

CHARLES COUNTY COMMUNITY COLLEGE:  
AN ECOLOGICAL APPROACH TO THE LANDSCAPE DEVELOPMENT  
OF A  
CAMPUS ARBORETUM

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## PREFACE

The preparation of this thesis was made possible through a Longwood Program Graduate Fellowship at the University of Delaware. This research paper is intended to provide information and suggestions related to an ecological approach to the landscape development of a campus arboretum.

Mrs. Belva Jensen, Professor of Biology, Charles County Community College, has demonstrated an interest in this project. Her counsel and guidance during the course of this study was invaluable. Dr. Russell J. Seibert, Director of Longwood Gardens, Dr. Robert Armstrong, Geneticist of Longwood Gardens, Dr. Richard Lighty, Coordinator of the Longwood Program, and Dr. Charles Dunham, Professor of Horticulture, have been of assistance to the writer in the development of this project.

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## ABSTRACT

This study was initiated to provide information to be used in making decisions related to the development of a new type of campus arboretum at Charles County Community College, La Plata, Maryland. This arboretum would be based on an ecological approach to the selection of native plant material to be used in the landscape development of the Campus.

After analyzing the site and its conditions, it was found that of the 173 acres, approximately 50% of the land had slopes greater than 10% and was therefore unsuited to conventional development. Of the remaining 50% of the land, approximately 25% is in a flood plain. Therefore, only 25% of the land is suited to development without major changes in topography or drainage patterns.

Three line-transect surveys were conducted on June 20, 1972, to determine the indigenous flora associated with the six major soil types of Aura, Beltsville, Bibb, Croom, Iuka, and Sassafras. A total of 39 native genera, 48 native species, and 1 introduced genus were found indigenous to the Campus.

In the lists of recommended plants for these soil types, a total of 95 genera and 166 species were included for use in the landscape development of the Campus to provide an arboretum of native plants. These plants were selected on the basis of those native plants from within a 250 mile radius of the College which were of ornamental

value for use in landscaping in the various soil types. The lists are based on those native plants indigenous to the site on the soil types and those native plants recommended by Donald Wyman in his books entitled Trees for American Gardens, Shrubs and Vines for American Gardens, and Ground Cover Plants which have habitats similar to the existing site conditions of the soil types involved. These lists contain information on the habit, height, genus species, common name, flower color and month(s) of interest, fruit color or type and month(s) of interest, autumn color, and landscape comments on the plant involved. From these lists, the College or landscape architect can select the native plants which can be used in the various soil types which exist on the Campus.

In addition, setting up the Arboretum as an independent organization has a number of advantages as elaborated in this thesis. Of advantage will be an herbarium, records system, library, and labeling system appropriate to the development of an arboretum of native plants.

## INTRODUCTION

The purpose of this thesis is to provide information and suggestions on the development of a new type of campus arboretum at Charles County Community College. It is intended to: 1) suggest an ecological approach to the selection of native plant material to be used in the landscape development of the Campus; 2) encourage development of a campus arboretum; 3) provide lists of native plant material from within a radius of two-hundred fifty miles of the Campus which can be used in landscaping in the various soil types of the site; and 4) provide information and suggestions related to the organizational structure, herbarium, records system, library, and labeling system appropriate to the development of an arboretum of native plants.

The definition of the project began in 1966 with two individuals, Professor Belva Jensen of the Department of Biology of Charles County Community College, and the writer. The project was planned to relate to the master plan designed in 1970 by Vosbeck, Vosbeck, Kendrick and Redinger, an Architectural Engineering Planning Firm in Alexandria, Virginia(1).

CHAPTER I  
EXISTING FEATURES AND CONDITIONS

COLLEGE HISTORY:

Charles County Community College had its beginnings in 1958, when an advisory committee appointed by the Charles County Board of Education recommended establishment of Charles County Junior College. The name was changed in 1962 to Charles County Community College by legislation approved by the Maryland General Assembly. The College was headquartered temporarily in a high school(1958-1965) and then an abandoned Army Nike Missile Base(1965-1968). In 1964, land was purchased for a permanent campus site. This land lay fallow until 1967-1968 when construction was begun on the permanent building complexes(2). The College is located in Port Tobacco Valley, three miles west of La Plata, Maryland, and Maryland Route 301.

CLIMATOLOGICAL DATA:

The College is located in a temperate climatic area of the Atlantic Coastal Plain. Annual precipitation amounts to about 47 inches. The site contains several microclimates formed by the valleys and swales. During the winter, a frequent succession of high and low pressure systems bringing alternate flows of cold dry air from the north and warm humid air from the south, accounting for the

variety of weather from day to day. Prevailing winds are from the northwest to west-northwest for most of the year excepting summer, when they are south to southwest(3).

#### EXISTING COLLEGE FACILITIES:

The College moved into its 173-acre permanent site on Mitchell Road, La Plata, Maryland, in September, 1968. At that time, construction was complete on the Main Administration Building(D) and the Pollution Abatement Facility(F). In 1970, the Science and Technology Building(A-1) and the Security Building(S) were completed(4)[See Legend in Figure 9 for designation of letters(D), (F), (A-1), and others to building locations and see Appendix VII for information on the phases of development of the building complexes]. At the present time, plans are under way for the construction of the new Athletic Facilities(C-8, C-9, C-10), the Library(B-6) and the Cultural Center(B-7). Two parking lots with a capacity of 550 cars exist. One is adjacent to the Main Administration Building and the other to the Science and Technology Building. The roads and sidewalks are constructed as indicated in Figure 7.

The existing master plan(Figure 8) for Charles County Community College was designed to accommodate the building complexes needed for the academic, recreational, scientific and administrative activities of a student body of five thousand. A system of sidewalks, parking lots and roads to accommodate the pedestrian and vehicular circulation and service functions of the campus has been included.

**POPULATION AND ECONOMY OF CHARLES COUNTY:**

The College serves a community of 47,678 residents according to the 1970 Census(5). Tobacco production is the principal economic base of the area.

## CHAPTER II

### PHILOSOPHY AND DEVELOPMENT OF A NATIVE ARBORETUM

#### WHY A NATIVE ARBORETUM?:

An ecological approach to the landscape development of a campus arboretum would: 1) preserve the indigenous flora of the site; 2) demonstrate the use of native plants in landscaping a college campus; and 3) serve as an adjunct to educational programs in ecology, pollution abatement, and biology. With increased urbanization, the population lacks knowledge of our native plants and their use in landscape design. With educational displays and landscaping with native trees, shrubs, vines, and groundcovers, visitors can observe and select native plants which could be used in their own landscape.

For example, at Charles County Community College, construction has been restricted to flat areas of the site once used in tobacco production. The plant material has not been disturbed appreciably and, if protected, could provide the basis for an arboretum of native plants. The College is located in a rural area with farms to the North, South, and West. To the East of Mitchell Road, a housing development is under construction. Further construction is anticipated in the areas surrounding the College and protection of the tree belts around the site will give the College a unique setting for its

educational activities.

#### LANDSCAPE APPROACH:

Since building design, sizes, and heights are not known at this time, a landscape plan was not feasible for Charles County Community College. However, if soil conditions are not changed during construction of future buildings and roads, then the lists of recommended native plants in this thesis can be used in landscaping the Campus to provide an arboretum of native plants.

The objective of this thesis was not to recreate ecological settings, but to select native plant material which could be used in association with the existing native plants (Tables 1, 3, 5, 7) in the landscape development of a campus arboretum. Each list of recommended plants (Tables 2, 4, 6, 8) is written to provide a maximum amount of information for the reader and the College concerning the form, height, genus, species, common name, flower color and month(s) of interest, fruit color or type and month(s) of interest, autumn color, and landscape comments.

Each list is based on those native plants indigenous to the site or those native plants of ornamental value recommended by Donald Wyman (6, 7, 8) which could be used in association with the indigenous material on the various soil types as described in the next section. All native plants recommended by Wyman were traced through Gray's Manual of Botany (9) or Small's Manual of Southeastern Flora (10) to determine: 1) if they were within the 250 mile range and 2) if they had native habitats similar to the existing site conditions of Charles

County Community College. Additional information about plant characteristics was obtained from the books entitled Flora of District of Columbia and Vicinity(11), The Fern Guide: Northeastern and Midland United States and Adjacent Canada(12), and Wyman's Gardening Encyclopedia(13). Native herbaceous plants were not covered within the scope of this project excepting those indigenous to the site.

It is recommended that the College: 1) preserve and incorporate existing indigenous flora in landscaping of future building complexes whenever possible(Tables 1, 3, 5, 7); and 2) use the lists of recommended plants in this thesis(Tables 2, 4, 6, 8) for selecting material for landscaping areas disturbed during construction of needed facilities. With siting of buildings, roads, and drainage systems according to the natural topography, many of the native trees, shrubs, vines, and groundcover plants can be preserved on the site. Building fences around areas to be preserved should reduce damage to existing flora during construction.

#### PLANT SURVEYS:

Three plant surveys were conducted on June 20, 1972, as indicated in Figure 6 to determine if an ecological association existed in relationship to the various soil types, orientation, and drainage patterns of the site. The line surveys were set up to pass through the six major soil types of 103 Sassafras Sandy Loam, 105 Croom Gravelly Loam, 161 Beltsville Silt Loam, 216 Aura Gravelly Sandy Loam, 581 Bibb Silt Loam, and 714 Iuka Sandy Loam. The soil types 701 and 703 Ochlockonee Fine Sandy Loam were not included in the survey because

of 1) the small area they occupied and 2) they were changed considerably in the construction of the Pollution Abatement Facility near Port Tobacco Creek. At the present time, a soil survey has been conducted for Charles County, Maryland, however, it has not been published. The soils analysis map(Figure 6) was traced from an aerial soil map provided by Mr. Edward Hall, County Agent for Charles County, Maryland(14). All information relating to the soil types and their characteristics was obtained from the soil survey conducted by the Soil Conservation Service for the neighboring county of Prince Georges County, Maryland(15). The width of the line-transect surveys was approximately 50 feet. All open areas of the Campus(mainly 161 Beltsville Silt Loam) are regularly mowed by the college maintenance crew, therefore, the lists of indigenous plants(Tables 1, 3, 5, 7) reflect plants from the outer edges and inner areas of woodlands on the Campus.

In Plant Survey I(Tables 1, 3A), the plants were predominantly of a climax oak-beech association with a canopy of Fagus grandifolia, Quercus alba, Liriodendron tulipifera, and with an understory of Cornus florida and Ilex opaca. On the other hand, in Plant Survey II(Tables 5A, 5B, 5C, and 7), the plants were predominantly of pioneer juniper-pine association with a canopy of Liquidambar styraciflua, Juniperus virginiana, Quercus palustris, Pinus virginiana, and with an understory of Rhus typhina, Rhus radicans, Sambucus canadensis, and so forth. Each of these soil types and plants related to them will be discussed in the following sections.

