

CHAPTER THREE

NATURAL RESOURCES

Natural systems are formed by a complex balance of interdependent forces and cycles. Although the ecosystem is constantly changing, human actions have the potential to upset the natural balance, transforming in a matter of days or months what has evolved over hundreds or thousands of years. For example, the destruction of pure groundwater or prime agricultural soils can be, in terms of a human life span, permanent.

Environmental problems develop when activities overtax the ability of natural resources to replenish and restore themselves. One of the most important factors to be considered in the planning process then is the capacity of land to accept development. Environmental compatibility assessments should underlie all land use and density decisions. A better understanding of an area's natural systems enables communities to both use and protect the resource base on which they depend.

Despite its location within the growing New York metropolitan area, Dover retains large areas of prime agricultural and undeveloped land. The Town contains a wide variety of natural resources including lakes, extensive wetlands, significant floodplains, large wooded tracts, rural settings and several creek basins. These and other natural features are considered amenities that attract development, but they can also place environmental constraints on actual construction. As Dover continues to grow and sensitive areas are targeted for development, the natural limitations of the land must be respected, not only for health and safety reasons, but also to preserve the high quality environment that provided the original attraction to the area.

This chapter will focus on the natural constraints of the land in order to identify critical environments and assess the suitability of land for future development.

TOPOGRAPHY

Relief and slope are two topographic features that significantly affect land use. Relief refers to the pattern of elevations and irregularities on the land surface. The slope of an area is its degree of steepness. The presence of East and West Mountain ridgelines, divided by the Ten Mile River valley, creates numerous opportunities for scenic views that contribute greatly to the beauty of Dover.

Relief and slope can represent varying degrees of restraints on development. For example, topographical location affects groundwater yields. Wells of the same depth penetrate a greater thickness of saturated materials in valleys than on hills, generally producing more water in low-lying areas. Also, land that has steep slopes is usually both expensive and difficult to develop in an environmentally sound way.

Relief

The Town of Dover is located in the Harlem Valley portion of eastern Dutchess County, a geographic area generally characterized by a north-south valley running from Pawling to North East. The Ten Mile River and Swamp River basin essentially splits Dover between East and West mountains. A number of smaller hills, streams and wetlands exist within the broad valley. The Town's highest elevation is 1,425 feet on East Mountain. Several high elevation areas over 1,000 feet are located on both East and West mountains.

The lowest elevation in the Town is 350 feet along the Ten Mile River, east of Lake Ellis. The river runs from the hamlet of Dover Plains south through the center of the Town then takes an eastern turn into Connecticut.

Slopes

An important factor for gauging development potential in the corridor is the steepness of sloping ground. Steep slopes are associated with access problems, the potential for serious erosion, shallow soils and difficulties in locating septic systems. Runoff from steeply sloping driveways can overflow onto public roads, creating hazardous conditions. Sensitive builders who recognize the constraints of steep slopes can use hillsides attractively without environmental harm, but construction costs will be significantly higher. As a general rule, development of moderately steep slopes over 15 percent should be subject to careful scrutiny and slopes 25 percent and over should be avoided.

Slopes of 25 percent or more cover large areas of both East and West mountains, as shown on the following Steep Slopes Map. Steep slopes are prevalent near the town border with Pawling in the areas surrounding Jones Pond, Waldo Hill, Hammersly Ridge and in the Deull Hollow area. Nellie Hill, south of Dover Plains, also contains steep slopes.

GEOLOGY

The rock base of Dutchess County generally consists of younger unconsolidated materials (glacial and more recent deposits) overlying older consolidated bedrock. The geological features of the area influence drainage, topography, ground-water availability, and soil types. Each of these natural characteristics, in turn, has helped shape the patterns of development in the area and affects the potential for future growth.

A hydrogeologist mapped the county's surface and bedrock geology for the Dutchess County Department of Planning in 1982 using soil survey data and state geological reports. The following descriptions of the corridor's surficial deposits and bedrock types draw on the Water Resources Study of Dutchess County, as well as on maps prepared by the United State Geological Survey in 1961.

