NATURAL FEATURES

The amount, type, extent and intensity of development on land is often constrained by the physical characteristics of the land itself. This is particularly true in Brunswick, where the Potomac River and steeply sloped ravines have dramatically shaped the pattern of development. Some physical features, such as wetlands and some woodlands, serve an important ecological function and should therefore be protected from development. Other features, such as floodplains, should be protected from development because of potential hazards from natural disasters.

The purposes of this chapter are: 1) to describe the physical characteristics of the land in Brunswick and its vicinity; 2) to identify constraints to development; 3) to identify physical features which should be protected from development; and 4) to set forth recommendations and policies for the protection of sensitive natural resources.

Geology and Mineral Resources

Geologic information is important to land planning because rock structure and type influence land form and surface drainage patterns.

The lower Middletown Valley, of which Brunswick is a part, is within the Blue Ridge Province, one of two major physiographic provinces found in Frederick County. The province lies between Catoctin Mountain and South Mountain and extends into western Maryland.

The Middletown Valley is floored with bedrock of Precambrian gneiss and slightly metamorphosed volcanic rocks of the young Precambrian age. The topography of the valley is characterized by rolling terrain cut by deep, narrow stream valleys. The two mountain ridges on either side of the valley (Catoctin and South Mountains) are composed of a thick layer of quartzite bedrock of Early Cambrian age. The quartzite is very resistant to weathering and erosion, which enables the ridges to stand out in topographic relief as mountains above the more easily eroded bedrock of the Middletown Valley.

Soils in the Middletown Valley area tend to be deep because of the relative nonresistance of the bedrock to weathering. Knobs of more resistant bedrock protrude through the soil and are seen as rounded out-croppings throughout the region.

The geology of an area also determines groundwater yields. The gneiss found in Brunswick is classified in Hydrologic Unit III, which contains the poorest aquifers. The average well yield is seven gallons per minute (gpm). The City of Brunswick, however, is not solely dependent on groundwater or springs for its water supply. The Potomac River is a vast and reliable water resource for the City.

Many geologic resources in Frederick County are currently mined, although none are located in the Brunswick region. Limestone, shale, and stone aggregate are mined in the Frederick Valley, east of Catoctin Mountain. No mineral resources in the Brunswick region have been identified for potential mining or recommended for conservation in the Frederick County Comprehensive Plan,

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Soils

Soils information indicates an area's suitability for various land uses. Most of the soils in the Brunswick area are classified as Myersville Fauquier loams, which are deep, well drained soils that formed in materials weathered from metabasalt, or greenstone. They are high in fertility and productiveness. Their suitability for development depends on the slope of the land; steep slopes are less suitable for development.

Topography

Topography is perhaps the most significant natural feature to consider when planning for future land uses in Brunswick. A high plateau originates in the area of the MD Route 17 and U.S. 340 interchange and extends eastward for about three miles to the banks of Little Catoctin Creek. MD Route 17 (between U.S. 340 and Petersville Road), Souder Road, and the village of Rosemont are located on this high plateau.

A series of subordinate plateaus or fingers of land extend southward from the main plateau toward the Potomac River. These plateaus and the steep slopes and ravines marking their edges define and shape neighborhoods within the City of Brunswick. North-south streets generally run along the tops of these subordinate plateaus. On the east side of the City, the Woodside station development and the school complex lie on one plateau. Steep slopes separate this plateau from areas to the south and west. The next plateau defines the area along Ninth Avenue. Gum Springs hollow separates this area from the third hill on which the old high school was located. Second Avenue runs along the spine of a fourth hill. A long steep ravine separates this hill from the fifth hill along which Maple Avenue runs. Another long steep ravine on the west side of Maple Avenue drains toward Martins Creek, which meanders along Petersville Road. The sixth plateau is located on the west side of Petersville Road. The west end neighborhood is located on the southern bank of this plateau. Dutchman's Creek marks the western boundary of this hill, thus separating the plateau to the west from the corporate limits of Brunswick. The hills in Brunswick define neighborhoods from east to west and also from south to north. The downtown area is found at the base of the hills along the railroad and Potomac River.

The ravines which separate the plateaus vary in length and steepness. The ravines on the west side of the City tend to be longer, extending from north to south nearly the entire length of the City. On the east side of the City, the ravines extend only partway up to the northern boundary of the City. The hills on the east side of the City tend to have steeper slopes at their southern boundary than those on the west, severely limiting north-south road connections on the east side of the City. Throughout the City, the steep slopes limit east-west access; Potomac Street and Souder Road are the longest east-west connectors.