## SOIL TYPE 161 BELTSVILLE SILT LOAM:

In Table 1, plants found indigenous to soil type 161 Beltsville Silt Loam are listed. As part of Plant Survey I, these plants were found along a transect with a compass reading of 90° East of the Main Administration Building to Mitchell Road(see Figure 6).

In Soil Type 161 Beltsville Silt Loam, the soil consists of moderately-well to well-drained fine sandy loams and silt loams over a dense impervious compact layer(fragipan); underlain by sand, silt, clay or gravel; 1 to 2 feet to a water table seasonally perched above the fragipan; pH ranges from 4.0 to 5.0; and the topography ranges from 0-5%. The area is basically a flat plateau cleared of all vegetation because of its use as a tobacco farm before being purchased by the College. Most vegetation except in small belts in front of the Main Administration Building has been destroyed on this soil type and the areas cleared are now regularly mowed by the college maintenance crew.

The remaining plant material indigenous to Soil Type 161 Beltsville Silt Loam consists of a maturing oak-beech climax forest. The predominant canopy species being Carya ovata, Fagus grandifolia, Quercus alba, with an understory of Cornus florida and Ilex opaca(see Table 1). The plant species observed were those along the line transect as indicated in Figure 6.

In Table 2, a wide range of native plants are listed for use in landscaping the area of 161 Beltsville Silt Loam. Since approximately 90% of this area is void of plant material at the present time, it offers an opportunity to use a wide variety of material. With the flat

TABLE 1

## INDIGENOUS FLORA OF SOIL TYPE 161 BELTSVILLE SILT LOAM

Plant Survey I: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map(Figure 6). Maturing oak-beech climax forest. Compass reading: 90° East of the Main Administration Building to Mitchell Road.

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
<i>Aralia spinosa</i> L. Devil's Walking Stick	N-UT, S	Sparse in number
<i>Carya ovata</i> (Mill.) K. Koch Shagbark Hickory	N-CT	Abundant- 25" diameter
<i>Cornus florida</i> L. Flowering Dogwood	N-UT	Abundant
<i>Fagus grandifolia</i> Ehrh. American Beech	N-CT	Abundant- 25"-30" diameter
<i>Ilex opaca</i> Ait. American Holly	N-UT	Abundant
<i>Liquidambar styraciflua</i> L. Sweet Gum	N-CT	Sparse in number
<i>Liriodendron tulipifera</i> L. Tulip Poplar	N-CT	Sparse in number
<i>Lonicera japonica</i> Thunb. Japanese Honeysuckle	I-V	Abundant at edge of woods
<i>Nyssa sylvatica</i> Marsh. Black Gum	N-CT	Sparse- 10"-20" diameter
<i>Quercus alba</i> L. White Oak	N-CT	Abundant- 25"-30" diameter
<i>Vitis labrusca</i> L. Wild or Fox Grape	N-V	Sparse- clinging to the trees

\*Legend: N- Native  
I- Introduced

CT- Canopy Tree  
UT- Understory Tree

S- Shrub  
V- Vine

topography and the Georgian style buildings in the area, avenues of trees, specimens, and or formally clipped material can be used. With both 1 and 2 story buildings in the area, demonstrations using native plants in landscaping buildings of various heights can be shown. The existing foundation plantings of the Main Administration Building should be identified and removed if not native within the 250 mile range as specified in this thesis. The plants selected for the area were those which could obtain specimen characteristics naturally; could tolerate normal to well-drained soil conditions; and required or could tolerate a soil pH of 4.0 to 6.0.

The remaining indigenous flora of Soil Type 161 Beltsville Silt Loam should be protected and incorporated into the landscape plan of the Campus if at all possible. Additions to the flora can be made by selecting plants from Table 2 which follows.

TABLE 2

A list of recommended native plants from within a 250 mile radius of Charles County Community College, La Plata, Maryland, that are of ornamental value in landscaping the Campus in soil type: 161 Beltsville Silt Loam (see Figure 6). This list is based on those native plants indigenous to the site on this soil type or those native plants recommended by Donald Wyman(6, 7, 8) which have habitats similar to the existing site conditions of this soil type. All plant names conform to the second edition of Gray's Manual of Botany. In addition, books by Small(10), Hitchcock and Standley(11), Wherry(12), and Wyman(13) were used in determining the various characteristics of the plants listed if they are not in Wyman's books. If spaces were left blank, the characteristics were insignificant. Those plants indigenous to this soil type are followed by an asterisk(\*). Unless otherwise indicated, the indigenous species were also recommended by Wyman(6, 7, 8).

Legend: E-T, Evergreen Tree                      E-V, Evergreen Vine                      S, Deciduous Shrub  
 E-S, Evergreen Shrub                      V, Deciduous Vine                      GC, Deciduous Groundcover  
 E-GC, Evergreen Groundcover              CT, Deciduous Canopy Tree              H-GC, Herbaceous Groundcover  
 E-F, Evergreen Fern                      UT, Deciduous Understory Tree              H-F, Herbaceous Fern

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HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 120'	<i>Acer saccharum</i> Sugar Maple	Red: 3-4 Samara	Orange- Red	Excellent street tree for wide streets; specimen; slow-growing; damaged by salt buildup from highways in winter.
UT 60'	<i>Amelanchier canadensis</i> Serviceberry	White: 4 Maroon: 7	Yellow- Red	Specimen, foundation, or mass plantings.
S 30'	<i>Aralia spinosa</i> * Devil's Walking Stick	White: 6 Black: 9-10	-	Exotic appearing plant; use as foundation tree or shrub; mass plantings; not recommended by Wyman.
CT 90'	<i>Betula papyrifera</i> Canoe Birch	- -	Yellow	Stately and majestic specimen tree; exfoliating white bark; not seriously affected by bronze birch borer.
S 9'	<i>Calycanthus floridus</i> Carolina Allspice	Reddish: 5 -	Yellow	Dense shrub for foundation planting or border; fragrant flowers; aromatic foliage; low maintenance.

TABLE 2 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
V -	<i>Campsis radicans</i> Trumpet Vine	Orange: 7 -	-	Shrubby vine; excellent on top of stone wall; brilliant orange to scarlet, trumpet shaped flowers in midsummer; needs support.
UT 36'	<i>Carpinus caroliniana</i> Carolina Hornbeam	- Nutlets: 9-10	Orange	Excellent small street or foundation tree; hard to transplant; gray "muscled" bark.
CT 120'	<i>Carya ovata*</i> Shagbark Hickory	- Nuts	Golden- brown	Specimen tree; picturesque; flaking bark in loose plates; protect indigenous trees if possible.
V -	<i>Celastrus scandens</i> American Bittersweet	- Yellow- Red: 9-12	Yellow	Needs both male and female for good fruiting; can kill trees and shrubs if allowed to grow rampant; excellent on walls.
UT 36'	<i>Cercis canadensis</i> Eastern Redbud	Pink: 5 -	Yellow	Specimen; mass plantings with <i>Cornus florida</i> ; naturalistic plantings.
UT 30'	<i>Chionanthus virginicus</i> Fringetree	White: 6 Blue: 9-10	-	Excellent ornamental except for problem with scale; use as a specimen or foundation tree for 2-story buildings; full sun.
CT, UT 60'	<i>Cladrastis lutea</i> American Yellow-wood	White: 6 -	Orange- Yellow	Excellent specimen for flowers, foliage, and light-gray bark; dense tree.
S 9'	<i>Clethra alnifolia</i> Summersweet	White: 7 -	Yellow- Orange	Fragrant spike flowers(4"-6"); blooms in summer; border shrub; spreads by underground stems.
UT	<i>Cornus florida*</i>	Bracts: White: 4-5 Red: 9-11	Red- Bronze	Excellent specimen, understory, foundation, or small street tree; has year-round interest; horizontal branching.
CT, UT 75'	<i>Diospyros virginiana</i> Persimmon	- Orange: 10	Yellow	Specimen in open areas; fruit provides food for wildlife; sexes separate.

TABLE 2 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 90'	<i>Fagus grandifolia</i> * American Beech	- -	Bronze	Excellent specimen, shade, and street tree; protect indigenous trees if possible.
S 3'	<i>Fothergilla gardeni</i> Dwarf Fothergilla	White: 5 -	Yellow- Scarlet	Excellent shrub for foundation and shrub border, especially with an ever-green background.
S 9'	<i>Fothergilla major</i> Large Fothergilla	White: 5 -	Yellow- Scarlet	Excellent shrub for foundation and shrub border, especially with an ever-green background.
CT 120'	<i>Fraxinus americana</i> White Ash	- -	Purple- Yellow	Specimen and street tree for wide streets; vigorous habit; lacks special soil requirements.
CT 90'	<i>Gymnocladus dioica</i> Kentucky Coffee-Tree	- Pods: 9-12	-	Picturesque tree; interesting bean pod type fruit; large, open branched; specimen.
UT 30'	<i>Halesia carolina</i> Carolina Silverbell	White: 5 Pods: 9-10	Yellow	Pendulous flowers and fruit pods; foundation or small specimen tree.
UT, S 10'	<i>Hamamelis vernalis</i> Spring Witch-hazel	Yellow: 2-3 -	Yellow	Excellent dense specimen; flowers before leaves appear.
UT, S 15'	<i>Hamamelis virginiana</i> Common Witch-hazel	Yellow: 10 -	Yellow	Excellent specimen as foundation or border plant; tolerates sun or shade; fall flowering.
E-T 45'	<i>Ilex opaca</i> * American Holly	- Red: 10-12	-	Excellent specimen, foundation, and street tree; protect indigenous trees if possible.
E-UT, S 24'	<i>Ilex vomitoria</i> Yaupon	- Red: 9-12	-	Excellent shrub or small tree for foundation, shrub border, hedges, and specimen; heavily fruiting.

