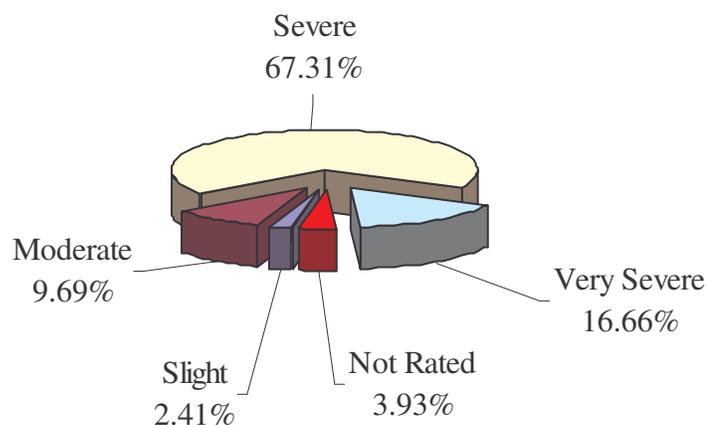
Table 4.28

Composite Capability Map Legend **Newbury Township**

<u>Rating</u>	<u>Acres</u>	<u>Percent of Township</u>
Slight	441.32	2.41%
Moderate	1,770.28	9.69%
Severe	12,305.69	67.31%
Very Severe	3,040.60	16.66%
Not Rated	714.61	3.93%
Total	18,272.50	100.00%

