

APPENDIX B: MOUNTAIN PROTECTION PLAN

Proposed Mountain Protection Plan

Where has Nature spread so rich a mantle under the eye? Mountains, forests, rocks, rivers. With what majesty do we there ride above the storms! How sublime to look down into the workhouse of nature, to see her clouds, hail, snow, rain, thunder, all fabricated at our feet! And the glorious Sun, when rising as if out of a distant water, just gilding the tops of the mountains, and giving life to all nature.

--Thomas Jefferson on Albemarle's mountains

MOUNTAIN PROTECTION COMMITTEE

The Mountain Protection Committee consisting of 12 citizens appointed by the Board of Supervisors, met regularly from June, 1995 through July, 1996.

The Committee reviewed existing County ordinances and regulations to assess the degree to which these public values are adequately protected at present. The County attorney as well as the Piedmont Environmental Council's staff attorney and Page Gilliam, a member of the Mountain Protection Committee and an attorney, reviewed the constitutional issue of taking without just compensation and Virginia legislative authority for local mountain protection.

Other presentations were made by Natural Resource Conservation Service, Virginia Department of Forestry, County Department of Planning and Community Development, Department of Zoning, Building Inspections Department, the Water Resource Manager, and the County Design Planner. A member of the University of Virginia's Department of Astronomy gave a presentation and conducted a field trip on outdoor lighting and dark night sky as a natural resource.

The Committee identified resources present in the mountainous areas of Albemarle County that it is in the public interest to protect:

- public safety
- soil
- water quality and quantity
- forest and agricultural resources
- plant and animal habitat
- scenic resources and their economic impact
- dark sky
- tourism

The Committee reviewed ordinances pertaining to mountain protection from other localities in Virginia. The Clarke County Mountain Land Plan (1994) provides the closest parallel in Virginia, seeking to protect, "forest resources, surface water quality, ground water, wildlife habitats and ecosystems, scenic values, and well-sited development compatible with the above five resources." The Committee also considered the balance between public values and the private interests of the mountain landowners in developing recommendations.

Finally, the Committee drafted recommendations that provide for the assurance of the health, safety and welfare of County residents, both within the mountain areas and throughout the County. The Committee's draft recommendations will be forwarded to the Board of Supervisors and citizens' groups for comment prior to presentation of a final report to the Board.

Mountain Protection Committee members:

David A. Tice, Chairman
Timothy Michel, Vice Chairman
Sherry Buttrick
Page Gilliam
Peter Hallock
Joseph Henley, Jr.
Mark Lorenzoni
William Nitchmann, planning commission liaison
Carleton Ray
William Rieley
Alexander Rives, ex-officio, shenandoah national park
Sally Thomas, Board of supervisors liaison
Mary Joy Scala, Staff

Sixty-six percent (66%) of Albemarle households favor a regulation to preserve the appearance or character of highly visible mountains and ridges.

--1994 Albemarle County Planning Needs Survey
Center for Survey Research, UVA.

INTRODUCTION

Albemarle's mountains have been and continue to be a source of income, natural resources, scenic beauty, and recreation. In fact, mountains may be said to define much of the character of Albemarle County. Directly and indirectly, the County's mountainous areas provide tens of millions of dollars to the local community in employment, tourism, and agricultural and forest

products. Beyond the economic benefits, the mountains provide important natural functions, such as provision of clean water, contributions to healthy air, and habitats for many of the County's plant and animal species. And, to many residents, the blue backdrop of the mountains gives Albemarle County in large measure its "sense of place," that quality which makes this area a special place to its residents and visitors and consistently ranked among the top places to live in the United States.

SUMMARY OF RECOMMENDATIONS

1. Delineation of a **Mountain Overlay District** describing the area containing the critical resources of the mountains, and recommendations which ensure health and safety of the mountain area's residents and control possible degradation of County's resources from activities within the District. These recommendations are applicable exclusively within the Mountain Overlay District.
2. Recommendation of County-wide application: **Lighting Ordinance**.

ADDITIONAL PLANNING TOOLS

Recommendations in this category assert the fundamental premise that planning for a sustainable future of the County must examine the County, its resources and developmental needs, from a comprehensive point of view. These strategies for the protection of mountain resources benefiting the County and City of Charlottesville proceed from the assumption of an interrelation between healthy rural and healthy urban areas.

ALBEMARLE'S MOUNTAIN RESOURCES

Albemarle's mountains are unique areas of the County which are distinguished by the natural resources and physical conditions listed below. Such resources and conditions are found in other areas of the County, but only in the mountains do they occur in such combination, as extensively, and to such extremes.

Critical Slopes: In Albemarle's mountains continuous critical slopes in excess of 50% can be found for distances of up to one mile, and in some cases, longer. Concerns regarding disturbance of steep land become pronounced in mountain areas due to generally shallow soils and length of grade on side slopes. Soil erosion, surface water runoff, and septic system contamination are amplified in these areas.

Soil: Forest cover is the optimum land use for minimizing soil erosion and maximizing water quality. Soils on steep slopes are typically more erodible than in other areas. Inaccessibility and isolated location of development sites in mountain areas necessitate longer driveways and access

roads over more highly erodible soils than in other areas of the County. Such driveways and access roads disturb many times more land area than a dwelling itself. The United States Department of Agriculture states in Handbook 537, "Both the length and steepness of the land slope substantially affect the rate of soil erosion by water." (p.12) This Handbook reports that, other variables such as cover and soil type being equal, soil loss on a slope of 20 degrees is 3 1/2 times greater than soil loss on an equivalent slope of 9 degrees. When the length of slope is lengthened from the sample 72 feet to 600 feet, as in a mountain slope, the soil loss is 10 times as great. Albemarle County Comprehensive Plan: "Soils are a natural resource which require proper use and preservation...Improper use of soils may result in accelerated soil erosion and sedimentation, ground or surface water pollution, landslides, flooding, drainage problems, failed septic systems, construction problems, and unproductive agricultural and forestal lands." (p.75)