TABLE 2 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 150'	<i>Juglans nigra</i> Black Walnut	- Nuts: 9-12	-	Specimen; give plenty of room; do not use as street tree because of fruit; coarse and open.
E-S 30'	<i>Kalmia latifolia</i> Mountain Laurel	Pink: 6 -	-	Excellent shrub for foundation or companion plant with rhododendrons; open form; flowers vary pink to white.
E-S, GC 18"-6'	<i>Leucothoe editorum</i> (fontanesiana) Drooping Leucothoe	White: 5-6 -	-	Gracefully arching shrub or groundcover; foundation, mass, or border plantings; semi-evergreen to evergreen; full sun or shade; spreads by underground stems.
CT 125'	<i>Liquidambar styraciflua</i> * Sweet Gum	- Horned balls: 9-12	Scarlet	Protect indigenous trees if possible; specimens, native woodland or street trees; difficult to transplant in larger sizes.
CT 150'	<i>Liriodendron tulipifera</i> * Tulip Popular	Greenish: 6 Pods: 9-10	Yellow	Excellent specimen or street tree for wide streets; give plenty of room; protect indigenous trees if possible.
V -	<i>Lonicera sempervirens</i> Trumpet Honeysuckle	Orange: 6-8 Red: 9-10	-	Handsome native vine; flowers scentless; best in full sun.
CT 90'	<i>Magnolia acuminata</i> Cucumber Magnolia	Greenish: 6 Pink: 9-10	Brown	Fast growing; specimen tree; fruits cucumber shaped; massive tree at maturity.
E-T 90'	<i>Magnolia grandifolia</i> Southern Magnolia	White: 5-6 Pods: 9-11	-	Excellent specimen, foundation, or street tree for 2-3 story buildings; flowers fragrant; cucumber-like fruit with red seeds.
CT 90'	<i>Nyssa sylvatica</i> * Black Gum	- Blue: 9-10	Scarlet- Orange	Excellent specimen tree; hard to transplant except when very small; beautiful fall color; protect indigenous trees if possible.

TABLE 2 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT, UT 60'	<i>Ostrya virginiana</i> Hop Hornbeam	- Pods: 8-11	Yellow	Small specimen or foundation tree; slow growing; hard to transplant; free from pests and diseases; bladder- like fruit pods.
CT, UT 75'	<i>Oxydendron arboreum</i> Sourwood	White: 6-7 Capsules: 10-12	Scarlet	Excellent late flowering specimen or medium width street tree.
E-GC 12"	<i>Pachistima canbyi</i> Canby Pachistima	Reddish: 5 -	-	Excellent foreground edging for rhodo- dendron plantings; full sun or shade.
S 9'	<i>Philadelphus inodorus</i> Scentless Mock-Orange	White: 6 -	-	Splendid shrub habit, but scentless flowers; shrub border or foundation planting.
E-T 150'	<i>Pinus strobus</i> White Pine	- Cones: 9-12	-	Specimen, windbreak, hedges, or street tree for wide streets; picturesque.
CT 150'	<i>Platanus occidentalis</i> American Sycamore	- -	-	Specimen or street tree; exfoliating bark, problem with twig blight; coarse textured leaves.
CT 90'	<i>Quercus alba</i> * White Oak	- Acorns: 9-12	Red- Purple	Specimen; needs plenty of room; State Tree of Maryland; protect indigenous trees if possible.
CT 75'	<i>Quercus rubra</i> var. <i>borealis</i> Northern Red Oak	- Acorns: 9-12	Red	Specimen or street tree for wide streets; transplants easily; vigorous.
CT 75'	<i>Quercus palustris</i> Pin Oak	- Acorns: 9-12	Scarlet	Picturesque specimen or street tree (20' from roadway); fibrous root system; easy to transplant.
CT 50'	<i>Quercus phellos</i> Willow Oak	- Acorns: 9-12	Yellowish	Excellent specimen or street tree for wide streets; fibrous root system; easy to transplant.

TABLE 2 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
E-S 6'	Rhododendron carolinianum Carolina Rhododendron	Rose: 5 -	-	Early flowering; specimen or mass plantings; compact and dense habit.
E-S 6'-18'	Rhododendron catawbiense Catawba Rhododendron	Lilac: 6 -	-	Profuse bloomer; mass or foundation plantings; compact and dense habit.
S 6'	Rhododendron nudiflorum Pinxterbloom	Pink: 5 -	-	Deciduous azalea; mass, foundation, or shrub border plantings.
S 9'-15'	Rhus glabra Smooth Sumac	Greenish: 7 Red Scarlet: 9-12		Excellent fall color and fruiting spikes; mass and foundation plantings.
UT, S 30'	Rhus typhina Staghorn Sumac	Greenish: 7 Red Crimson: 9-12		Excellent fall color and fruiting spikes; mass and foundation plantings.
S, GC 6'	Rosa virginiana Virginia Rose	Pink: 6 Red: 9-11	Scarlet	Excellent ornamental as barrier hedge or bank plantings; stoloniferous; red twigs; single flowers.
UT, S 18'	Stewartia malacodendron Virginia Stewartia	White: 7 -	-	Summer flowering; interesting flaking bark.
UT, S 15'	Stewartia ovata Mountain-Camellia	White: 7 -	Orange- Scarlet	Large summer flowers; flaking bark on older branches; listed as <u>Stewartia grandiflora</u> in Wyman's books.
E-S 3'-6'	Taxus canadensis Canada Yew	- Red: 9-10	-	Hardest of yews; withstands shade; light green foliage and red berries; hedge and foundation plantings.
E-T 90'	Tsuga canadensis Canadian Hemlock	-	-	Excellent tree, windbreak, or clipped hedge.
E-T 75'	Tsuga caroliniana Carolina Hemlock	-	-	Fine textured; hedges, windbreaks, or specimen.

TABLE 2 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 120'	<i>Ulmus americana</i> American Elm	- -	-	Excellent specimen, street or shade tree; problem with Dutch Elm Disease; vase-shaped; widely arching branches.
S 6'-12'	<i>Vaccinium corymbosum</i> Highbush Blueberry	White: 5 Blue: 9-10	Scarlet	Vigorous plant for foundation or specimen; excellent fall color and red winter twigs.
UT, S 15'	<i>Viburnum prunifolium</i> Black Haw	White: 5 Blue: 9-11	Red	Single stem tree or shrub; profuse fruiting; specimen or mass plantings.
V -	<i>Vitis labrusca*</i> Fox Grape	- Blue	-	Native vine; protect indigenous plants if possible.

SOIL TYPES 216 D-3 AURA GRAVELLY-SANDY LOAM AND 103 D-3 SASSAFRAS  
SANDY LOAM:

In Table 3, Soil Types 216 D-3 Aura Gravelly-Sandy Loam(Tables 3A and 3B) and 103 D-3 Sassafras Sandy Loam(Table 3C) were combined because of their similar soil conditions, orientation, and indigenous flora. Two line transect surveys were conducted on Soil Type 216 D-3 to determine if the indigenous flora varied in different locations of the same soil type. The first transect(Table 3A) continued from the survey including 161 Beltsville Silt Loam(Table 1) and the second transect(Table 3B) continued from the survey including 103 D-3 Sassafras Sandy Loam(see Figure 6). As seen in Tables 3A and 3B, no major variations were found in the two areas sampled.

In 216 D-3 and 103 D-3, the soils consist of well-drained gravelly loams over firm gravelly subsoils; underlain by a gravelly, very hard substratum; 5 or more feet to the water table; severe topography with slopes of 10% or more; pH of 4.0 to 5.0; and, for the most part, an eastern orientation. With the severe slopes, a high run off of water and resultant erosion is evident.

In both 216 D-3 and 103 D-3, the indigenous flora consisted of a maturing oak-beech forest(see Tables 3A-B-C). A greater variety of plant material was observed in these soil types as opposed to Soil Type 161 Beltsville Silt Loam(Table 1). Herbaceous groundcovers of Arisaema triphyllum, Podophyllum peltatum, and Polystichum acrostichoides were found scattered throughout these soil types. A dense canopy of Fagus grandifolia, and Quercus alba with an understory of Cornus

TABLE 3

INDIGENOUS FLORA OF SOIL TYPES 216 D-3 AURA GRAVELLY-SANDY LOAM AND  
103 D-3 SAFFAFRAS SANDY LOAM

## A: 216 D-3 AURA GRAVELLY-SANDY LOAM

Plant Survey I: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map(Figure 6). Maturing oak-beech climax forest. Compass reading: 90° East of the Main Administration Building to Mitchell Road; continuation from survey of Soil Type 161 Beltsville Silt Loam.

Legend\* N- Native                      CT- Canopy Tree                      S- Shrub                      GC- Groundcover  
I- Introduced                      UT- Understory Tree                      V- Vine

<u>GENUS SPECIES/ COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
<i>Arisaema triphyllum</i> (L.) Schott Jack-in-the-Pulpit	N-GC	Small patches at edge of swale
<i>Carpinus caroliniana</i> Walt. Ironwood	N-UT	Sparse in number
<i>Carya ovata</i> (Mill.) K. Koch Shagbark Hickory	N-CT	Sparse: 10"-15"
<i>Cornus florida</i> L. Flowering Dogwood	N-UT	Abundant
<i>Fagus grandifolia</i> Ehrh. American Beech	N-CT	Abundant: 12"-15"
<i>Ilex opaca</i> Ait. American Holly	N-UT	Abundant
<i>Juniperus virginiana</i> L. Red Cedar	N-UT	Abundant near outer edges of forest to Mitchell Road
<i>Liquidambar styraciflua</i> L. Sweet Gum	N-CT	Sparse in number
<i>Lonicera japonica</i> Thunb. Japanese Honeysuckle	I-V	Scattered throughout

TABLE 3

A: 216 D-3 AURA GRAVELLY-SANDY LOAM(Continued)

<u>GENUS SPECIES/ COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Monotropa uniflora L. Indian Pipes	N-GC	Only one clump seen
Nyssa sylvatica Marsh. Black Gum	N-CT	Sparse in number
Parthenocissus quinquefolia (L.) Planch Virginia Creeper	N-V	Sparse in number
Podophyllum peltatum L. May Apples	N-GC	Small patches
Polystichum acrostichoides (Michx.) Schott Christmas Fern	N-GC	Small patches
Prunus serotina Ehrh. Black Cherry	N-UT	Sparse in number
Quercus alba L. White Oak	N-CT	Abundant: 15"-20"
Quercus rubra var. borealis (Michx. f.) Farw. Northern Red Oak	N-CT	Sparse in number
Robinia pseudo-acacia L. Black Locust	N-CT	Sparse in open areas near Mitchell Road
Sassafras albidum (Nutt.) Nees White Sassafras	N-UT, S	Scattered under dense shade
Smilax rotundifolia L. Catbrier	N-V	Scattered throughout forest: especially in sunny areas near Mitchell Road

TABLE 3 (Continued)

## B: 216 D-3 AURA GRAVELLY-SANDY LOAM

Plant Survey III: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map (Figure 6). Maturing oak-beech climax forest. Compass reading: SE 148° from the SE corner of parking lot adjacent to the Science and Technology Building to Mitchell Road.