The ravines separating the hills in the City represent severe development constraints and therefore remain largely undeveloped. Steep slopes which are sensitive to development generally include the ravines which exceed grades of 35 percent. The City's Open Space Zoning in these areas for

the most part prohibits development in the steepest areas, and the Subdivision Regulations prohibit roads which exceed 15 percent grades. Many of the existing streets in Brunswick could not be built under today's standards. There are, however, several areas in the City zoned for development in which houses have been built on steep grades and roads extended down steep slopes. As development pressures in Brunswick increase and as the number of level and easily developed lots decreases, demand for development of marginal, steeply sloped lots can be expected to increase.

Hydrology

The Potomac River is the most significant water resource in the Brunswick area. Historically, the river brought the City's first residents, as Brunswick was established as a trading post for travelers along the river. The development of the C&O Canal along the Potomac brought the first wave of growth to the City in the 1800s. Use of the river and canal as transportation route declined with the advent of the railroad, so today the river serves as a scenic, recreational and water supply resource. Careful planning is required to insure that it will continue to be available as a resource in the future.

The Potomac River marks the southern boundary of the City of Brunswick, Frederick County and the State of Maryland. To the south of Brunswick lies Loudoun County, Virginia. The river originates in West Virginia and drains into the Chesapeake Bay south of Washington, D.C. Its total drainage area of 14,670 square miles includes all of Frederick County, part or all of six other Maryland counties, as well as parts of Virginia, West Virginia and Pennsylvania. Within Frederick County, Catoctin Creek and the Monocacy River are the main tributaries draining into the Potomac. Several streams that flow through Brunswick also drain directly in the Potomac.

Water discharge on the Potomac River is recorded at Point of Rocks, six miles east of Brunswick and east of Catoctin Creek. The average discharge at Point of Rocks is 9,365 cubic feet per second. The maximum discharge was recorded in 1936 at 480,000 cubic feet per second, and the minimum was 530 cubic feet per second in 1966. The average width of the Potomac River in Frederick County is about 1,000 feet. The bottom of the river falls an average of 2.6 feet per mile through Frederick County. Because it is a large and swiftly flowing river, the Potomac River today has relatively good water quality and remains a major recreational asset and water supply source to Brunswick.

As a recreational resource, the Potomac River is used for boating, canoeing, kayaking, and fishing. Small mouth bass, sunfish, catfish, and carp are among the fish commonly found in this section of the river. The C&O Canal National Park and the Brunswick Campsite provide recreational access to the river.

There are several streams in Brunswick which drain the plateaus extending through the City. Martin's Creek is the largest stream, extending along Petersville Road and through the downtown area. To the west of the City limits are Dutchman's Creek and its tributary. Several smaller unnamed streams cut through the ravines found between Maple Avenue and Second Avenue and Fifth Avenue, in Gum Springs hollow, and between Ninth Avenue and the Woodside Station

development.

Floodplains and Wetlands

Floodplains and wetlands are areas are of particular concern in land use planning. Not only do these areas represent potential flood hazards to development, they are environmentally sensitive to the effects of development as well. Floodplains are defined in several ways: one hundred year flood plain, standard project flood plain, and soils flood plain. One hundred year floods are defined as those that could occur once in 100 years on average. One hundred year floodplains are delineated by the Federal Emergency Management Agency (FEMA) for inclusion in their flood insurance program. The standard project flood plain is defined as the reasonable upper limit of flooding in an area, so includes a more extensive area than the 100 year flood plain. Soils flood plains are identified as areas with soil types which are characteristic of flood plain areas.

Most of the flood plain areas in Brunswick are located along the Potomac River. FEMA-delineated 100-year floodplains include the C&O National Park, the Brunswick Campsite and part of the railroad property. Structures in the 100 year flood plain include the campsite trailer, the sewage treatment plant, the water intake and pumping station, the round- house, and a CSX maintenance shed.

The Baltimore District Corps of Engineers delineated the standard project flood plain for the Potomac River in 1975. The standard project flood plain extends beyond the 100-year flood plain. Several structures are included within this flood plain, including the train station, and structures on Walnut Street, S. Delaware Avenue, S. Virginia Avenue, S. Maryland Avenue, and S. Maple Avenue.

A draft flood management study for Brunswick was completed in the fall of 1991. The report focused on Martin's Creek and included a delineation of the 100 year flood plain along its banks. About forty structures, located on Maple Avenue, Potomac Street, or Petersville Road are within or in the vicinity of the delineated flood plain. The other streams in Brunswick were noted in the study to have small contributing drainage areas and apparent adequate capacity to carry large flows without overtopping the banks of the stream.