Water Quality and Quantity: Sedimentation of Albemarle's public drinking water reservoirs in addition to increased demand will necessitate the building of the 26 million dollar Buck Mountain Reservoir before 2040. The South Rivanna Reservoir loses 13 million gallons of storage capacity annually as a result of sedimentation. The Ragged Mountain Reservoir, by contrast, loses no appreciable capacity. Albemarle County Comprehensive Plan: "Goal: Protect the County's surface water and ground water supplies for the benefit of Albemarle County, the City of Charlottesville, the Town of Scottsville, and downstream interests. ...Protection of water resources is of vital importance to Albemarle County and Virginia in general. Albemarle's location adjacent to the Blue Ridge Mountains provides both the advantage of clean headwaters,

and a responsibility to protect them. The County's Rural Areas play a crucial role in water supply protection...The maintenance of pasture and especially forestal areas is generally beneficial to water quality." (p.57)

Sugar Hollow Reservoir With Log Debris, June, 1995

Forest and Agricultural Resources: Now that The Eastern Deciduous Forest, largely cut during the 18th and 19th centuries, is returning, the mountains of the County are almost entirely in forest cover, with the remaining acreage in orchards and pasture. The principal threat to the County's mountain forests and farms has now become fragmentation and conversion to residential land use. The County's Agricultural/Forestral Industries Support Committee states, " Continued forest fragmentation is probably the biggest threat to the future viability of the forest industry in Albemarle County...As parcel size declines, operability for timber harvesting decreases. Forest sizes below 40 acres are difficult to manage economically. The proximity of houses and other structures escalates the problem." A viable forest industry is an essential economic incentive to maintenance of forestland. The Comprehensive Plan of Albemarle County places agriculture and forestry above residential land use in importance in the County's Rural Areas. The Mountain areas are zoned almost exclusively Rural Areas. The Rabun-Myersville-Catoctin soil association on the Southwest-Carters Mountain chain is among the most productive hardwood forest soils in the Commonwealth.

A Mountain Orchard Near Covesville
Photograph courtesy of G. Carleton Ray

Debris Flows: The U.S. Geological Survey's report, Landslide and Debris-Flow Hazards Caused by the June 27, 1995 Storm in Madison County, Virginia, states the following: Fast moving flows of mud and rock, called debris flows, are among the most destructive types of landslides and are responsible for substantial damage and loss of life worldwide... Their consistency ranges from watery mud to stiff, rocky mud similar to wet concrete and dense enough to carry boulders, trees and cars. ... Debris flows are triggered predominantly by adding moisture to soil on steep slopes faster than the moisture can drain away leading to a temporary condition of perched water in the soil.... They commonly start on steep hillsides as shallow soil slides that liquify, accelerate to speeds of 35 miles per hour or more, and flow down hillslopes and channels until slowing on more gentle ground.

The North Fork of the Moorman's River experienced debris flows during the June, 1995 flood. Some of the Moorman's debris flows were thousands of feet long, and created massive swaths of destruction. Debris flows are recurring episodes. Portions of Albemarle's mountains also experienced flows from Hurricane Camille in 1969.

Moorman's River Debris Flow, June, 1995
Photograph courtesy of G. Carleton Ray

Plant and Animal Habitat: Although a number of native species such as the white-tailed deer nearly vanished by the early 1900's have recovered, losses of native biological diversity (number of plant and animal species and number of individuals in each species) are a significant concern. A number of eastern migratory songbirds are in decline, almost without doubt due to human activities. Those declines are caused by several factors, most importantly, fragmentation of habitat-- the dividing of large areas into smaller parcels, and the resulting disruption of forest cover. Albemarle County Comprehensive Plan: "Wildlife is a renewable natural resource which requires both protection and harvesting for proper management. The mountainous areas of the County contain the more dense populations of wildlife..." (p.75)

Scenic Resources and their economic impact: Albemarle County is well known for its scenic character. Maintaining this character is important to current residents and to prospective residents and tourists. A number of highly visible structures constructed recently have occasioned public concern about the continued scenic quality of the mountain landscape. Public expression of concern suggests that the scenic quality of the mountains is important to County residents. Albemarle County Comprehensive Plan states, "Objective: Preserve the County's scenic resources as being essential to the County's rural character, economic vitality, and quality of life. (p.83)... An "issue that is of importance to visual impact is the horizon. In a county with as much varied topography as Albemarle, the natural horizon becomes very prominent. Any serious modification of the natural ridge lines in the County will modify the visual character of an entire area."(p.87)

UVA Observatory, Fan Mountain
Photograph courtesy of G. Carleton Ray

Dark Sky: Excessive outdoor lighting in the urban and developed areas of the County is increasing. The natural resource of dark night sky and its importance to the University's

Observatories has been insufficiently considered in planning processes in the County. Energy wasted nationally from poorly designed outdoor lighting amounts to more than a billion dollars a year (International Dark Sky Association, 1990) Poorly designed outdoor lighting creates glare, which compromises safety especially for drivers, degrades the quality of the entrance corridors leading to the City and degrades the quality of the built environment.

Tourism: Tourism and associated economic benefits related to the mountains continue to grow in the county. Travel sales in 1994 accounted for 17% of total sales or \$109,139,211 in the County. Each year approximately 1,985,000 people visit Shenandoah National Park. Direct economic benefit to counties adjoining the Park is approximately 85 million dollars per year. In 1990 there were 550,183 visitors to Monticello, which translates into over 159 million dollars in revenue to the County.