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
<i>Arisaema triphyllum</i> (L.) Schott. Jack-in-the-Pulpit	N-GC	Abundant
<i>Carya ovata</i> (Mill.) K. Koch Shagbark Hickory	N-CT	Scattered throughout
<i>Cornus florida</i> L. Flowering Dogwood	N-UT	Abundant as approached swale near Mitchell Road
<i>Dryopteris noveboracensis</i> (L.) Gray New York Fern	N-GC	Scattered along swale near Mitchell Road
<i>Fagus grandifolia</i> Ehrh. American Beech	N-CT	Abundant
<i>Ilex opaca</i> Ait. American Holly	N-UT	Abundant along eastern slope of swale near Mitchell Road
<i>Juglans nigra</i> L. Black Walnut	N-CT	Sparse in number
<i>Lindera benzoin</i> (L.) Blume Spice Bush	N-S	Scattered throughout
<i>Liquidambar styraciflua</i> L. Sweet Gum	N-CT	Sparse in number
<i>Liriodendron tulipifera</i> L. Tulip Poplar	N-CT	Abundant
<i>Onoclea sensibilis</i> L. Sensitive Fern	N-GC	Abundant along swale
<i>Pinus virginiana</i> Mill. Virginia Pine	N-CT	Declining in heavy shade

TABLE 3

## B: 216 D-3 AURA GRAVELLY-SANDY LOAM(Continued)

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Podophyllum peltatum L. May Apples	N-GC	Abundant
Polystichum acrostichoides (Michx.) Schott. Christmas Fern	N-GC	Scattered throughout
Quercus alba L. White Oak	N-CT	Abundant- 10"-25" diameter
Robinia pseudo-acacia L. Black Locust	N-CT	Scattered in open areas
Sassafras albidum (Nutt.) Nees White Sassafras	N-UT, S	Sparse in number
Ulmus americana L. American Elm	N-CT	Scattered
Vitis labrusca L. Fox Grape	N-V	Scattered

## C: 103 D-3 SASSAFRAS SANDY LOAM

Plant Survey III: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map(Figure 6). Maturing oak-beech climax forest. Compass reading: SE 148° from the SE corner of parking lot adjacent to the Science and Technology Building to Mitchell Road.

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Arisaema triphyllum (L.) Schott. Jack-in-the-Pulpit	N-GC	Abundant along swale
Asplenium platyneuron (L.) Oakes Ebony Spleenwort	N-GC	Scattered
Asimina triloba (L.) Dunal Pawpaw	N-UT	Only one plant seen

TABLE 3

C: 103 D-3 SASSAFRAS SANDY LOAM(Continued)

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
<i>Carya ovata</i> (Mill.) K. Koch Shagbark Hickory	N-CT	Scattered throughout
<i>Cornus florida</i> L. Flowering Dogwood	N-UT	Sparse throughout
<i>Juniperus virginiana</i> L. Red Cedar	N-UT	Abundant in clear areas and outskirts of woods
<i>Lindera benzoin</i> (L.) Blume Spice Bush	N-S	Abundant along swale
<i>Liquidambar styraciflua</i> L. Sweet Gum	N-CT	Abundant: 6"-10" diameter
<i>Parthenocissus quinquefolia</i> (L.) Planch. Virginia Creeper	N-V	Abundant
<i>Platanus occidentalis</i> L. Sycamore	N-CT	Scattered along swale
<i>Polystichum acrostichoides</i> (Michx.) Schott. Christmas Fern	N-GC	Scattered throughout
<i>Quercus alba</i> L. White Oak	N-CT	Large: up to 25" diameter; abundant
<i>Quercus stellata</i> Post Oak	N-CT	Sparse
<i>Rhus radicans</i> L. Poison Ivy	N-V, GC	Scattered throughout; especially at edge of woods and cleared areas
<i>Rhus typhina</i> L. Staghorn Sumac	N-S	Abundant at edge of woods
<i>Robinia pseudo-acacia</i> L. Black Locust	N-CT	Abundant along edge of woods and cleared areas
<i>Rubus</i> spp. Blackberries	N-S	Abundant in cleared areas

TABLE 3

C: 103 D-3 SASSAFRAS SANDY LOAM(Continued)

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Sambucus canadensis L. Common Elderberry	N-S	Abundant at edge of woods
Smilax rotundifolia L. Catbrier	N-V	Scattered throughout

florida and Ilex opaca were observed. In both Soil Types, a number of pioneer species such as Juniperus virginiana, Pinus virginiana, and Robinia pseudo-acacia were observed as one approached open areas near the Main Administration Building or Mitchell Road.

It is recommended that the plant material observed on Soil Types 216 D-3 and 103 D-3 be preserved to serve as an outdoor biology laboratory indicating plants associated with a native maturing oak-beech climax forest as well as to provide a native tree belt in front of the Campus towards Mitchell Road. Preservation of these areas will reduce the noise created by Mitchell Road; preserve the rural character of the Campus; reduce major erosion which might occur if stripped of its native vegetation; and to serve as an experimental area to determine the long-range effects of construction surrounding an arboretum of native plants.

However, if construction of needed facilities must proceed into these areas, then Table 4 should be used as a basis for selection of landscape material for Soil Types 216 D-3 and 103 D-3. The plants listed in Table 4 can tolerate moist, well-drained acid soil, and semi-dense shade. If conditions are not appreciably changed in these Soil Types during construction of facilities, then the existing flora can be preserved and plants from Table 4 can be incorporated into the landscape when necessary. Although not covered in this thesis, native perennials could be used in these areas as well as other areas of the Campus to complete the plant association from canopy trees to ground-covers.

TABLE 4

A list of recommended native plants from within a 250 mile radius of Charles County Community College, La Plata, Maryland, that are of ornamental value in landscaping the Campus in soil types: 216 D-3 Aura Gravelly-Sandy Loam and 103 D-3 Sassafras Sandy Loam(see Figure 6). This list is based on those native plants indigenous to the site on these soil types or those native plants recommended by Donald Wyman(6, 7, 8) which have habitats similar to the existing site conditions of these soil types. All plant names conform to the second edition of Gray's Manual of Botany. In addition, books by Small(10), Hitchcock and Standley(11), Wherry(12), and Wyman(13) were used in determining the various characteristics of the plants listed if they are not in Wyman's books. If spaces were left blank, the characteristics were insignificant. Those plants indigenous to these soil types are followed by an asterisk(\*). Unless otherwise indicated, the indigenous species were also recommended by Wyman(6, 7, 8).

Legend: E-T, Evergreen Tree                      E-V, Evergreen Vine                      S, Deciduous Shrub  
 E-S, Evergreen Shrub                      V, Deciduous Vine                      GC, Deciduous Groundcover  
 E-GC, Evergreen Groundcover              CT, Deciduous Canopy Tree              H-GC, Herbaceous Groundcover  
 E-F, Evergreen Fern                      UT, Deciduous Understory Tree              H-F, Herbaceous Fern

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HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
UT 36'	<i>Acer pensylvanicum</i> Striped Maple	- -	Yellow	Excellent small tree in naturalized areas; striped bark; does well in rich, cool woods.
UT 30'	<i>Aesculus glabra</i> Ohio Buckeye	Yellow: 5 Prickly	Orange	Brilliant fall color; may be used in place of <i>Aesculus hippocastanum</i> ; good small tree in naturalized areas.
UT 36'	<i>Amelanchier laevis</i> Alleghany Serviceberry	White Red: 7	Yellow- Red	Light gray smooth bark; small foundation tree.
S 4'	<i>Amelanchier stolonifera</i> Running Serviceberry	White: 5 Purplish	Red	Use for erosion control on banks or where a spreading shrub is needed.
H-GC 6"-2'	<i>Arisaema triphyllum</i> * Jack-in-the-Pulpit	White: 4-5 Red: 6-10	-	Excellent native groundcover in moist areas; spathe color varies.

TABLE 4 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
H-F 12"	<i>Asplenium platyneuron</i> * Ebony Spleenwort	-	-	Excellent native fern; retain in naturalized areas.
UT 35'	<i>Asimina triloba</i> * Pawpaw	Purple: 5 Yellow: 9-10	Yellow	Interesting small tree for foliage and large, fleshy fruit.
S 12'	<i>Baccharis halimifolia</i> Groundsel Bush	White White: 9-10	Bronze	Withstands salt spray; use in open woods or along roadsides where salt may accumulate from highways in winter
CT 75'	<i>Betula lenta</i> Sweet Birch	-	Golden Yellow	Specimen; pyramidal and dense when young; round-topped at maturity; bark reddish brown to black, cherrylike.
CT 90'	<i>Betula nigra</i> River Birch	-	Yellow	Beautiful tree along stream banks; exfoliating reddish-brown bark.
UT 36'	<i>Carpinus caroliniana</i> * Ironwood	- Nutlets: 8-10	Orange- Red	Hard to transplant; interesting small tree with "muscle bark"; use as specimen or foundation plant.
CT 120'	<i>Carya ovata</i> * Shagbark Hickory	- Nut: 9-12	Golden Brown	Best of hickories; interesting flaking bark; nuts provide food for wildlife.
S 4'	<i>Comptonia peregrina</i> Sweet Fern	-	-	Excellent shrub; difficult to transplant; aromatic, fern-like foliage; needs acid soil.
UT 40'	<i>Cornus florida</i> * Flowering Dogwood	White: 4-5 Red: 9-11	Scarlet	Excellent specimen, understory, foundation, or small street tree; has year-round interest; horizontal branching; bracts are white, flowers are yellow.
S 15'	<i>Cornus racemosa</i> Gray Dogwood	White: 6 White: 8	Purplish	Barrier planting, hedges, or bank plantings.
H-F	<i>Dryopteris noveboracensis</i> * New York Fern	-	-	Excellent native fern in naturalized areas.