Figure 4.8

Composite Capability **Soil Rating Percentages** **Newbury Township**



Source: Geauga County Soil Survey, 1982

Map 4.25

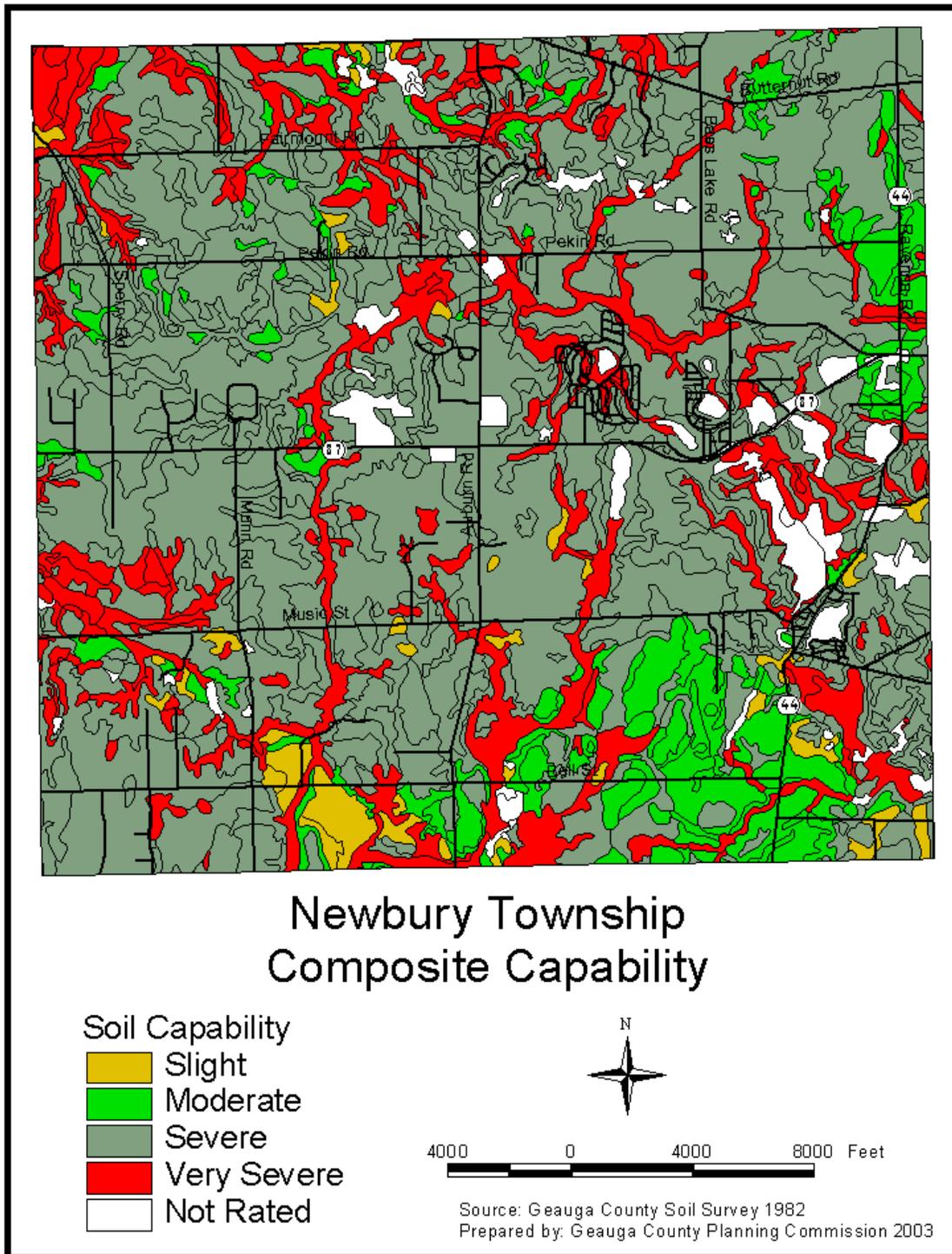


Table 4.29
Summary of Soil Capability Ratings
Newbury Township

<u>Soils</u>	<u>Septic Tank</u>	<u>Dwellings With Basements</u>	<u>Dwellings Without Basements</u>	<u>Commercial/ Light Industry</u>	<u>Local Roads</u>	<u>Underground Utilities</u>
Bogart (Bg B)	Severe	Severe	Moderate	Moderate	Severe	Severe
Canadice (Ca)	Very severe	Very severe	Very Severe	Very Severe	Very severe	Very Severe
Canfield (Cd B)	Severe	Severe	Moderate	Moderate	Severe	Severe
Canfield (Cd C)	Severe	Severe	Moderate	Severe	Severe	Severe
Carlisle (Cf)	Very severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Chili (Cn A, B)	Slight	Slight	Slight	Slight	Moderate	Moderate
Chili (Cn C)	Moderate	Moderate	Moderate	Severe	Moderate	Moderate
Chili (Co D)	Severe	Severe	Severe	Severe	Moderate	Moderate
Chili-Oshtemo (Cy D)	Severe	Severe	Severe	Severe	Moderate	Moderate
Chili-Oshtemo (Cy F)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Damascus (Da)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Ellsworth (Eh B)	Severe	Severe	Moderate	Moderate	Severe	Severe
Ellsworth (Eh C)	Severe	Severe	Moderate	Severe	Severe	Severe
Ellsworth (Eh D)	Severe	Severe	Severe	Severe	Severe	Severe
Ellsworth (Eh E, F)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Fitchville (Fc A, B)	Severe	Severe	Severe	Severe	Severe	Severe
Glenford (Gf B)	Severe	Severe	Moderate	Moderate	Severe	Severe
Glenford (Gf C)	Severe	Severe	Moderate	Severe	Severe	Severe
Haskins (Hs A, B)	Severe	Severe	Severe	Severe	Severe	Severe
Holly (Ho)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Jimtown (Jt A)	Severe	Severe	Severe	Severe	Severe	Severe
Lordstown (Lr B)	Very Severe	Very Severe	Moderate	Moderate	Moderate	Very Severe
Lordstown (Lr C)	Very Severe	Very Severe	Moderate	Severe	Moderate	Very Severe
Lordstown (Lx D)	Very Severe	Very Severe	Severe	Severe	Severe	Very Severe
Lordstown (Lx F)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Loudonville (Ly B)	Very Severe	Very Severe	Moderate	Moderate	Moderate	Very Severe
Loudonville (Ly C)	Very Severe	Very Severe	Moderate	Severe	Moderate	Very Severe
Mahoning (Mg A, B)	Severe	Severe	Severe	Severe	Severe	Severe
Orrville (Or)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Oshtemo (Os B)	Severe	Slight	Slight	Slight	Slight	Slight
Oshtemo (Os C)	Severe	Moderate	Severe	Moderate	Moderate	Moderate
Pits, Gravel (Pg)	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated
Ravenna (Re A, B)	Severe	Severe	Severe	Severe	Severe	Severe
Rawson (Rm B)	Severe	Moderate	Slight	Moderate	Moderate	Moderate
Rittman (Rs B)	Severe	Severe	Moderate	Moderate	Severe	Severe
Rittman (Rs C)	Severe	Severe	Moderate	Severe	Severe	Severe
Sebring (Sb)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Sheffield (Sf)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Tioga (Tg)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Udorthents (Ud)	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated
Urban Land (Ur)	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated
Wadsworth (Wb A, B)	Severe	Severe	Severe	Severe	Severe	Severe
Wallkill (Wc)	Very Severe	Very Severe	Very Severe	Very Severe	Very severe	Very Severe
Wooster (Wu D)	Severe	Severe	Severe	Severe	Severe	Severe

Source: Gauga County Soil Survey, 1982