Southwest Mountains Near Pantops Development Area
Photograph courtesy of G. Carleton Ray

HISTORY OF MOUNTAIN PROTECTION IN ALBEMARLE COUNTY

COMPREHENSIVE PLANNING

Mountain resource protection efforts began in 1971 with the adoption of the County's first Comprehensive Plan. One of the Plan's six Goals was: "Respect conservation values, including the preservation of stream valleys, mountain slopes, watersheds and other open space areas." The Land Use Plan delineated the mountains as "conservation areas." The Natural Resource Objective was: "Albemarle County is rich in natural resources which include beautiful stream valleys, scenic mountains, abundant woodlands, wildlife habitations, and mineral deposits. All of these resources are irreplaceable assets which deserve recognition, protection, and proper management." A strategy was: "Mountain slopes of 15% or greater should be built upon only under carefully exercised controls; slopes of 25% or greater should not be allowed to develop."

The 1977 Comprehensive Plan contained the following Goal for the Conservation of Natural Resources: "Conserve the County's environment and the balance of its natural ecology. This requires the conservation of water supply impoundment watersheds, the best agricultural land, mineral deposits, forests, steep slopes, hilltops/ridges, open space vistas, water quality in streams, and flood hazard areas. These areas should be protected from intensive commercial, industrial, and residential development." A map of "Conservation Areas" included hilltops, major ridge lines, slopes over 15%, streams/rivers and their valleys, and the Rivanna Reservoir watershed. In addition, conservation measures were also proposed for the County's woodlands. Hillside development standards were proposed on slopes exceeding 15%, which included road construction, grading and drainage standards.

In 1980 a new zoning ordinance was adopted, which included the Rural Areas zoning district to restrict rural development rights, and the critical slopes provisions. Nearly every mountain is zoned Rural Areas, and is affected by the development rights restrictions, except two small peaks in the Urban Growth Area. The critical slopes provisions require a "building site," a contiguous area of land in slopes of less than 25%. The regulation is intended "to implement the Comprehensive Plan by protecting and conserving steep hillsides together with public drinking water supplies and flood plain areas and in recognition of increased potential for soil erosion, sedimentation, water pollution and septic disposal problems associated with the development of those areas described in the Comprehensive Plan as critical slopes. It is hereby recognized that such development of critical slopes may result in: rapid and/or large scale movement of soil and rock; excessive stormwater run-off; siltation of natural and man-made bodies of water; loss of aesthetic resource; and in the event of septic system failure, a greater travel distance of septic effluent, all of which constitute potential dangers to the public health, safety and/or welfare."

The 1982 Comprehensive Plan included environmental standards to protect and conserve natural resources. The Plan states: "Clearing, grading, building, cropping or overgrazing of critical

slopes can result in extensive erosion and landslides or sloughing of soil and rock; excessive stormwater runoff; increased siltation and sedimentation of natural and man-made bodies of water; loss of aesthetic resource and in the event of septic system failure, a greater travel distance of septic effluent.”

The 1989 Comprehensive Plan states that, “Natural, scenic, and historic resources are essential to Albemarle County's rural character, economic vitality and quality of life.” The Plan notes the strong relationship between these environmental resources, water supply protection, and agricultural/forestry preservation, which are the major reasons for protecting the Rural Area. The Plan also notes the interdependency of environmental resources, “ For example, the maintenance of forested areas protects surface water quality, wildlife habitat, critical slopes, groundwater recharge areas, and air quality.” The 1989 Plan also discusses design standards for scenic resources. “In a county with as much varied topography as Albemarle, the natural horizon becomes very prominent. Any serious modification of the natural ridge lines in the County will modify the visual character of an entire area.” The Plan recommended adoption of an Open Space and Critical Resources Plan, to identify and to develop protection measures for significant natural and scenic resources, including critical slopes, important wildlife habitat, wooded areas of environmental importance, and hilltops and ridges.

The Open Space Plan, adopted July 15, 1992 as an amendment to the Comprehensive Plan, identifies Mountains as one of four major open space systems which are the most important open space lands to protect. It lists resources associated with mountains: critical slopes, scenic views, wildlife habitat, extensive forests, unique soils for orchards, natural areas (including geologic features, and habitats for rare and endangered plants and animals), and headwaters. The Open Space Plan defines mountains by a designated elevation contour line, based generally on location of critical slopes and areas of visual impact.

The Open Space Plan recommends the following strategy which was also added to the Comprehensive Plan action agenda:

“Develop a mountain protection district to protect the scenic and aesthetic values associated with mountains, and to further protect their environmental characteristics.”

The Plan states: “Visual concerns related to mountains center on disruption of the relatively pristine wooded character which provides a sense of continuity, natural beauty, and wilderness. Extensive critical slopes, combined with high elevations, result in a prominent display of changes to the mountain landscape. Activities which alter the continuity of the ridgeline or result in excessive tree removal should be discouraged.

Environmental concerns include (1) the loss to development of a unique and beneficial natural environment and (2) disruption of the natural balance of soils, slope and vegetation. While detailed studies have not been undertaken at this time, it is anticipated that due to the location of generally unspoiled and extensive forests, together with a relatively small human and domestic animal population, mountains may be areas of comparative significance as "natural areas" and "wildlife habitats." Mountains also provide areas of unique soils suitable for orchards and vineyards between elevations of 800 - 1800 feet. Environmental benefits of undisturbed forests

often associated with mountains include increased groundwater recharge, surface water quality, and climate modulation. In addition, concerns regarding disturbance of steep land become pronounced in mountainous regions due to generally shallow soils and length of grade on side slopes. Issues related to soil erosion, surface water runoff, and septic system contamination are amplified in these areas.”

EXISTING LAND USE REGULATIONS

The mountain land is largely within the Rural Areas Zoning Classification which permits 5 small lot divisions per parcel with residual acreage divisible into lots of 21 acres or larger.

Building requires a 30,000 sq. foot site of less than 25% slope; there are no current regulations limiting the slopes upon which driveways may be built or the steepness of driveways.

The Southwest Mountains are recognized as a National and State Rural Historic District. No land use regulations accompany that designation.