Surficial Deposits

Unconsolidated materials deposited by glaciers and glacial meltwaters cover much of the bedrock in the county. These deposits fall into three categories: till, sand and gravel, and lacustrine materials. There are no significant lacustrine (clay-based) deposits in Dover.

- Till consists of a mixture of materials deposited directly by glaciers, ranging in size from microscopic silt to boulders. Its permeability and porosity can vary widely. Most of the till deposits in Dutchess County have a high clay content and low permeability rates. This limits their usefulness as groundwater supplies and makes it necessary for septic systems in till areas to be carefully designed and separated.

- Sand and Gravel consists of large particles deposited in lowlands and river valleys. These deposits are the generally county's most productive groundwater sources. They are the best water transmitters and, therefore, are the most reliable recharge areas for sand and gravel aquifers. However, sand and gravel layers are so porous that pollution from overcrowded septic systems, salt, waste disposal sites, chemical spills, or other sources spread through them easily, making them highly vulnerable to contamination. These deposits also provide important building and road construction materials, extracted from mines throughout the county.

Thin glacial deposits of less than three feet with exposed bedrock dominate both the East and West Mountain areas of Dover. Large deposits of thicker glacial till are also present in these areas. The largest thick till deposit is in the northwestern corner, or Chestnut Ridge area of the Town. Till deposits tend to be thicker in low areas than in highlands, where they are more vulnerable to erosion. Scattered areas of till deposits are also present in the higher elevations within the valley, such as Nellie Hill, Church Hill and Wingdale.

Sand and gravel deposits more than five feet thick are located along the river valleys. These areas of thick glacial outwash or ice-contact sand and gravel are present at the base of the steep slopes of East and West mountains and also extend from the Town's northern border south through Dover Plains and along the Ten Mile and Swamp rivers. Other significant sand and gravel deposits in the southern half of the Town are along Burton Brook and within the area surrounding the Great Swamp wetland complex. The large deposits of surficial sand and gravel have attracted many mining operations to Dover.

It is important to recognize that Dover's geology, like the rest of Dutchess County's, is far more complex than the maps showing only surface deposits can portray. Test borings often find layers of till that contain sizeable pockets of sand or clay, or both. Cross-sections of some sand and gravel formations show alternating layers of till, while other gravel deposits in the same region or aquifer may be pure

all the way down to bedrock. Maps of surface features are useful indicators of the dominant geological characteristics of the town, but they should not be used as substitutes for field investigations of areas proposed for subdivision or development.

Bedrock

Bedrock types have distinct characteristics which affect land development, particularly in terms of water supply. Variations in bedrock type also affect the permeability, porosity, and chemical makeup of the soils which can affect the type and density of development that is most appropriate in a given area.

The bedrock in Dover can be divided into three generalized types: schist-phyllite, quartzite-crystalline and carbonate rock formations. Schist-phyllite rock underlies West Mountain and the majority of the Duell Hollow section of the Town. This type of bedrock forms the most extensive formations in Dutchess County. It is low in both porosity and permeability. Consisting of mostly schists in the southeastern portion of the county, this bedrock formation has a mineral composition of quartz, mica and feldspar. West Mountain contains a combination of Walloosac Phyllite, Schist and Meta-Graywacke and Everett Schist and minor Meta-Graywacke. Manhattan Pelitic Schists are located in Duell Hollow. A narrow band of schist-phyllite rock at the base of West Mountain runs from north of Dover Furnace to the Pawling border.

Quartzite-Crystalline bedrock is located in the northeast sector of Dover. The majority of East Mountain is interlayered meta sedimentary rock and granitic gneiss, with large areas of Poughquag Quartzite at its base. The gneiss bedrock on East Mountain contains mostly light and dark-colored minerals, such as quartz, feldspar, white and black mica and garnet, arranged in layers. It is usually banded, streaky or speckled in appearance. The Poughquag Quartzite found at the base of East Mountain is a compact and very hard rock made up almost totally of quartz.