TABLE 4 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
S 4'-10'	<i>Elliottia racemosa</i> Southern-Plume	White: 7 -	-	Rare specimen; companion plant with ericaceous plants; best in moist sandy soil.
S 7'	<i>Euonymus americana</i> Strawberry-Bush	- Pink: 9-10	Red	Not of great ornamental value, but can be used as hedge or in shrub border.
GC, V -	<i>Euonymus obovatus</i> Running Euonymus	- Scarlet: 9-10	Red	Vigorous grower; brilliant fall color; tolerates dry to moist conditions.
CT 100'	<i>Fagus grandifolia</i> * American Beech	- -	Bronze	Excellent specimen; protect indigenous plants if possible; light gray bark.
E-S, GC 3"	<i>Gaultheria procumbens</i> Wintergreen	White: 5 Scarlet: 9-10	-	Excellent shrub or groundcover for naturalized areas; thrives in moist soil and partial shade.
E-GC 18"	<i>Gaylussacia brachycera</i> Box Huckleberry	White: 5 Blueberries: 8	-	Difficult to propagate; spreads slowly (about 6"/year); excellent evergreen groundcover under white pines and rhododendrons.
CT 90'	<i>Halesia monticola</i> Mountain Silverbell	White: 5 Pods: 9-10	Yellow	Specimen; beautiful in bloom; companion plant with white pines and naturalistic plantings.
S 6'	<i>Hydrangea quercifolia</i> Oak-leaf Hydrangea	White: 7 -	Reddish	Stoloniferous shrub; foliage plant in shrub border; leaves resemble red oak leaves.
S 6'	<i>Hypericum densiflorum</i> Dense Hypericum	Yellow: 7 -	-	Dense shrub; fine textured.
E-T 45'	<i>Ilex opaca</i> * American Holly	- Red: 9-12	-	Excellent native ornamental for naturalized areas, specimens, and foundation plantings; protect indigenous plants if possible.

TABLE 4 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 150'	<i>Juglans nigra</i> * Black Walnut	- Nuts: 8-12	-	Specimen only where plenty of room is given; do not use as street tree because of fruit; protect indigenous plants if possible.
ET 90'	<i>Juniperus virginiana</i> * Red Cedar	- Blue: 9-12	-	Excellent native ornamental for specimen, windbreak, and foundation plant for 2-3 story buildings; pest free for the most part.
E-S 3'	<i>Kalmia angustifolia</i> Sheep-Laurel	Rose: 6 -	-	Excellent for moist areas; foliage poisonous; naturalistic and foundation plantings.
E-GC 18"	<i>Leiophyllum buxifolium</i> Box Sandmyrtle	White: 5 -	-	Does well in acid soil; use as ground-cover in naturalized areas.
S 15'	<i>Lindera benzoin</i> * Spicebush	Yellow: 4 Scarlet: 9-12	Yellow	Excellent for moist areas; fragrant flowers, fruit, leaves, and stems; use as foundation plant or in naturalized plantings.
CT 125'	<i>Liquidambar styraciflua</i> * Sweet Gum	Green Horned Balls: 9-12	Scarlet	Excellent specimen, shade, or street tree; corky twigs and furrowed bark; star-shaped leaves.
CT 150'	<i>Liriodendron tulipifera</i> * Tulip Poplar	Greenish: 6 Pods: 9-11	Yellow	Excellent specimen, shade, or street tree; protect indigenous plants if possible.
V -	<i>Lonicera flava</i> Yellow Honeysuckle	Orange: 6 -	-	Handsome of native honeysuckle vines; open growing; not for screening; good for slopes.
S 6'	<i>Lyonia mariana</i> Staggerbush	White: 6 -	-	Acid or boggy soil; plant in masses.
H-GC -	<i>Monotropa uniflora</i> * Indian Pipes	- -	-	Protect in naturalized areas.

TABLE 4 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 90'	<i>Nyssa sylvatica</i> * Sour or Black Gum	- Blue: 9-11	Scarlet- Orange	Excellent native tree; hard to transplant; excellent fall color; specimen or street trees; protect indigenous plants if possible.
H-F	<i>Onoclea sensibilis</i> * Sensitive Fern	- -	-	Excellent ornamental fern; protect in naturalized areas.
E-GC 6"-1'	<i>Pachysandra procumbens</i> Allegheny-Spurge	White: 5 -	-	Use in shaded locations; utilize in place of <i>Pachysandra terminalis</i> .
V, GC -	<i>Parthenocissus quinquefolia</i> * Virginia Creeper	- Blue: 9-12	Red	Climbs by tendrils; use to cover stone walls or trellises; excellent fall color; use in naturalized areas.
E-T 45'	<i>Pinus virginiana</i> * Virginia Pine	- Cones: 9-12	-	Not of ornamental value, however, some should be retained in the arboretum.
CT 120'	<i>Platanus occidentalis</i> * Sycamore	- Balls: 10-12	-	Susceptible to twig blight; retain in naturalized areas as specimen or street tree; not recommended by Wyman.
H-GC 12"-15"	<i>Podophyllum peltatum</i> * May Apple	White: 5 Green: 6-8	-	Umbrella like foliage; excellent native perennial groundcover in woodland areas; likes moist conditions.
E-F 1'-3'	<i>Polystichum acrostichoides</i> Christmas Fern	- -	-	Excellent native evergreen fern; groundcover and mass plantings in naturalized areas.
UT 36'	<i>Prunus pensylvanica</i> Red or Pin Cherry	White: 5 Red: 8	Red	Short-lived; splendid for woodland borders and wildlife food.
CT 90'	<i>Prunus serotina</i> * Black Cherry	White: 5 Black: 8	-	General foliage tree; specimen; valued for its fruit.
CT 90'	<i>Quercus alba</i> * White Oak	- Acorns: 9-12	Red	Excellent native tree for specimen or street tree; protect indigenous trees if possible.

TABLE 4 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT	<i>Quercus stellata</i> * Post Oak	- Acorns: 9-12	-	Protect in naturalized areas; not recommended by Wyman.
S 9'	<i>Rhododendron arborescens</i> Sweet Azalea	White: 6 -	Red	Fragrant; late blooming; use in foundation or mass plantings.
GC, S 1 1/2'	<i>Rhododendron atlanticum</i> Coast Azalea	White: 5 -	-	Fragrant; stoloniferous; use in foundation or mass plantings.
S 9'-15'	<i>Rhododendron calendulaceum</i> Flame Azalea	Yellow- Scarlet: 6 -	-	Use singly or in groups in oak woods; flower color holds well in sun; use as foundation plant for 2-3 story buildings.
S 3'	<i>Rhododendron canadense</i> Rhodora	Rose- Purple: 5 -	-	Extremely hardy; early flowering; use in naturalistic or foundation plantings.
E-S 12'-36'	<i>Rhododendron maximum</i> Rosebay Rhododendron	Rose- Purple: 6 -	-	Extremely hardy; tall plant for screen or foundation plant for 2-3 story buildings; late blooming; dense.
S 9'	<i>Rhododendron roseum</i> Roseshell Azalea	Pink: 5 -	-	Fragrant; bright-colored; use in naturalistic or foundation plantings.
S 6'-9'	<i>Rhododendron vaseyi</i> Pinkshell Azalea	Rose: 5 -	Red	Colorful fall color; does well in moist areas; use in naturalistic or foundation plantings.
V, GC	<i>Rhus radicans</i> * Poison Ivy	- -	-	Protect in naturalized areas.
S, UT 30'	<i>Rhus typhina</i> * Staghorn Sumac	Green: 6 Crimson: 9-12	Red	Protect in naturalized areas; useful in mass plantings or in dry areas at edge of woods; good fall color and interesting pyramidal fruit clusters.
CT 75'	<i>Robinia pseudo-acacia</i> * Black Locust	White: 6 Pods: 9-10	-	Open habit; late blooming; vigorous grower; tends to break easily; protect indigenous plants if possible.

TABLE 4 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
S 9'	Rubus odoratus Flowering Raspberry	Purple: 7 Red: 8-9	-	Exotic appearance; needs moist soil and partial shade; arching habit; provides food for wildlife.
S 2'-4'	Rubus spp.* Native Blackberries	White: 6 Black: 8	-	Protect in naturalized areas if possible; provides food for wildlife.
S 12'	Sambucus canadensis* Common Elderberry	White: Blue: 8-9	-	Excellent native shrub; late flowering; fruit provides food for wildlife.
UT 60'	Sassafras albidum* White Sassafras	- Black: 9-10	-	Excellent small tree; interesting fragrant foliage and bark; roots provide flavoring for Sassafras Tea.
V	Smilax rotundifolia* Catbrier	- -	-	Pest in ornamental plantings; protect in naturalized areas.
S 6'	Symphoricarpos albus Snowberry	White: 6 White: 9-10	-	Large white berries; use for hedge, specimen shrub, shrub border, and for wildlife food and cover.
CT 120'	Ulmus americana* American Elm	- -	Yellow	Excellent native tree except for susceptibility to Dutch Elm Disease; protect indigenous trees as specimens if possible.
S 6'	Viburnum cassinoides Witherod	White: 6 Red- Black: 9-10	Red	Vivid fall color and fruit display; use in full sun or partial shade; mass or foundation plantings.
S 15'	Viburnum dentatum Arrowwood	White: 6 Blue: 9-11	Red	Rapid grower; use as filler in shrub border or in mass plantings; not of great ornamental value.
S, UT 30'	Viburnum lentago Nannyberry	White: 5 Black: 9-12	Red	Vigorous; dense; use as background screen at edge of woodland; provides food and cover for wildlife.

TABLE 4 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
S 12'	Viburnum trilobum American Cranberrybush	White: 5 Scarlet: 9	Red	Excellent for massing; provides food and cover for wildlife.
V	Vitis labrusca* Fox Grape	- Blue	-	Protect indigenous plants if possible.

SOIL TYPES 103 E-3 SASSAFRAS SANDY LOAM, 105 D-3 CROOM GRAVELLY LOAM, AND 714 B-2 IUKA SANDY LOAM:

In Tables 5 A-B-C, the plants indigenous to Soil Types 103 D-3 Sassafras Sandy Loam, 105 D-3 Croom Gravelly Loam, and 714 B-2 Iuka Sandy Loam are listed. A line transect survey 50 feet North of the existing utilities right of way (see Figure 6) included Soil Types 103 E-3, 714 B-2, and a portion of 105 D-3. An additional transect 50 feet south of the utilities right of way gave a more accurate coverage of the plants indigenous to Soil Type 105 D-3.

In 103 E-3 Sassafras Sandy Loam, the soil consists of a sandy to gravelly loam with 5 or more feet to the water table; severe topography with slopes of 10% or more; pH of 4.5 to 5.0; and has a western orientation over most of the area.

In Plant Survey II, a wide variety of plant material was observed for Soil Type 103 E-3 (Table 5A) especially along the swale crossed by the transect. However, away from the swale, the same pioneer dry species as found in 105 D-3 and 714 B-2 (Tables 5B and 5C) were observed. Along the moist areas of the swale, a canopy of Carya ovata, Fagus grandifolia, Platanus occidentalis, and Ulmus americana were predominant with an understory of Cornus florida, Ilex opaca, Lindera benzoin, and Sassafras albidum. Approximately 100 feet North or South of the swale area, Quercus palustris, Quercus stellata, and Robinia pseudo-acacia were predominant.