The Open Space Plan identifies the mountains as one of four major open space systems and defines the mountains by designated elevation contour lines. The plan recommends adoption of regulations to protect the mountains.

Map – Mountain Overlay District

RECOMMENDATIONS

The following recommendations for a Mountain Overlay District and Lighting Ordinance require specific amendments to the Zoning Ordinance, County Code, Subdivision Ordinance and Erosion and Sediment Control Ordinance. The legal basis for the proposed changes is Virginia Code Section 15.1-489, "Purpose of Zoning Ordinances" (See Appendix 2).

1. MOUNTAIN OVERLAY DISTRICT

AMENDMENTS TO ZONING ORDINANCE

Section 30.7 MOUNTAIN OVERLAY DISTRICT

Designate as Mountain Overlay District these lands identified on the Concept Map of the 1992 Open Space Plan as "Mountains" and listed in the Table entitled "Mountains." (See Appendix)

Purpose and Intent: The purpose of designating a Mountain Overlay District is to identify those areas of the County within which it is in the public interest to enact supplemental regulations or review in order to protect those resources characteristic of or dependent on the mountainous regions of the County: **public safety, water quality, public drinking water reservoir capacity, soil conservation, forest and agricultural resources, plant and animal habitat, scenic values associated with the mountains and their economic impact, and tourism.**

Application: The boundaries of this District are intended to encompass mountain areas of critical slopes and areas above such critical slopes that are highly visible and may be dependent for access on the areas of critical slope beneath. The District's boundaries are delineated by contour line in the **map labeled Mountain Overlay District** and attached hereto and also found in the Albemarle County Open Space Plan; the mountains to which the District is applicable and contour line above which the District applies are listed in the table entitled "Mountains."

Definitions: For purposes of this section, "Ridge" and "Crest" shall be defined as in the N.C. Gen. Stat. Sect. 113A-206: North Carolina's "Ridge Law" (1983):

"Ridge:" "the elongated crest or series of crests at the apex or uppermost point of intersection between two opposite slopes or sides of a mountain, and includes all land within 100 vertical feet below the elevation of any portion of such line or surface along the crest" as shown on attached map.

"Crest:" "the uppermost line of a mountain or chain of mountains from which land falls away on at least two sides to a lower elevation or elevations."

Permitted Uses:

By Right: Uses permitted by right shall include all uses permitted by right in the underlying districts in accordance with the provisions hereinafter delineated.

By Special Use Permit: Uses permitted by special use permit shall include all uses permitted by special use permit in the underlying districts in accordance with the provisions hereinafter delineated.

Exceptions: 1) Agricultural buildings and associated farm and timber roads 2) Buildings of less than 500 square feet of interior space not including porches. 3) Structures other than buildings of a height less than 20 feet, such as gazebos, water towers.

Notes: Communication towers are currently permitted by Special Use Permit. The Committee discourages towers in the Mountain Overlay District except in existing tower farms, and supports the requirement of a Special Permit.

Regulations:

a) Erosion and sediment control permit shall be required for all driveways and houses in the Overlay District.

Because construction of driveways often disturbs large areas on steep slopes, the effects of erosion during construction in these areas are particularly acute. Making all driveway construction meet the criteria of the Erosion and Sediment Control Ordinance and comply with the provisions of that ordinance will substantially reduce on-site erosion and off-site deposition. Currently, a soil erosion agreement, and if necessary a soil erosion plan are required to be submitted for the construction of any single family dwelling. This proposed ordinance would require a plan instead of an agreement to be submitted, and would include the driveway with the house; however, field staking of driveway centerlines and culvert locations will be acceptable instead of driveway plans and profiles. Identical amendment to the Erosion and Sediment Control Ordinance is included for clarity in these recommendations.

Benefit/Cost: Erosion control does add to construction cost, but this cost, as in other areas where erosion control is required, is simply a part of the cost of building responsibly. The benefit to downstream water quality and soil protection for future generations far outweighs the cost of these temporary construction measures.

b) Ridge protection : Buildings or structures shall be constructed in a manner that no site disturbance occurs upon the Ridge unless it can be demonstrated that such construction would better protect the above-named mountain resources than its alternative, or unless there is no alternative to location on the Ridge.

This provision is intended to prevent the development of concentrated runoff high on the mountains which may have negative impact on soil stability and water quality below. In addition, preservation of the natural horizon is a stated objective of the County's Comprehensive Plan (p.87) and is consistent with Va. Code Sect. 15.1-489 which includes "facilitat[ing] the creation of a convenient, attractive and harmonious community" and "preservation of agricultural and forestal lands and other lands of significance for the protection of the natural environment" among the enabled purposes of zoning regulations.

Benefit/Cost: Little economic impact will be felt because most of the areas defined as Ridge are not currently accessible for building activity. The small economic gain of the building on the Ridge is offset many times by the damage inflicted on the lands of those below.

c) Building sites: Building on parcels partially inside the Mountain Overlay District shall occur on the portion of the parcel outside the District unless it is demonstrated that a building site is not available outside the District.

This provision is intended to direct development away from the most environmentally sensitive and visible portions of those parcels partially within the Mountain District without affecting the number of development rights on the parcel. Development in remote locations is most costly to the County in terms of providing services.

Benefit/Cost: This provision would benefit soil conservation, water quality and scenic resources by directing development away from environmentally sensitive areas, and lessening the length and impact of private driveways traversing steep slopes. It would limit the danger of wildfire and landslide. Administration would require a minimal amount of added staff time.

d) Allocation of Development Rights: Subdivision of a parcel partially inside the Mountain Overlay District shall allocate all development rights for small lots to the portion of the parcel outside the Mountain Overlay District unless it can be demonstrated that legal building sites outside the District do not exist.

This provision is intended to direct development away from the most environmentally sensitive portions of those parcels partially within the Mountain District without affecting the number of development rights on the parcel.