Carbonate rock formations underlie the central valley of Dover, as well as the Webatuck area from Lake Ellis south to Wingdale and along the Ten Mile River into Connecticut. Carbonate rocks are very well-suited for agricultural use. These rocks also form the most productive bedrock aquifers in the county, with a range from 1 to 220 gallons per minute from drilled wells. This productivity is largely due to the fact that carbonate rocks dissolve easily, allowing water to flow into the channels and caverns that develop in rock. However, they also allow easy transmission of pollution.

Aquifers

Aquifers are natural groundwater reservoirs stored in surficial or bedrock deposits. As noted previously, sand and gravel layers are the best water transmitters and, therefore provide the most reliable surficial recharge areas. However, sand and gravel soils are so porous that pollution from overcrowded septic systems, road salt, chemical

spills and other sources make them highly susceptible to contamination. Carbonate rocks such as limestone form the best bedrock aquifers. Areas where sand and gravel overlies carbonate rocks are, therefore, the most productive as well as the most vulnerable aquifers in the Town.

The majority of sand and gravel deposits located in the central river valley of Dover, running from Dover Plains south to Pawling, overlay carbonate rock (see Aquifer Map). However, much of this area is also characterized by soils with poor filter ratings which drain too fast to allow for adequate filtering of pollutants. This makes these prime water producing formations in danger of becoming polluted from concentrations of poorly sited and designed sewage systems. These areas deserve special consideration for aquifer protection measures.

SOILS

The analysis of soils in this area is based upon the Soil Survey of Dutchess County, which was first prepared in 1939. The survey, which was updated in 1972 and is currently being reclassified, lists, describes, and maps different soil types based on a variety of characteristics including color, texture, structure, consistency, derivation, acidity, depth to bedrock, quantity of gravel or rocks, slope and erosion loss. On the basis of these characteristics, areas that are alike in kind, thickness and arrangement of their layers are mapped as one soil type.

The following sections, as illustrated on the Soil Constraints Map, will concentrate on the three characteristics of soils that most directly influence their suitability for development, crops, and other land uses--permeability, filtering and depth to bedrock.

Permeability

Permeability rates, usually given in inches per hour, reflect the ease with which water flows downward through soil layers. The Soil Conservation Service of the U.S. Department of Agriculture uses a standard permeability rate of 0.6 inches per hour in rating soils. A slower rate is considered to have poor permeability and is a significant limitation on the ability of septic systems to function properly, unless special designs or substantial filling are used. However, in many such areas septic systems have functioned adequately for years. Local variations in soil or slope features, the use of fill in creating septic fields, and the non-intensive use of the waste disposal systems can enable these septic systems to operate properly.

Soils with a permeability rate of more than six inches per hour are considered to be poor filters. These soils also place constraints on the location and construction of septic systems because they transport waste at a rate that doesn't allow for adequate filtering of pollutants. Poor filtering allows pollutants to be more readily carried through soils to water supplies. Poor permeability and poor filter soil ratings, therefore, can make it necessary to place restrictions on septic designs or development densities in areas without central water and sewer systems.

Soils with poor permeability rates are located along the bases of many steep slope areas throughout Dover. There are also less permeable soils in the Chestnut Ridge area and the Great Swamp. Larger areas of more rapidly permeable soils, or poor filters, are located in and around Dover Plains extending south along the Ten Mile and Swamp rivers. Poor filter areas are also located in Duell Hollow and along Burton Brook. All of these poor filter soils coincide with areas identified as sand and gravel aquifers.

Shallow Soils

Shallow soils limit the placement of septic systems, foundations, and other development features. Because they often appear in conjunction with steep slopes, shallow soils can be highly vulnerable to erosion and transmit pollutants quickly. Development in areas of shallow soils usually involves additional construction costs for such corrective measures as removal of bedrock for structures and roads, filling for installation of foundations and septic systems, slope stabilization, and erosion control.

Severely rated shallow soils, less than 40 inches to bedrock, dominate much of Dover with the largest concentrations along the eastern and western borders of the Town on East and West mountains. Areas of shallow soils are also located in Duell Hollow and at scattered sites with steep slopes throughout the central valley.