Continuing with Plant Survey II, the soil conditions, topography, pH, and the indigenous flora found on Soil Type 105 D-3 (Table

5B) were almost identical with those of Soil Type 103 E-3. The 105 D-3 Croom Soil consists of somewhat excessively drained gravelly loams that have a very hard, compact subsoil and substratum; 5 or more feet to the water table; severe topography with slopes of 10% or more; pH ranges from 4.5 to 5.5; and a western orientation.

The plant materials found indigenous to 105 D-3 were of a dry pioneer juniper-pine association. Only a few of the trees found in this area were greater than 20-25 feet in height. A canopy of Juniperus virginiana, Pinus virginiana, Quercus palustris, Quercus stellata, and Robinia pseudo-acacia were observed throughout the area with an understory of Liquidambar styraciflua, Rhus typhina, Rubus spp., and Sassafras albidum. Groundcovers included Asplenium platyneuron, Lonicera japonica, Polystichum acrostichoides, and Rhus radicans.

In the small area of 714 B-2 Iuka Sandy Loam, the soil consists of a well-drained sandy loam; underlain by gravel in places; 1 to 2 feet to a seasonally high water table; is subject to flooding in most places; moderate topography with a 5-10% slope; and has a pH of 4.0 to 5.0.

The plant species found associated with 714 B-2 (Table 5C) had characteristics of both the dry pioneer species of 103 E-3 and 105 D-3 as well as those associated with the flood plain soil of 581 A-4. A canopy of Acer rubrum, Juniperus virginiana, Liquidambar styraciflua, Pinus virginiana, and Quercus palustris were observed with an understory of Rhus typhina, Sassafras albidum, and Viburnum dentatum. As in Soil Types 103 E-3 and 105 D-3, most trees were less than 25 feet in height in Soil Type 714 B-2.

TABLE 5

INDIGENOUS FLORA OF SOIL TYPES 103 E-3 SASSAFRAS SANDY LOAM,  
105 D-3 CROOM GRAVELLY LOAM, AND 714 B-2 IUKA SANDY LOAM

## A: 103 E-3 SASSAFRAS SANDY LOAM

Plant Survey II: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map(Figure 6). Mixed deciduous climax forest along swale and a pioneer juniper-pine association over remainder of area. Compass reading: SW 250° following the power line and underground utilities from the Science and Technology Building to the Pollution Abatement Center. Survey conducted approximately 50' North of utility lines following swale.

Legend\* N- Native                      CT- Canopy Tree                      S- Shrub                      GC- Groundcover  
I- Introduced                      UT- Understory Tree                      V- Vine

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Acer saccharum Marsh. Sugar Maple	N-CT	Scattered along swale
Arisaema triphyllum (L.) Schott. Jack-in-the-Pulpit	N-GC	Scattered throughout along swale and moist areas
Betula lenta L. Sweet or Cherry Birch	N-CT, UT	Sparse in number
Betula lutea Michx. Yellow Birch	N-CT, UT	Sparse in number
Botrychium dissectum Spreng. Lace-leaf Grape Fern	N-GC	Scattered along swale
Carya cordiformis (Wang.) K. Koch Pignut Hickory	N-CT	Single specimen only- 34" diameter
Carya ovata (Mill.) K. Koch Shagbark Hickory	N-CT	Abundant
Cornus florida L. Flowering Dogwood	N-UT	Abundant along swale

TABLE 5

A: 103 E-3 SASSAFRAS SANDY LOAM(Continued)

<u>GENUS SPECIES/Common Name</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
<i>Fagus grandifolia</i> Ehrh. American Beech	N-CT	Abundant
<i>Ilex opaca</i> Ait. American Holly	N-UT	Abundant along swale
<i>Juglans nigra</i> L. Black Walnut	N-CT	Sparse along swale
<i>Lindera benzoin</i> (L.) Blume Spicebush	N-UT, S	Abundant
<i>Liquidambar styraciflua</i> L. Sweet Gum	N-CT	Scattered throughout
<i>Liriodendron tulipifera</i> L. Tulip Poplar	N-CT	Scattered throughout- 15"-20" diameter
<i>Platanus occidentalis</i> L. Sycamore	N-CT	Abundant- 25"-30" diameter
<i>Polystichum acrostichoides</i> (Michx.) Schott. Christmas Fern	N-GC	Abundant along swale
<i>Quercus palustris</i> Muenchh. Pin Oak	N-CT	Abundant away from swale
<i>Quercus stellata</i> Wang. Post Oak	N-CT	Sparse in dry areas away from swale
<i>Robinia pseudo-acacia</i> L. Black Locust	N-CT	Abundant at outer edges of forest.
<i>Sassafras albidum</i> (Nutt.) Nees White Sassafras	N-UT	Abundant
<i>Smilax rotundifolia</i> L. Catbrier	N-V	Abundant in open areas
<i>Ulmus americana</i> L. American Elm	N-CT	Scattered along swale- to 25" diameter
<i>Vitis labrusca</i> L. Fox Grape	N-V	Scattered throughout

TABLE 5 (Continued)

## B: 105 D-3 CROOM GRAVELLY LOAM

Plant Survey II: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map (Figure 6). Pioneer juniper-pine association. Compass Reading: SW 250° following the power line and underground utilities from the Science and Technology Building to the Pollution Abatement Center. Survey conducted approximately 50' South of utility lines.

<u>GENUS SPECIES/Common Name</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
<i>Acer rubrum</i> L. Red Swamp Maple	N-CT	Abundant- shrubby
<i>Asplenium platyneuron</i> (L.) Oakes Ebony Spleenwort	N-GC	Scattered throughout
<i>Betula papyrifera</i> Marsh. Paper Birch	N-CT	Sparse in number- shrubby
<i>Cornus florida</i> L. Flowering Dogwood	N-UT	Sparse in number
<i>Juniperus virginiana</i> L. Red Cedar	N-UT	Abundant
<i>Liquidambar styraciflua</i> L. Sweet Gum	N-CT	Abundant- small size- less than 6" diameters
<i>Liriodendron tulipifera</i> L. Tulip Poplar	N-CT	Sparse in number
<i>Lonicera japonica</i> Thunb. Japanese Honeysuckle	I-V	Abundant
<i>Phytolacca americana</i> L. Pokeweed	N-Herbaceous	Abundant at edge of woods
<i>Pinus virginiana</i> Mill. Virginia Pine	N-CT	Abundant
<i>Polystichum acrostichoides</i> (Michx.) Schott Christmas Fern	N-GC	Scattered throughout
<i>Quercus palustris</i> Muenchh. Pin Oak	N-CT	Scattered throughout

TABLE 5

## B: 105 D-3 CROOM GRAVELLY LOAM(Continued)

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Quercus stellata Wang. Post Oak	N-CT	Scattered throughout
Rhus radicans L. Poison Ivy	N-GC, V	Abundant
Rhus typhina L. Staghorn Sumac	N-S	Abundant at outer edges of woods
Robinia pseudo-acacia L. Black Locust	N-CT	Abundant
Rubus spp. Blackberries	N-S	Scattered in open areas
Sassafras albidum (Nutt.) Nees White Sassafras	N-UT, S	Abundant
Viburnum dentatum L. Southern Arrow-Wood	N-S	Scattered throughout

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## C: 714 B-2 IUKA SANDY LOAM

Plant Survey II: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map(Figure 6). Pioneer juniper-pine association. Compass Reading: SW 250° following the power line and underground utilities from the Science and Technology Building to the Pollution Abatement Center. Survey conducted approximately 50' North of utility lines.

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Acer rubrum L. Red Swamp Maple	N-CT	Abundant
Juniperus virginiana L. Red Cedar	N-UT	Abundant

## C: 714 B-2 IUKA SANDY LOAM(Continued)

GENUS SPECIES/Common NAME

TABLE 5

<u>GENUS SPECIES/Common NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Liquidambar styraciflua L. Sweet Gum	N-CT	Abundant
Pinus virginiana Mill. Virginia Pine	N-CT	Abundant
Quercus palustris Muenchh. Pin Oak	N-CT	Scattered throughout- 10"-12" diameter
Rhus typhina L. Staghorn Sumac	N-S	Abundant
Sassafras albidum (Nutt.) Nees White Sassafras	N-UT, S	Scattered throughout
Viburnum dentatum L. Southern Arrow-Wood	N-S	Scattered throughout

The plants recommended in Table 6 for Soil Types 103 E-3, 105 D-3, and 714 B-2 were selected because they can tolerate exposed, dry conditions. The soils in the three areas consist of well-drained sandy to gravelly loams with a pH of 4.0-5.5. With construction of future buildings and other facilities in the three areas, it can be anticipated that exposed areas will tend to be dry because of a western orientation to the sun and exposure to northwestern winds. Therefore, plants such as Ilex vomitoria, Juniperus horizontalis, Leiophyllum buxifolium, Myrica pensylvanica, Rhus copallina, Vaccinium arboreum, and Vaccinium pallidum have been recommended. Many of these plants can grow under a variety of conditions, however, all are somewhat resistant to drought. Plants such as Acer negundo and Betula populifolia were recommended for possible use as rapidly growing screens even though they are short lived. With the steep slopes and resultant erosion potential, a number of groundcovers such as Arctostaphylos uva-ursi, Comptonia peregrina, Juniperus horizontalis, Leiophyllum buxifolium, Myrica pensylvanica, Rhus aromatica, Rhus copallina, Rhus typhina, and Yucca filamentosa have been recommended for bank cover and erosion control.

It is recommended that the College utilize the areas of 103 E-3, 105 D-3, and 714 B-2 for construction of their buildings because of the pioneer vegetation on these Soil Types in lieu of Soil Types 216 D-3 and 103 D-3 where a maturing oak-beech forest is located. Also, it is recommended that the College preserve the indigenous flora in the swale area of 103 E-3 because of the variety and size material there.

TABLE 6

A list of recommended native plants from within a 250 mile radius of Charles County Community College, La Plata, Maryland, that are of ornamental value in landscaping the Campus in soil types: 103 E-3 Sassafras Sandy Loam, 105 D-3 Croom Gravelly Loam, and 714 B-2 Iuka Sandy Loam(see Figure 6). This list is based on those native plants indigenous to the site on these soil types or those native plants recommended by Donald Wyman(6, 7, 8) which have habitats similar to the existing site conditions of these soil types. All plant names conform to the second edition of Gray's Manual of Botany. In addition, books by Small(10), Hitchcock and Standley(11), Wherry(12), and Wyman(13) were used in determining the various characteristics of the plants listed if they are not in Wyman's books. If spaces were left blank, the characteristics were insignificant. Those plants indigenous to these soil types are followed by an asterisk(\*). Unless otherwise indicated, the indigenous species were also recommended by Wyman(6, 7, 8).