Benefit/Cost: This provision would benefit soil conservation, water quality and scenic resources by directing development away from environmentally sensitive and visual portions of parcels, and lessening the length and impact of private driveways traversing steep slopes. It would limit the danger of wildfire and landslide.

e) Subdivision: Where alternatives exist prior to subdivision, new parcels of land shall not be created which would: 1) create no alternative to location of a building site on a Ridge; 2)

create parcels which preclude building sites from being located outside the District; and, 3) create parcels which preclude location of small lots outside the District.

This provision is intended to prevent what would otherwise be avoidable impacts to public safety and welfare by creating situations in which there would be no alternative but to build in contradiction with the intent of this ordinance.

AMENDMENT TO SUBDIVISION ORDINANCE

All final plats within the Mountain Overlay District shall show one or more building sites of at least 30,000 square feet and be verified by a registered surveyor to meet all the criteria of allowable building sites. These building areas shall be described according to their location within the boundary survey.

Buildable areas shown on preliminary plats are not presently shown on the final plat. Therefore, the building inspector has no way of knowing if a house is being built in the area designated on the preliminary plat because the building permit is issued according to the final plat, which shows no topography and does not locate the area designated as buildable on the preliminary plat. Further, the buildable areas are often identified on preliminary plats from County topography, which is 20-foot contour interval, interpolated to 5 foot contour interval -- too general to be reliable for this use.

Benefit/Cost: The minimal expense of showing the buildable areas on the final plat would be offset by the assurance that the law can be efficiently enforced.

AMENDMENTS TO EROSION AND SEDIMENT CONTROL ORDINANCE

a) Erosion and sediment control permit shall be required for all driveways and houses in the Overlay District.

Because construction of driveways often disturbs large areas on steep slopes, the effects of erosion during construction in these areas are particularly acute. Making all driveway construction meet the criteria of the Erosion and Sediment Control Ordinance and comply with the provisions of that ordinance will substantially reduce on-site erosion and off-site deposition. Currently, a soil erosion agreement, and if necessary a soil erosion plan are required to be submitted for the construction of any single family dwelling. This proposed ordinance would require a plan instead of an agreement to be submitted, and would include the driveway with the house; however, field staking of driveway centerlines and culvert locations will be acceptable instead of driveway plans and profiles. Identical amendment to the Erosion and Sediment Control Ordinance is included for clarity in these recommendations.

Benefit/Cost: Erosion control does add to construction cost, but this cost, as in other areas where erosion control is required, is simply a part of the cost of building responsibly. The benefit to downstream water quality and soil protection for future generations far outweighs the cost of these temporary construction measures.

b) Land Stability: No slopes shall be created that are steeper than 2:1 unless retaining walls, revetments, or other stabilization measures acceptable to the County Engineer are employed.

This provision is intended to minimize soil erosion and prevent landslides. The ratio of 2:1 is the steepest slope permitted for bank construction by the County, and by VDOT in the subdivision street standards. Slopes that are steeper are not stable and can result in erosion, sedimentation of streams and water supply, as well as damage to life and property through landslides. For reasons stated above, these problems are particularly acute in the mountain areas. In areas of predominantly rock this gradient may be increased to 1.5:1 where acceptable to the County Engineer.

Benefit/Cost: This provision should assist in controlling the amount of sediment flowing into downstream waterways including reservoirs, and thereby improving or maintaining water quality throughout the County and beyond, and minimizing the danger of mud slides in mountain areas. In the steepest areas, retaining walls or revetments may be a more viable alternative to increased width of grading. Such walls add to the cost of construction. These areas are likely to be the least suitable for development due to inaccessibility, cost of services and other construction costs.

c) Run-off Control: Water from ditches, storm-drains and rooftops and impervious surfaces shall be released into natural streams or watercourses as defined as "adequate" per the "Virginia Erosion and Sediment Handbook."

This provision is intended to control flooding and soil erosion and creation of gullies caused by swiftly moving, and therefore highly eroding water run-off, as well as to minimize degradation in water quality and deposition of sediment downstream.

Benefit/Cost: This provision would reduce the deposition of sediment onto downstream properties and into the reservoirs. The latter diminishes their capacity and reduce the amount of treatment needed for drinking water especially during rainy weather. The cost of engineering run-off control so as to comply with this provision should be more than returned in protection from property damage caused by swiftly moving water.

d) Driveways within the Mountain Overlay District shall be built with side slopes on cut and fill slopes at 2:1 (horizontal slope: vertical slope) or flatter.

The steepest allowable side slopes (except in rock cuts) on subdivision streets to be accepted into the State Secondary Road system is 2:1 (i.e., 2 feet of horizontal distance for each one foot of vertical rise or fall). Slopes steeper than this have proven to be unstable over time. Unstable side slopes lead to erosion, deposition of sediment downstream, and in extreme cases, dangerous conditions. These problems are particularly acute in the mountain areas. Where 2:1 side slopes are not feasible, retaining walls, revetments, or other slope stabilization methods acceptable to the County Engineer must be employed. In areas of predominantly rock this gradient may be increased to 1.5:1 where acceptable to the County Engineer.

Benefit/Cost: Building roads and driveways with side slopes of 2:1 or flatter may cost more initially. If long-term maintenance and down-slope damage are taken into account, it is cheaper to build with stable slopes from the start.

e) Minimum allowable radius for horizontal curvature of private roads and driveways shall be 40 feet.

Any curve tighter than 40-foot radius on center-line is too tight for straight-bodied trucks, and fire trucks (V. Peruchietti, Giffels & Rossetti, Inc.; Detroit, Michigan; The Operations Council, American Trucking Associations, Inc.; Washington, D.C.). Access to residences in mountain areas is of great concern to adjacent mountain property owners and the general public, because fires in wooded mountain areas can spread quickly, with catastrophic results. Mountain areas usually present no alternatives to a single driveway available to an emergency vehicle.