Non-tidal wetlands are important to maintaining the local ecosystem. They control flood waters, support fish and wildlife, and filter suspended sediments and chemicals before they enter the ground or surface water. Federal and State regulations provide for the protection of non-tidal wetlands and control disturbance to them. The regulations also define a non-tidal wetland as "an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation." Non-tidal wetland areas are located along the Potomac River in Brunswick. One of the small islands along the Potomac River in Brunswick has been identified as a wetland of special state concern because it is a habitat for an endangered plant species. Upland wooded wetlands are also associated with Dutchman's Creek west of the City.

Woodlands

Woodlands are a beneficial resource for many reasons. Wooded areas stabilize steep slopes and slow urban runoff. Within stream and river valleys, trees act as filters to sediment and pollutants which would otherwise pollute the water, and their shade helps maintain cool temperatures for fish and wildlife species. Woodlands act as screens and buffers as well, separating incompatible land uses and breaking the monotony of dense development.

Within the City of Brunswick, wooded areas are found in the stream valleys and along the Potomac River. Wooded areas also surround the City on the east and west sides. While some of the wooded areas are protected by Open Space zoning, the Open Space zoning does not protect all of the wooded areas of the City.

Rare, Threatened and Endangered Species

The Maryland Natural Heritage Program has identified a number of rare plant and animal species in Frederick County. While the species have been identified, information concerning the exact location of their habitats is not available. Rare species which occur in Frederick County are often found in wetlands and rich forest lands. Some of the rare species are on the State's official threatened and endangered species list, and others are proposed to be added to it.

Any rare, threatened and endangered species in the Brunswick area are most likely located along the Potomac River in the C&O Canal National Park and Brunswick Campsite areas, where there are some wetland and woodland areas. In fact, one of the islands along the river has been identified as the habitat of a rare plant species. The canal is protected from development by its park status, although some of the islands in the Potomac River are privately owned. Flood plain regulations also restrict development in this area.

Natural Features Plan Proposals

The Maryland Planning Act of 1992 requires that Master Plans contain goals, objectives, principles, policies and standards designed to protect sensitive areas from the adverse effects of development. In Brunswick, sensitive areas include streams and rivers and their buffers, 100-year floodplains and wetlands, the habitats of threatened and endangered species, and steep slopes.

Rivers and Streams and their Buffers

The rivers and streams which should be protected within Brunswick and its surrounding area include the Potomac River, Dutchman's Creek, Martin's Creek, the streams on each side of Second Avenue, Gum Spring, the stream between Ninth Avenue and Woodside Station, and Little Catoctin Creek. These streams represent the steep ravines which define the topography of Brunswick. These stream valleys are shown on the Master Plan Map as Open Space-Conservation areas. The boundaries were determined by the width of the stream itself, the limits of any associated flood plain, existing lot lines, the limits of development and woodlands, and the extent of steep slopes greater than 35 percent. Privately owned lots of record and paper streets are

included within the Open Space-Conservation designation. Restrictive zoning, such as the current Open Space District, should be used to protect these stream valleys from inappropriate development. The Open Space District permits a limited amount of development to occur on lots of record provided a number of strict standards can be met, thus protecting the steep slopes and woodlands from excessive development.

The Potomac River and its buffer are primarily protected in Brunswick through public park status. Its designation as Open Space on the Plan as well as the City's flood plain regulations also serve to protect the sensitive area along the river. The City's flood plain regulations are particularly important in limiting development on the part of the railroad property which is located in the 100-year flood plain. The water quality of the Potomac River is primarily controlled by State regulations.

Dutchman's Creek and Little Catoctin Creek are currently located outside the City, but are within the City's proposed future annexation limits. When the properties on which these streams are located are developed, the stream valleys should be protected from development through use of the Open Space or other protective zoning classification and through dedication of these areas to public or homeowner's association ownership. The boundaries of these stream valleys should be more specifically defined when these properties are developed. The protected area should include the streams, any associated flood plains and wetlands, associated woodlands, and steep slopes along the banks exceeding 35 percent.