Legend: E-T, Evergreen Tree                      E-V, Evergreen Vine                      S, Deciduous Shrub  
 E-S, Evergreen Shrub                      V, Deciduous Vine                      GC, Deciduous Groundcover  
 E-GC, Evergreen Groundcover              CT, Deciduous Canopy Tree              H-GC, Herbaceous Groundcover  
 E-F, Evergreen Fern                      UT, Deciduous Understory Tree              H-F, Herbaceous Fern

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HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
UT 60'	Acer negundo Box Elder	-	-	Fast screen; short lived.
CT 120'	Acer rubrum* Red Swamp Maple	Red: 4 Samara: 5	Red	Specimen or street tree; protect indigenous trees if possible along swale.
CT 120'	Acer saccharum* Sugar Maple	-	Yellow- Orange	Excellent specimen or street tree; protect indigenous trees along swale.
UT 60'	Amelanchier canadensis Shadbush	White: 4 Maroon: 6	Yellow- Red	Excellent small tree; courtyard or foundation tree.
E-GC 6"-1'	Arctostaphylos uva-ursi Bearberry	White: 5 Red: 6-10	-	Bank cover; groundcover for full sun; wildlife food; hard to transplant.

TABLE 6 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
H-GC 6"-2'	<i>Arisaema triphyllum</i> * Jack-in-the-Pulpit	White: 4-5 Red: 6-9	-	Protect indigenous plants along swale if possible; could be used on North side of buildings as a groundcover.
H-F 8"-15"	<i>Asplenium platyneuron</i> * Ebony Spleenwort	-	-	Native fern for dry areas; protect indigenous plants if possible.
CT, UT 75'	<i>Betula lenta</i> * Sweet or Cherry Birch	-	Yellow	Excellent specimen; good fall color and cherrylike bark; protect indigenous plants along swale if possible.
CT, UT	<i>Betula lutea</i> * Yellow Birch	-	Yellow	Protect indigenous plants along swale; not recommended by Wyman.
CT 90'	<i>Betula papyrifera</i> * Paper Birch	-	Yellow	White exfoliating bark; excellent specimen; protect indigenous plants along swale if possible.
UT 30'	<i>Betula populifolia</i> Gray Birch	-	Yellow	Short lived; use in poor gravelly soils; white bark; leaf miner and storm damage problems.
H-F 12"	<i>Botrychium dissectum</i> * Lace-leaf Grape Fern	-	-	Protect indigenous plants if possible
CT 120'	<i>Carya cordiformis</i> * Pignut Hickory	-	-	Single large specimen along swale; protect if possible; specimen for dry rocky areas.
CT 120'	<i>Carya ovata</i> * Shagbark Hickory	-	Golden-Brown	Specimen or street tree; protect indigenous trees if possible.
CT 90'	<i>Catalpa speciosa</i> Northern Catalpa	White: 6 Green: 8-12	-	Early summer flowering; coarse tree; specimen.
S 18'	<i>Clethra acuminata</i> Cinnamon Clethra	White: 7	Yellow-Orange	Cinnamon-brown bark; shrub border or foundation plantings.
GC, S 4'	<i>Comptonia peregrina</i> Sweet-fern	-	-	Fragrant foliage; bank plantings; full sun; spreads by underground stems.

TABLE 6 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
UT 40'	<i>Cornus florida</i> * Flowering Dogwood	Bracts White:4-5 Red:10-12	Red- Bronze	Excellent specimen, understory, foundation, or small street tree; has year-round interest; horizontal branching.
UT 36'	<i>Crataegus crus-galli</i> Cockspur Thorn	White: 5 Red: 9-12	Orange- Scarlet	Hedges, specimens, or foundation plantings.
UT 30'	<i>Crataegus phaenopyrum</i> Washington Hawthorn	White: 6 Red:10-12	Orange- Scarlet	Hedges, specimens, or foundation plantings; excellent fruiting.
UT 21'	<i>Crataegus pruinosa</i> Frosted Hawthorn	White: 5 Red to Orange:9-12	-	Small specimen or foundation tree; dense habit.
UT 15'	<i>Crataegus succulenta</i> Fleshy Hawthorn	White: 5 Red:10-12	-	Small specimen or foundation tree; thorny and dense.
CT 90'	<i>Fagus grandifolia</i> * American Beech	- -	Bronze	Excellent specimen, shade, or street tree; protect indigenous trees along swale if possible.
CT 135'	<i>Gleditsia triacanthos</i> Common Honey-locust	- Brown:9-12	-	Problem with thorns; ornamental brown fruit pods, 12"-19"; specimen; do not use as street tree.
E-T 45'	<i>Ilex opaca</i> * American Holly	- Red:10-12	-	Excellent specimen, foundation, or small street tree; protect indigenous trees along swale if possible.
UT, S 24'	<i>Ilex vomitoria</i> Yaupon	- Red:10-12	Bronze	Semi-evergreen; excellent small tree or shrub; drought resistant; beautiful fruit.
CT 150'	<i>Juglans nigra</i> * Black Walnut	- Nuts:10-12	Yellow	Specimen; protect indigenous trees along swale if possible.
E-GC 12"-18"	<i>Juniperus horizontalis</i> Creeping Juniper	- Blue:10-12	-	Excellent groundcover for banks and foundation plantings; withstands dry conditions.

TABLE 6 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
E-T 90'	<i>Juniperus virginiana</i> * Eastern Red Cedar	- Blue:10-12	-	Excellent native evergreen; slow growing; pest free; windbreak or foundation plant.
E-GC 18"	<i>Leiophyllum buxifolium</i> Box Sand-Myrtle	White: 5 -	Bronze	Low, widely branched evergreen ground-cover for sandy soils.
S 12'	<i>Leucothoe racemosa</i> Sweet Bells	White: 5 -	Scarlet	Upright plant for shrub border or foundation plant in shaded dry soils.
S 15'	<i>Lindera benzoin</i> * Spicebush	Greenish:4 Scarlet:9-10	Yellow	Protect indigenous plants along moist swale if possible; not recommended for dry exposed areas.
CT 125'	<i>Liquidambar styraciflua</i> * Sweet Gum	- Horned Balls:9-12	Scarlet	Protect indigenous plants if possible; specimens or street trees; difficult to transplant in larger sizes.
CT 150'	<i>Liriodendron tulipifera</i> * Tulip Poplar	Greenish:6 Pods:9-10	Yellow	Protect indigenous plants if possible; not recommended for dry areas.
S, GC 4'-9'	<i>Myrica pensylvanica</i> Bayberry	- Gray:9-12	-	Semi-evergreen; aromatic leaves; best in poor, sandy soil; ornamental fruit; foundation, mass, and bank plantings; erosion control.
H-GC	<i>Phytolacca americana</i> * Pokeweed	- Blue:8-10	-	Protect in naturalized areas; not of ornamental value.
E-T 75'	<i>Pinus resinosa</i> Red Pine	- Cones:9-12	-	Broad pyramidal head; specimen, mass and foundation plant; ornamental reddish bark; good for dry areas.
E-T 75'	<i>Pinus rigida</i> Pitch Pine	- Cones:9-12	-	Excellent for dry rocky soils; very open growth habit.
ET 45'	<i>Pinus virginiana</i> * Virginia Pine	- Cones:9-12	-	For use in mass plantings on poor barren soils; not of ornamental value in landscaping buildings; sparse and open habit.

TABLE 6 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 100'	<i>Platanus occidentalis</i> * Sycamore	- Balls:4-5	Yellow	Protect indigenous plants in moist swale area; not recommended for dry exposed areas; specimen or street tree.
E-F 1'-3'	<i>Polystichum acrostichoides</i> * Christmas Fern	- -	-	Protect in moist swale area; excellent native fern for shaded moist areas; not for dry exposed areas.
UT 30'	<i>Quercus marilandica</i> Black-Jack Oak	- Acorns: 9-12	Brownish Yellow	Excellent slow-growing tree on poor, dry, sterile soils.
CT 75'	<i>Quercus palustris</i> * Pin Oak	- Acorns: 9-12	Scarlet	Excellent specimen and lawn tree; do not use as street tree because of pendulous branches.
CT 90'	<i>Quercus prinus</i> Chestnut Oak	- Acorns: 9-12	Dull Orange	Excellent for dry, sterile, rocky soils.
CT	<i>Quercus stellata</i> * Post Oak	- Acorns: 9-12	-	Withstands dry conditions; not recommended by Wyman.
S 3'	<i>Rhus aromatica</i> Fragrant Sumac	Yellow:5 Scarlet: 6-10	Yellow	Foreground and bank plantings in dry, exposed areas; full sun; dense shrub.
S, UT 30'	<i>Rhus copallina</i> Shining Sumac	Green:8 Crimson: 9-12	Scarlet	Excellent ornamental for dry, sterile soils; specimen; foundation plant for 2-3 story buildings.
H-GC, V	<i>Rhus radicans</i> * Poison Ivy	- -	-	Protect in naturalized areas.
S 30'	<i>Rhus typhina</i> * Staghorn Sumac	Green: 6 Crimson: 9-12	Red	Excellent for mass plantings for poor dry soils in full sun.

TABLE 6 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 75'	<i>Robinia pseudo-acacia</i> * Black Locust	White: 6 Pods:8-9	-	Excellent for dry, sterile soils; fast growing; breaks easily in storms; do not use as street tree.
S 2'-4'	<i>Rubus</i> spp.* Native Blackberries	White: 6 Black:8	-	Protect in naturalized areas if possible; provides food for wildlife.
UT 60'	<i>Sassafras albidum</i> * White Sassafras	- Black:9-10	-	Excellent small tree; interesting fragrant foliage and bark; roots provide flavoring for Sassafras Tea.
V	<i>Smilax rotundifolia</i> * Catbrier	- -	-	Protect in naturalized areas only; pest in ornamental plantings.
CT 120'	<i>Ulmus americana</i> * American Elm	- -	Yellow	Excellent native tree except for susceptibility to Dutch Elm Disease; protect indigenous trees as specimens if possible.
E-S, UT 27'	<i>Vaccinium arboreum</i> Farkleberry	White:7 Blue:9-10	-	Evergreen shrub or small tree for mass plantings in sandy soils.
S 3'	<i>Vaccinium pallidum</i> Dryland Blueberry	White:5-6 Blue:9	Scarlet	Mass plantings for dry, sandy soils; fruit for wildlife and man.
S, GC 2'	<i>Vaccinium stamineum</i> Common Deerberry	White:5-6 Blue:9	Scarlet	Excellent for mass plantings in dry sandy soils; fruit for wildlife and man.
S 15'	<i>Viburnum dentatum</i> * Southern Arrow-wood	White:6 Blue:9-11	Red	Vigorous shrub for mass plantings and shrub border.
V	<i>Vitis labrusca</i> * Fox Grape	- -	-	Protect in naturalized areas.
E-S, GC 3'	<i>Yucca filamentosa</i> Adam's Needle	White:6-7 Pods:9-10	-	Thrives in sunny, dry locations; foundation or mass plantings on banks.
S 6'	<i>Zenobia pulverulenta</i> Dusty Zenobia	White:6 -	Red	Excellent shrub for sandy, acid soil; foundation plantings or companion shrub with other ericaceous plants.