Benefit/Cost: Providing access to straight-bodied emergency vehicles is an overwhelming benefit when compared to the small and short-term saving of constructing curves of tighter radii.

f) Driveways shall disturb no more than 65 feet in cross-section.

If a ten-foot wide driveway is built on an existing 3:1(33%) side slope, with 2:1 cut and fill slopes, it will disturb approximately 65 feet in cross-section. (See illustration below.) The disruption of large areas of land is particularly dangerous in mountain areas because the mountains form a large system of steep, usually forested land which may be affected far beyond the limits of individual construction sites.

Benefit/Cost: Generally, locating roadways in areas not requiring a large amount of grading is both less expensive, and less disruptive. In those cases where additional measures (e.g., retaining walls) must be taken to avoid large cross-sectional grading, the long-term stability and protection of forest land will outweigh the short-term cost.

g) Longitudinal gradient on driveways shall not exceed 16%.

The Virginia Department of Transportation maximum longitudinal gradient allowed in mountainous terrain is 16%. County private road standards for 3-5 lots is 16% maximum. Slopes steeper than this are a danger to all who must use the driveway, including fire, police, other emergency vehicles, and delivery vehicles. While the Committee believes that the County would be wise to institute such a regulation County-wide, there is an especially urgent need to restrict the steepness of driveways in mountainous areas. In the Mountain Overlay District steep gradients are likely to be much longer and the associated accidents more problematic because of the steep side-slopes and remoteness of driveways.

Benefit/Cost: Every effort should be made to locate driveways to minimize grading, length, and impact on existing trees; however, the risk to human life in gradients too steep for safety is too great to consider the relatively small savings of alignment going too directly up a steep slope.

2. COUNTY-WIDE LIGHTING ORDINANCE

AMENDMENT TO COUNTY CODE OR ZONING ORDINANCE

Adopt a county-wide ordinance with the following provision:

All exterior lighting fixtures above 5000 lumens shall be fully shielded. (a 100 watt bulb gives off 1500 lumens).

Definition: Fully shielded fixture: means an outdoor light fixture shielded in such a manner that all light emitted by the fixture, either directly from the lamp or indirectly from the fixture, is projected below the horizontal.

STUDY AND FUTURE ADDITION TO LIGHTING ORDINANCE:

Determine maximum allowable foot-candles for each category of use and implement regulations prescribing maximum foot-candles for each category.

Note: Action on the above ordinance should not be delayed pending completion of this study, but rather amended when the study is complete.

ADDITIONAL RECOMMENDATION:

Develop resolution for Board of Supervisors asking power companies to cease promoting unshielded and inefficient outdoor lighting in the County.

The cumulative effect of light pollution from the urban and developed areas of the County has the effect of degrading the dark sky in the mountain areas of the County. This natural resource is particularly important for the research conducted at the Observatory on Fan Mountain. Individual unshielded lights in the mountain areas contribute to the degrading of the dark night sky and are also highly visible and therefore detrimental to the scenic quality of the mountains. For these reasons the Mountain Committee finds that a lighting ordinance which is county-wide in scope is necessary to protect the mountain resource of dark night sky.

- Energy wasted nationally from poorly designed outdoor lighting amounts to more than a billion dollars a year.
- Poorly designed outdoor lighting creates glare, which compromises safety especially for drivers, degrades the quality of the entrance corridors leading to the City and degrades the quality of the built environment.
- Light pollution in the night sky adversely affects tourism by negatively impacting the nocturnal viewshed; for example, the view to and from Monticello, Shenandoah National Park, Blue Ridge Parkway.
- Poorly designed lighting permits light trespass upon neighbors, which is no less intrusive than excessive noise.
- Excessive outdoor lighting adversely impacts UVa.'s Observatories, which constitute a unique resource on the east coast.
- The dark sky is a scenic resource enjoyed by all County residents for whose degradation there is no compelling economic justification. Rather, the economic benefit of efficient energy use would complement protection of the resource.
- Easy solutions to the problem of poorly designed outdoor lighting are available commercially and are inexpensive. In the long run they *save* money.

ADDITIONAL PLANNING TOOLS

The mountainous areas of Albemarle County are not only prominent physical features possessing critical natural resources, but they are also important parts of many human and natural systems in the County and region. Like other County human, cultural and natural resources, they therefore require consideration as components of larger planning issues. Though the Mountain Protection Committee's task is to develop recommendations for the protection of the mountains of the County, the Committee feels that it fails to complete its task if it does not suggest that planning for the protection of discrete areas or resources, such as the mountains, the urban areas, or the watershed must be integrated with a more systematic approach which provides for the protection of resource systems, such as drinking water, economic viability of urban areas, or transportation networks.

Some of the County's land use regulations developed with a compartment-alized approach to land planning may have unintended consequences for protection of its natural resources and other comprehensive planning goals of the County. Rural residential parcels (5-20 ac.) too small to farm or timber or serve as habitat, increase sprawl, put unintended pressure on mountain and agricultural lands. Areas of the County possessing critical resources may require different types of land use restrictions to protect the resource. Segregated land uses may unintentionally increase housing costs, and increase pressure on transportation systems and on agricultural lands in the path of proposed new roads. Discussion of natural resource protection, that is, may not be broad enough in scope to suggest effective or equitable solutions. The recommendations which follow attempt to point toward a systematic approach to resource protection for Albemarle County.

Develop brochure detailing design recommendations in Mountain Areas

Based on the model of Rappahannock County's brochure, "Ridgetop Development," Albemarle should make available to anyone constructing a residence in the Mountain Overlay District a brochure which encourages sensitive site planning. Prospective mountain residents should be educated regarding both aesthetic and safety considerations. "Being considerate and preserving the gentle, natural beauty that has drawn us to this County," Rappahannock's brochure suggests, "should be paramount in all our minds."