Martin's Creek has been the subject of a study by the State Department of Natural Resources. A draft report delineated 100-year flood plain along the stream. The recommendation to officially designate this area as 100-year flood plain has not been adopted by the City or the Federal Emergency Management Agency (FEMA). If the area were officially designated, the affected property owners would be subject to the limitations imposed by the City's flood plain regulations. The regulations would be particularly problematic for developed properties located in the City's downtown, and might impose limitations on the capacity of some downtown business to expand. The stream is channeled through the downtown via underground pipes. Instead of designating part of the downtown as a sensitive area, the adequacy of flood control in the downtown area should be addressed in a later study. The Plan does designate the northern, above ground section of the Martins Creek stream valley (north of West C Street) as Open Space-Conservation.

As a long term protective measure, this Plan would recommend that the City explore alternative approaches to making the privately owned lots located within the designated stream valleys permanent open space. Approaches might include public acquisition of lots or development right easements, property tax abatement, or incentive programs for donation of properties. This would ensure that these sensitive areas are protected from development.

100-Year Floodplains and Wetlands

The 100-year floodplains and wetlands in Brunswick are located along the Potomac River. Only a few structures are located in the flood plain area. These areas are adequately protected from development as public parkland and by the Open Space Plan designation, the City's flood plain

regulations and State regulations.

Habitats of Threatened and Endangered Species

The only known habitat of a threatened and endangered species in the Brunswick area is located in the C&O Canal National Park located along the Potomac River. The park provides adequate protection of the habitat.

Woodlands

Woodland areas in Brunswick will be protected by the Forest Resource Ordinance of Frederick County. The purpose of the Ordinance is to provide for the conservation, protection and planting of trees to produce forested area. The County will administer and enforce the Ordinance for the City. The Ordinance applies to persons making application for a subdivision, a grading permit, or sediment control permit on areas greater than 40,000 square feet in size. The Ordinance sets forth guidelines and requirements for forest retention, replacement and afforestation (planting trees in cleared areas). Off-site planting is permitted if on-site planting is not possible; payment into a forest conservation fund is also possible.

Steep Slopes

All of Brunswick is characterized by steep slopes. Many of the structures and roads in Brunswick were constructed on slopes exceeding 35 percent. For the purposes of this Plan, steep slopes are defined as areas which exceed 35 percent slopes. Construction on slopes can cause erosion and drainage problems, and be detrimental to water quality in streams and rivers. While many mistakes of the past cannot be reversed, this Plan includes several recommendations to insure that the detrimental effects of development on steep slopes are prevented in the future.

First, the steep stream valleys which traverse Brunswick and its vicinity are designated as Open Space - Conservation on the Plan map. Other steeply sloped lots are also designated Open Space - Conservation; these areas include properties located on the west side of Petersville Road, on the south side of East A Street, on the north side of Potomac Street, and the area to the south of the Woodside Station development. The areas designated Open Space - Conservation should be the focus of efforts to preserve and replant trees to stabilize the slopes and the subject of restrictive zoning. Any disturbance or development in these areas should be subject to strict compliance with sediment and erosion control standards.

When planning new developments in Brunswick, every effort should be made to protect the steeply sloped parts of the property. The Manchester Village and Woodside Station developments are examples of developments which were designed to protect steep areas. The trees on slopes should be preserved, and where trees are not existing, planting efforts should be made through implementation of the Forest Resource Ordinance.

This Plan also recommends that new commercial development occur on slopes less than 20 percent. Industrial development should be focused in areas with slopes in the 0 to 15 percent

range. Within a development, steeply sloped areas can be used as open space, buffer areas, and recreation.

Natural Features, Policies and Recommendations

- *New developments will be planned and designed so as to minimize adverse effects on sensitive natural features, particularly strewn valleys and their buffers, 100-year floodplains and wetlands, and steep slopes. The City will encourage the use of development techniques which cluster development on appropriate parts of the site.*

- *Future industrial and development will be located in areas with slopes of 15 percent or less, commercial development will be located* in *areas with slopes of 20 percent or less.*

- *The City will explore approaches to maintaining privately owned, Open Space - Conservation areas as permanent open space.*

- *Strewn valley areas, with the adjoining slopes exceeding 35 percent, will be protected from development.*

- *The City will assess procedures for evaluating the storm water management and sediment control impacts of all developments, particularly those occurring on lots of record. The City will coordinate review of plans with the County Department of Public Works. The City will establish review procedures for developments in which the County does not require storm water management or sediment control plans to be reviewed or implemented.*

- *The City will undertake a study to review the adequacy of the channelization of Martins Creek in the downtown area for flood control.*

- *The City will review its road construction standards to insure that steep slopes are protected in the development of new roads.*

- *All City facilities will* fully *comply with State water quality standards and regulations. All City industries will also comply with all State environmental standards and regulations.*