Prime and Important Agricultural Soils

In November of 1987, the Soil Conservation Service and Dutchess County Soil and Water Conservation District prepared a countywide map of Prime and Statewide Important Farmlands based on soil groups. This map is being updated using the new soil survey. The following U.S. Department of Agriculture criteria were used: "prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding." Statewide important farmlands are those "that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods." (Secretary of Agriculture Memorandum No. 9500-2, 1982).

For mapping purposes, slopes over 8 percent were too erodible to be considered prime farmland and slopes exceeding 15 percent were too erodible to be considered of statewide importance. Designation requires that land be undeveloped, which was determined by comparison with 1980 aerial photographs. The locations of prime and statewide important farmlands should only be considered approximate because of the relatively small scale of the countywide base map. Also, the rapid pace of development in Dutchess County since 1980 has already covered over or threatens many of the remaining areas having important agricultural soils. With these qualifiers acknowledged, the potentially productive farmland in Dover is quite extensive.

Statewide important soils cover a substantial portion of the northwest corner of Dover. There is also a larger concentration around South Dover in the Webatuck area, as well as scattered sites east and south of Dover Plains, Duell Hollow, around the Harlem Valley Psychiatric Center and south of the psychiatric center into Pawling. Prime soils exist within the Ten Mile and Swamp River floodplains, In Chestnut Ridge, Dover Plains and Deull Hollow. These soils also are found along Wingdale Road (CR 21), West Dover Road (CR 20), Dog Tail Corners Road and Cricket Hill Road (CR 26).

SURFACE WATER RESOURCES

Drainage Basins

The entire area drained by a particular stream or river is called a drainage basin or watershed. The ridgeline that encircles a drainage basin and separates one basin from another is called the basin or watershed boundary.

Dover is divided into two secondary watersheds: the Ten Mile River and the Swamp River, both of which are part of the primary Ten Mile River watershed. The Ten Mile and Swamp rivers in Dover and the Webatuck and Wassaic creeks in Amenia form the Ten Mile River drainage basin. The Ten Mile River basin is 33 miles long and drains 210 square miles of eastern Dutchess County from the Columbia County border to the Town of Pawling. A small area in eastern Dover drains into the Housatonic River in Connecticut.

The Ten Mile River is the largest watercourse in Dover, running for 10 miles from the Amenia border to the Connecticut border south of Dog Tail Corners Road (CR 22). By virtue of its size, the Ten Mile River is one of the most important functional, scenic and recreational features of the Harlem Valley.

The Swamp River runs for 8.5 miles in Dover. The river flows north from Pawling through the Great Swamp wetland complex and joins the Ten Mile River south of Dover Plains. These river corridors provide important habitats for aquatic, bird, and other wildlife species.

Many streams flow into these major waterways and provide important linkages between lakes, ponds, and wetland areas. As part of the larger surface drainage system, all waterways including minor and even seasonal streams should be considered during the development process. Water contamination can be prevented by using proper disposal practices and adequate setbacks when siting septic systems.

Lakes and Ponds

Dover has numerous scattered lakes and ponds, six of which are five acres or more as identified in the New York State Department of Environmental Conservation (DEC) Characteristics of New York State Lakes Gazetteer of Lakes and Ponds and Reservoirs (June 1985). Lake Ellis has 57.57 acres of water surface and is the largest lake in Dover. It is located at the base of East Mountain off of Weil Road and is bordered by three private camps and a small number of private homes.

The other water bodies identified are Sharparoon Pond, which is almost 13 acres and located on the grounds of the New York City Mission camps, and Crane and Depression ponds, both located on East Mountain and 6.42 and 19.27 acres, respectively. Pell Lake is north of Wingdale Road (CR 21) on the Union Vale border, and Jones Pond is just off of West Dover Road (CR 20). Both have 12.85 acres of water surface area.