See attached brochure in Appendix 3, County of Rappahannock: Ridgetop Development. The Mountain Protection Committee is willing to draft such a brochure based in part on information which it has compiled.

Inventory of Albemarle County's Natural Heritage

Current knowledge of the critical elements of Albemarle's natural resources, including its biological communities is spotty and speculative. An inventory of the County's critical natural resources including rare and unique natural resources is needed to provide property owners, planners and County staff with the information to make wise land stewardship decisions.

Methods of conducting this assessment and evaluation should be pursued. The Open Space Plan recommends a Natural Areas Inventory of designated areas for significant natural communities, their sensitive plant and animal habitats, geologic landmarks, and other natural features. TJS/PARE proposed such an inventory for the five localities of the Planning District. Cover Type

Analysis and Habitat Evaluation Procedures assessment are also suggested in the Open Space Plan, which cites the lack of information available about wildlife and aquatic habitat in Albemarle.

Support Land Use Assessment Tax

The concept of land use assessment tax for forest land, agricultural, horticultural and open space lands should be continued and defended.

Rural land in Albemarle County costs taxpayers only \$0.21 in county services for every \$1.00 it generates in county real estate tax revenues. Since residential land costs taxpayers more in services that it generates in tax revenues (\$1.16 in costs for every \$1.00 in revenues), the undeveloped rural land substantially subsidizes residential use in the county. (Source: *Fiscal Impact of Major Land Uses in Albemarle County*; PEC, Tamara Vance, 1984)

Transfer of Development Rights (TDR)

The County should continue to request enabling legislation in the General Assembly to permit a TDR program.

While the creation of a Mountain Overlay District and proposed revisions to the Subdivision, Erosion Control, and Zoning Ordinances will reduce many of the problems associated with development in mountain areas, the large number of development rights in these areas continue to threaten the resources of the mountains. Transfer of Development Rights will provide a means for shifting development rights out of the mountains and other Rural Areas while providing rural landowners with a means of profiting fairly from the transfer.

George F. Allen, in "Three proposals affecting forestry and development," Virginia's Forests, Summer, 1991, explains TDR's through the following example:

"...a landowner in a rural zoned area with 400 acres may be allowed under current zoning to divide his 400 acre parcel into five 2 acre lots and as many 21 acre lots as can fit into the residue, being 18 lots for a total of 23.

"If this rural landowner's property were in a designated TDR 'sending' area, then the landowner, in an ideal situation, could voluntarily sell to a developer some of his development rights. Let's say a developer buys 10 of the 23 such TDR's from one rural landowner's 400 acre parcel for \$2,000 each. The rural landowner would receive \$20,000 and have only 13 development rights left on his property. The rural landowner's parcel would probably have a lessened market value, but that is the landowner's choice as to what to do with his or her land. Meanwhile, the developer could use these 10 development rights to increase the density to pack more houses or apartments on land designated as a 'receiving' zone.

"The foregoing example is the ideal, positive way that a TDR program would operate. It would be voluntary and to some extent allow the free market concept to operate in a government-created system of land rights."

Purchase of Development Rights

The County should develop a program to purchase development rights for preservation of agricultural and forest lands, significant plant and animal communities and areas of significance to tourism and recreation. Such a program might be funded from real estate transfer tax, cellular phone tax, meals or lodging tax, grants, or private contributions.

Such a program would allow landowners to choose monetary compensation for protecting natural resources of public value. Land in such a program would remain in private ownership and on the tax rolls while serving a public purpose. Virginia Beach has initiated such a program, aiming to acquire development rights from 20,000 acres of agricultural lands, funded by 1.5 cents of the property tax rate and a cellular phone tax.

The scenic-mountain landscape has been stated as a factor in the Albemarle and Charlottesville tourism industry. According to state Division of Tourism data, visitors to Albemarle County spent \$109 million in 1994. A one percent lodging excise tax would generate \$150,000 a year to purchase development rights or conservation easements.

Full Cost Accounting and "Revenue Sharing"

Discussions of revenue sharing between the County and City should involve a comprehensive approach and include the flows of benefits and costs in both directions. The City and urban area benefit economically from ecosystem services, notably watershed protection and air quality, provided by rural land of the County.

Major economic contributions accrue to the people of Albemarle and Charlottesville as a result of the natural functions of the forests. A disproportionate share of these values are provided by the mountain forests.

For example, forest landowners in the county provide watershed protection for the City\County water supply reservoirs. Without the protection of forest cover, particularly on mountain slopes, City and County users of public water would be required to divert hundreds of thousands of dollars from other uses to maintain the same level of water quality. Full cost accounting of the public water resource would show that rural mountain landowners, who receive little or no benefit from the resource, are bearing (subsidizing) this cost for urban residents and users of the public water.

Similarly, the mountain forests play a significant role in filtering air, sequestering carbon and other air pollutants and improving air quality. Due to climatic patterns, the mountain forests play a greater role in this function than lowland forests. This function benefits the local economy by reducing expenditures for health care and for anti-pollution measures that would likely be required in the absence of these forests. Albemarle's forests currently store an estimated 19.7 million tons and annually remove 300,000 additional tons of carbon, as well as numerous other pollutants. Achieving this same level of atmospheric cleansing through anti-pollution measures

would cost citizens an estimated \$8.4 million dollars that those residents have available for other services and investments due to the role that the mountain forests perform.

Efforts that significantly affect the value of mountain forest land for the primary purpose of benefiting the urban area should include incentives, or other strategies. Such full cost accounting is now gaining in recognition in other cities and regions such as New York State.

Change in Large Lot Division Size

Large Lot Size within the Mountain Overlay District: Change the large lot division size from a minimum of 21 acres to a minimum of 42 acres in the Mountain Overlay District.

This provision is intended to reduce the fragmentation of habitat and of viable landscape resource base. Due to the extensive fragmentation of the lowland landscapes into smaller and smaller parcels, the large blocks of forest common to the mountains are growing in importance, especially for "forest interior" species of wildlife that require large areas of forest in which to breed and forage. Many of these species are neo-tropical migratory birds which breed in Albemarle's forests and migrate to tropical regions for the winter months. Recent surveys of these species reveal that many are declining in number. While a number of factors are at play, the fragmentation of forests into smaller blocks is seen as a potential problem for the long-term sustainability of these populations.

With respect to forestry, the Agricultural/Forestry Industries Support Committee's report states, "Continued forest fragmentation is probably the biggest threat to the future viability of the forest industry in Albemarle County.... As parcel size declines, operability for timber harvesting decreases. Forest sizes below 40 acres are difficult to manage economically. The proximity of houses and other structures escalates the problem." The U.S. Geological Survey's report, *Landslide and Debris-Flow Hazards Caused by the June 27, 1995 Storm in Madison County, Virginia*, states that as non-structural hazard mitigation, "Land-use regulations can be used to reduce hazards by limiting the type or amount of development in hazardous areas. A community can zone hazard-prone areas for open space uses like parks, grazing or certain types of agriculture." The report cites as an example a "resource management zoning district" created by San Mateo County, California, which limits the number of dwellings to one dwelling unit per 40 acres.

Benefit/Cost: This provision would have significant benefits to wildlife habitat and forest resource base and a minimal impact on the value of parcels lying entirely within the Mountain District whose topography includes sufficient land below 25% in grade to allow for maximum use of division rights.

Subsequent Review

This committee recommends that it reconvene in two years to review the efficacy of the ordinances recommended in this Mountain Protection Plan.

APPENDICES

Appendix 1

MOUNTAIN CONTOUR LIST

The following named mountains and other unnamed mountains are delineated on the attached Mountain Overlay District map. (USGS quad sheet locations are noted if names are duplicated). They are defined by a designated elevation contour line, based generally on location of critical slopes and areas of visual impact.

700 Foot Contour

Stillhouse Mountain
Lewis Mountain
Mt. Jefferson
Southwest Mountains
Trevillian
Wolfpit
Long
Sugarloaf
Lonesome
Broadhead
Hightop (Keswick Quad)
Walnut
Dowell
Peters
Goodlow
Carters Mountain
Monticello
Patterson
Round Top (Alberene Quad)

800 Foot Contour

Buck Mountain
Piney Mountain (Earlysville Quad)
Dudley Mountain
Britts
Piney (Alberene Quad)
Ragged Mountains
Round Top (Charlottesville West Quad)
Bear Den (Charlottesville West Quad)
Newcomb

Woodson
Gibson (Alberene Quad)
Gillums Mountain
Turner Mountain

900 Foot Contour

Taylor's Mountain
Martin's Mountain (Crozet Quad)
Sprouse Mountain
Israel Mountain
Tom Mountain
Gay Mountain
Ammonett Mountain
Cook Mountain
Persimmon Mountain
Fan Mountain
Mount Oliver
Appleberry Mountain
Shiloh Mountain
Brush Mountain
Yellow Mountain
Harris Mountain
Green Mountain (Free Union Quad)
Cherry Mountain

1000 Foot Contour

Boaz Mountains
Walnut Top Mountain
Heard Mountain
Mill Mountain
Chalk Mountain
Castle Rock Mountain
Moses Mountain
Massies Mountain
Long Arm Mountain
High Top (Covesville Quad)
Burnt Mountain
Sharp Top
Ennis Mountain
Round Top Mountain (Waynesboro East Quad)
Turks Mountain
Blue Ridge Mountains
Scott

Bear Den (Waynesboro East Quad)
Calf
Bucks Elbow
Little Yellow
Beaver Creek
Middle
Pasture Fence
Pinestand
Cedar
Big Flat
Little Flat
Loft
County Line Mountain
Lick Mountain
Fox Mountain
Gibson (Brown's Cove Quad)
Martins (Brown's Cove Quad)
High Top (Brown's Cove Quad)
Currant
Pigeon Top Mountain

Appendix 2

ENABLING LEGISLATION: Sec. 15.1-489 Va. Code: Purpose of zoning ordinances: *Zoning ordinances shall be for the general purpose of promoting the health, safety or general welfare of the public* and of further accomplishing the objectives of S.15. 1-427. To these ends, such ordinances shall be designed to give reasonable consideration to each of the following purposes, where applicable: (i) to provide for adequate light, air, convenience of access, and *safety from fire, flood*, crime and other dangers; (ii) to reduce or prevent congestion in the public streets; (iii) to *facilitate the creation of a convenient, attractive and harmonious community*; (iv) to facilitate the provision of adequate police and fire protection, disaster evacuation, civil defense, transportation, *water*, sewerage, flood protection, schools, parks, *forests*, playgrounds, recreational facilities, airports and other public requirements; (v) to protect against destruction of or encroachment upon historic areas; (vi) to *protect against one or more of the following*: overcrowding of land, undue density of population in relation to the community facilities existing or available, obstruction of light and air, danger and congestion in travel and transportation, or *loss of life, health, or property from fire, flood*, panic or other dangers; (vii) to encourage economic development activities that provide desirable employment and enlarge the tax base; (viii) *to provide for the preservation of agricultural and forestal lands and other lands of significance for the protection of the natural environment*; (ix) to protect approach slopes and other safety areas of licensed airports, including United States government and military air facilities; (x) to promote the creation and preservation of affordable housing suitable for meeting the current and future needs of the locality as well as a reasonable proportion of the current and future needs of the planning district within which the locality is situated. Such ordinance may also include reasonable provisions, not inconsistent with applicable state water quality standards, *to protect surface water and ground water* as defined in S. 62.1-255.

(Emphasis: references relevant to protection of Albemarle's mountains)

Appendix 3