Floodplains

Floodplains are low-lying areas, normally adjacent to streams, which are inundated in times of heavy rains or severe snow melts. They act as shock absorbers in a drainage system by providing space for excess runoff. Left undisturbed, floodplains can also serve as recharge areas for groundwater supplies. Floodplains place severe constraints on construction, but are extremely useful for recreational corridors and agriculture.

Floodplains that have a one percent chance of being completely inundated in a given year are called 100-year floodplains. Dover's floodplains were remapped in August of 1984 as part of the National Flood Insurance Program administered by the Federal Emergency Management Agency. Under this program, communities that adopt and enforce floodplain ordinances are eligible for federal disaster assistance. Dover adopted a floodplain ordinance in 1978. In addition, individuals who own or purchase property in the floodplain may purchase insurance to cover flood losses.

Dover's 100-year floodplains are especially evident along the Ten Mile and Swamp rivers. Particularly wide floodprone areas are along the Ten Mile River in the area around Dover Plains and south between Berkshire and Old Post Road (CR 6). Small portions of Burton Brook south of Dover Furnace Road (CR 26), Seven Wells Brook and Stone Church Brook are also prone to flooding. In reviewing floodplain maps, however, it is important to note that the locations of floodplain boundaries are not static. Floodplain filling, changes in the amount of developed land area, and other activities that alter the drainage characteristics of a watershed can affect the shape and size of floodplains.

In order to safeguard human life and property, protect watershed areas, prevent downstream pollution, and minimize expenditures of public money for flood control projects, local governments should restrict residential development within the 100-year floodplains and allow for other uses only under special permit. Standards for construction, fill, or dredging in floodprone areas include such provisions as the control of erosion and sedimentation, anchoring to prevent the washing away of structures or stored materials, and restrictions against any action that would increase flood levels in downstream properties.

The need for flood-conscious land use regulations extends beyond the floodplain. Drainage regulations are usually designed to manage stormwater runoff rates while allowing total runoff volumes to increase when a site is developed. As more and more of a watershed is developed, such regulations lead to more frequent flooding downstream because the cumulative result of increased runoff volumes places a greater load on

downstream channels. Regulations that require the use of stormwater infiltration galleries (with proper water quality safeguards) and long-term retention ponds in up-basin areas can be used to prevent new development from aggravating flood problems.

Wetlands

Freshwater wetlands occur where the water table is at or near the land surface for most of the year. They play an important role in regulating and purifying groundwater supplies and surface waters. They slow floodwaters and often act as natural retention basins. Wetlands also provide valuable wildlife habitat and open space, and combine with stream channels and ponds to form green space corridors through the area.

Under the New York State Freshwater Wetlands Act of 1975, the New York State Department of Environmental Conservation (DEC) maps and regulates wetlands covering at least 12.4 acres and smaller wetlands judged to be of unusual local importance. The law requires permits for all non-agricultural activities that could change the quality of a wetland. Certain indicator plants are used to verify in the field the boundaries and 100-foot buffer zone of state-regulated wetlands. In July of 1987, DEC adopted official wetland maps of Dutchess County showing approximate boundaries. These maps can be revised, however, as DEC continues to improve its information and wetlands are affected by natural processes or disturbances.

In 1979-80, the Dutchess County Environmental Management Council independently mapped all wetlands in Dutchess County, including those not large enough to be considered by the Freshwater Wetlands Act. Individually, the smaller wetlands tend to offer fewer natural benefits. Cumulatively, however, they play a critical role in regulating water quality and quantity, moderating floods, supporting wildlife, and contributing diversity and open space to the area.

There are 38 state-regulated wetlands within Dover covering approximately 1,835 acres. There are also an additional 195 small, unregulated wetlands scattered throughout the Town which were identified by the Dutchess County Environmental Management Council. Included among the wetlands is the Great Swamp wetland complex which covers parts of Dover, Pawling and Putnam County. The Great Swamp, which covers 4,174 acres (1,100 acres in Dover), is the largest and best example of a true wetland community in the region, and is home to many rare and endangered species. The Great Swamp also provides important habitat for migratory birds. It is classified as one of the few Class I wetlands in the state. The Dutchess County Environmental Management Council recently completed a report on the Great Swamp. A number of other wetland areas also contain rare plant habitats.

SIGNIFICANT AREAS

In 1983, after seven years of research by a committee of the Environmental Management Council, 33 sites in Dutchess County were designated Significant Areas. Significant Areas are natural places that

are geologically, hydrologically, or biologically unique. They often provide habitat for rare, threatened, or endangered species, as well as supporting a wide range of wildlife. Efforts to protect the diversity of wildlife and vegetative types in these critical locations benefits the community as a whole in equally diverse and important ways, from enhancing the aesthetic environment, to cleansing the air, purifying water supplies, and providing recreational opportunities.

East and West mountains are listed among the original 33 Significant Areas. Both areas are considered significant because of their scenic beauty and abundant wildlife. East Mountain is a New York State designated Significant Habitat for species and also contains rare plant communities.

West Mountain provides habitat for fragile vegetation and also contains two unique geological formations, the Stone Church and Seven Wells. Both natural formations were carved by the action of the brooks which flow through them. The Stone Church is a cavern illuminated by a skylight from a fissure in the roof. From its apex the cavern gradually widens to form an arch, the span of which is about 25 feet. The Seven Wells are a series of pools ranging from 3 to 20 feet in depth in the Seven Wells Brook.

UNIQUE AND RARE HABITATS

The carbonate rocks underlying the center portion of the Town of Dover support a number of rare plant communities, several of which contain plants that exist in fewer than six places in the State of New York. Since Dover is still largely a rural town, the limestone plant associations have flourished, often supported by farming practices. Development pressures in other parts of the state have resulted in the loss of limestone plant communities, especially since farmland is often sold for development.

The rare limestone plant communities along with the critical habitat areas on East and West Mountain and the extensive wetland habitats in the Town of Dover have helped to create more rare habitats in this town than in any other town in Dutchess County. As previously mentioned, both East and West Mountain contain significant plant and animal habitats. East Mountain is home to such species as the timber rattlesnake, which is rare to the county, and rare plant communities including the tamarack swamp and a virgin hemlock forest. West Mountain provides habitat for fragile vegetation, such as rare mosses and liverworts, as well as the pine barrens including pitch pine and scrub oak. West Mountain also contains rattlesnake habitats.

The Environmental Impact Statement prepared by any developer should contain detailed research on the flora and fauna present on the property and should be cross-referenced with the Nature Conservancy in Katonah, New York.

CRITICAL ENVIRONMENTAL AREAS

The Critical Environmental Area (CEA) designation is authorized under subdivision 617.4 (h) of the State Environmental Quality Review Act (SEQR). Under the Act, an area may be designated a CEA using one or a combination of the following 4 criteria: 1) a benefit or threat to human health; 2) a natural setting, 3) areas with social, cultural, historic, archeological, recreational, or educational values; and 4) areas with inherent ecological, geological, or hydrological sensitivity.

Any unlisted action subject to review under SEQR within the boundaries of a CEA becomes a "Type I action", requiring the preparation of a Full Environmental Assessment Form (EAF) and coordinated review among involved agencies. More minor Type II, excluded or exempt activities, such as maintenance and repair or construction of accessory structures, are not affected. An Environmental Impact Statement may be required if the EAF results indicate that the proposed action will have a significant environmental impact. Currently there are 26 Critical Environmental Areas in Dutchess County. Three of the 26 are in Dover: the Duell Hollow area, the MICA Plant, and portions of the Great Swamp.

The Duell Hollow CEA, located in the southeastern corner of Dover, is an estimated 1,050 acres adjacent to and part of the CEA designated by the Town of Pawling. It includes most of the watersheds of Duell Hollow Brook (a state classified trout stream), the Harlem Valley Psychiatric Center reservoir and three state designated wetlands among its water resources. Significant scenic and historic resources, and a variety of rare plant and animal species are also located within this CEA.

The MICA Plant CEA is an inactive dumpsite located between Route 22 and the Harlem Valley Rail Line across from the junction with Cricket Hill Road (CR 26). Its significance is that hazardous wastes are suspected to exist in the dump areas and may threaten nearby water resources, and people and wildlife that may come into contact with any wastes that leach into ground or surface water systems. The site was designated a CEA because of its possible threat to the environment.

In January of 1992, the Dutchess County Legislature designated the Great Swamp (DP-22) a CEA, a portion of which is located in Dover (see previous description in wetlands section).

DOVER OPEN SPACE INVENTORY

The Town of Dover has a wealth of open space resources whose protection is crucial to retaining the present rural character of the Town and its quality of life. As a starting point for determining what type and level of protection effort is needed, the Dutchess County Department of Planning and the Dover Conservation Advisory Commission have worked together in compiling the Dover Open Space Inventory.

The purpose of the inventory is to provide information on Dover's open space resources for use in updating the Town's planning policies and making land use decisions. In order to help accomplish these

objectives, the inventory is designed to be used in conjunction with the existing information on the Town's natural resources, already developed by the Conservation Advisory Council, to:

- 1) identify the open space resources in Dover, consider their interrelatedness and recognize the networks within which they function;
- 2) identify and document the significance of sites that the people of Dover feel are crucial elements of the Town's open space system; and
- 3) identify those open space resources that already receive some level of protection, and the threats to those without adequate protection.

The inventory is divided into two sections. The first analyzes information on land use which was obtained from the Dutchess County real property tax files. The second section contains information on the 24 sites identified by the Dover Conservation Advisory Council as the Town's most important open space sites. The inventory and the recommendations of a subsequent Open Space Plan report produced in conjunction with this master plan will provide a basis for the permanent protection of the crucial elements of Dover's existing open space network.

SUMMARY AND IMPLICATIONS FOR PLANNING

An overlay analysis of the various constraining features discussed in the previous sections produces a composite view of the natural limitations of the land for development. The identified locations of steep slopes, floodplains, wetlands, shallow soils, poor filter soils and soils with low permeability represent areas likely to impose restrictions on land uses and development densities. Accommodating anticipated growth while preserving a healthy environment clearly demands thoughtful and innovative planning strategies that produce development that is compatible with the land. Local land use regulations should employ such techniques as clustering, performance standards, stormwater infiltration policies, aquifer protection zones, conservation easements, erosion control plans and development density limits based on groundwater features to foster well-designed development in sensitive areas.

Most of the land in Dover has at least one characteristic that limits its suitability for development. Some of these factors are obviously less constraining than others. Soils with low permeability or poor filtering soils, for instance, are not a serious problem in areas capable of being served by central sewer systems. In those sections not likely to be served by central systems in the foreseeable future, lower average densities may be necessary in conjunction with carefully designed septic systems. With sensitive site planning, erosion controls and the probability of higher costs, properties with moderately steep slopes or shallow soils can often be developed. Floodplains and wetlands, on the other hand, usually impose stringent restrictions on construction. The Town might consider regulating wetlands smaller than the 12.4 acre limit currently regulated by the Department of

Environmental Conservation. Other limiting factors, such as the availability and quality of groundwater, are more difficult to generally represent and should rely on site-specific testing.

It should also be noted that prime and important farmlands often have the least physical constraints to development. Agricultural lands, which have already been cleared and are level or gently sloping with good soils, usually are the first properties targeted for development. Yet these valuable agricultural resources, which are needed for present and future food production, are extremely vulnerable to permanent loss. Although important farm soils are sometimes not considered natural limitations on development, Dover should consider mandatory clustering or other conservation strategies to protect existing farmlands and identified farm soils so as not to limit future agricultural activities in the area.

Because of the high percentage of land with natural constraints and the increasing growth pressures, local officials should carefully tie their development decisions to the carrying capacity of the land. Using the natural resource descriptions in this master plan in conjunction with the State Environmental Quality Review Act, boards can obtain detailed, site-specific information about the impacts that proposed projects may have on sensitive resources. Alternative site designs, density limits and other mitigation measures can then be explored to best prevent the possibility of future groundwater contamination or other forms of environmental damage.