## SOIL TYPE 581 A-4 BIBB SILT LOAM:

in 581 A-4 Bibb Silt Loam(see Figure 6) the soil consists of poorly drained silty to sandy loams; of recent alluvium washed from higher coastal plain areas; 0-1 foot to a seasonally high water table; flat topography with 0-3% slopes; pH of 4.0 to 5.0; and is subject to periodic flooding. This area includes Port Tobacco Creek, the single continually flowing water source on the Campus Site.

The plant species indigenous to 581 A-4 are those normally found in a flood plain association(Table 7). Along the creek bank, a canopy of Acer rubrum, Carpinus caroliniana, Carya ovata, and Platanus occidentalis were observed. At the outer edges of the flood plain bordering on Soil Types 103 E-3, 105 D-3, and 714 B-2, the dryer species of Liquidambar styraciflua and Quercus palustris were found. An understory of Lindera benzoin and Sambucus canadensis were abundant along the stream bank.

In Table 8, the ornamental plants recommended for use in Soil Type 581 A-4 are those which are indigenous to this soil type and native plants selected from Wyman's books(6, 7, 8) which can tolerate moist conditions and periodic flooding. The area provides an opportunity to use many of the plants associated with flood plains such as Ilex cassine, Ilex decidua, Ilex glabra, Ilex verticillata, and Magnolia virginiana. Many of the plants in this list such as Larix laricina can tolerate both wet and normal soils.

In addition, many of the plants recommended for this soil type such as the Ilex spp., Pyrus(Aronia) arbutifolia, Pyrus(Aronia) melano-

TABLE 7

## INDIGENOUS FLORA OF SOIL TYPE 581 A-4 BIBB SILT LOAM

Plant Survey II: One of three line surveys conducted on June 20, 1972, in conjunction with the soils analysis map (Figure 6). Flood plain association. Compass reading: SW 250° following the power line and underground utilities from the Science and Technology Building to the Pollution Abatement Center. Port Tobacco Creek Flood Plain.

Legend\* N- Native                      CT- Canopy Tree                      S- Shrub                      GC- Groundcover  
I- Introduced                      UT- Understory Tree                      V- Vine

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Acer rubrum L. Red Swamp Maple	N-CT	Abundant
Arisaema triphyllum (L.) Schott Jack-in-the-Pulpit	N-GC	Abundant along stream bank: Port Tobacco Creek
Athyrium filix-femina var. asplenioides (Michx.) Farw. Lady Fern	N-GC	Abundant along stream
Betula populifolia Marsh. White or Gray Birch	N-CT	Sparse in number
Carpinus caroliniana Walt. Ironwood	N-UT	Scattered along Port Tobacco Creek
Carya ovata (Mill.) K. Koch. Shagbark Hickory	N-CT	Abundant
Lindera benzoin (L.) Blume Spice Bush	N-UT, S	Abundant
Liquidambar styraciflua L. Sweet Gum	N-CT	Abundant
Lonicera japonica Thunb. Japanese Honeysuckle	I-V	Abundant in open areas
Platanus occidentalis L. Sycamore	N-CT	Scattered throughout

TABLE 7 (Continued)

<u>GENUS SPECIES/COMMON NAME</u>	<u>HABITAT &amp; FORM*</u>	<u>COMMENTS</u>
Podophyllum peltatum L. May Apples	N-GC	Abundant in shaded areas
Polystichum acrostichoides (Michx.) Schott Christmas Fern	N-GC	Abundant along Port Tobacco Creek
Prunus serotina Ehrh. Black Cherry	N-UT	Scattered throughout
Quercus palustris Muenchh. Pin Oak	N-CT	Abundant
Sambucus canadensis L. Common Elderberry	N-UT, S	Abundant along forest near edge of Creek
Sassafras albidum (Nutt.) Nees White Sassafras	N-UT, S	Abundant

carpa, Rósa palustris, Sambucus canadensis, and Symphoricarpos orbiculatus can provide wildlife cover and food. Increased run-off from higher points of the Campus can be anticipated as more buildings and roads are constructed, therefore, a study could be conducted over a period of time to determine the effects of the water on the indigenous flora. The plants recommended for Soil Type 581 A-4 Bibb Silt Loam can be found in Table 8 which follows.

TABLE 8

A list of recommended native plants from within a 250 mile radius of Charles County Community College, La Plata, Maryland, that are of ornamental value in landscaping the Campus in soil type: 581 A-4 Bibb Silt Loam(see Figure 6). This list is based on those native plants indigenous to the site on this soil type or those native plants recommended by Donald Wyman(6, 7, 8) which have habitats similar to the existing site conditions of this soil type. All plant names conform to the second edition of Gray's Manual of Botany. In addition, books by Small(10), Hitchcock and Standley(11), Wherry(12), and Wyman(13) were used in determining the various characteristics of the plants listed if they are not in Wyman's books. If spaces were left blank, the characteristics were insignificant. Those plants indigenous to these soil types are followed by an asterisk(\*). Unless otherwise indicated, the indigenous species were also recommended by Wyman(6, 7, 8).

Legend: E-T, Evergreen Tree                      E-V, Evergreen Vine                      S, Deciduous Shrub  
 E-S, Evergreen Shrub                      V, Deciduous Vine                      GC, Deciduous Groundcover  
 E-GC, Evergreen Groundcover              CT, Deciduous Canopy Tree              H-GC, Herbaceous Groundcover  
 E-F, Evergreen Fern                      U, Deciduous Understory Tree              H-F, Herbaceous Fern

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HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 120'	Acer rubrum* Red Swamp Maple	Red: 4 Red: 5	Red	Beautiful fall color; problem with weak wood at times.
H-GC 6"-2'	Arisaema triphyllum* Jack-in-the-Pulpit	White:4-5 Red:6-10	-	Excellent native groundcover in moist areas; spathe color varies.
H-F	Athyrium filix-femina var. asplenioides* Lady Fern	-	-	Excellent native fern along stream banks and moist areas of flood plain.
UT 30'	Betula populifolia* White or Gray Birch	-	Yellow	Beautiful bark; breaks easily in storms; native in wet swampy areas.
E-V	Bignonia capreolata Cross-Vine	Orange:5 -	-	Excellent for screen planting; beautiful flowers.

TABLE 8 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
UT 36'	<i>Carpinus caroliniana</i> * Ironwood	- Nut:9-12	Orange- Red	Excellent small tree; difficult to transplant; "muscled" bark.
CT 120'	<i>Carya ovata</i> * Shagbark Hickory	- Nut:9-12	Golden- Brown	Best of hickories; interesting flaking bark; nuts provide food for wildlife.
CT 90'	<i>Celtis laevigata</i> Sugar Hackberry	- Black	-	Bottomland tree; resistant to witches' broom which affects <i>Celtis occidentalis</i> ; pendulous spreading branches.
S 15'	<i>Cephalanthus occidentalis</i> Buttonbush	White:7 -	-	Summer flowering shrub; must have moist soil.
S 9'	<i>Cornus amomum</i> Silky Dogwood	Yellowish Blue	Red	For naturalistic plantings; bank cover; red twigs add winter interest.
S, GC 3'-7'	<i>Cornus stolonifera</i> Red-Osier Dogwood	White:5 White:8	Red	Stoloniferous; excellent for banks and wet areas; red twigs add winter interest.
CT, UT 60'	<i>Fraxinus pennsylvanica</i> Green Ash	- -	Yellow	Specimen tree; low grounds and river banks.
E-T 36'	<i>Ilex cassine</i> Dahoon Holly	- Red:9-12	-	Excellent small tree in wet soils; heavy fruit production; dense evergreen.
UT 30'	<i>Ilex decidua</i> Possum-Haw	- Orange:9-12	-	Semi-evergreen; excellent small tree for low swamps; foundation plant.
E-S 9'	<i>Ilex glabra</i> Inkberry	- Black:9-12	-	Willow evergreen growth; swampy areas; shears well; foundation and naturalistic plantings.
S 9'	<i>Ilex verticillata</i> Winterberry	- Red:9-12	Yellow	Excellent ornamental; swampy areas or any good garden soil; foundation, mass, or naturalistic plantings.
CT 60'	<i>Larix laricina</i> Eastern Larch	- -	Yellow	Excellent for wet spots or normal soil; specimen.

TABLE 8 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
S 15'	<i>Lindera benzoin</i> * Spicebush	Yellow:4 Scarlet: 9-12	Yellow	Excellent for moist areas; fragrant flowers, fruit, leaves, and stems.
CT 125'	<i>Liquidambar styraciflua</i> * Sweet Gum	Green:4 Horned Balls:9-12	Scarlet	Excellent specimen shade or street tree; corky twigs and furrowed bark; star shaped leaves.
UT 60'	<i>Magnolia virginiana</i> Sweet-Bay Magnolia	White:5 Pod:9-12	-	Very fragrant, waxy flowers; gray bark; likes moist conditions.
E-UT, S 36'	<i>Myrica cerifera</i> Bayberry	- Gray:10-12	-	Excellent ornamental; foundation plant; tolerates swampy conditions; fragrant foliage and fruit.
CT 90'	<i>Nyssa sylvatica</i> Sour or Black Gum	- -	Scarlet- Orange	Excellent specimen tree; hard to transplant except when small; beautiful fall color.
CT 120'	<i>Platanus occidentalis</i> * Sycamore	- Balls:4-5	Yellow	Susceptible to twig blight; not recommended by Wyman.
H-GC 12"-15"	<i>Podophyllum peltatum</i> * May Apple	White:5 Green:6-8	-	Umbrella like foliage; excellent perennial groundcover in moist areas.
E-F 1'-3'	<i>Polystichum acrostichoides</i> * Christmas Fern	- -	-	Excellent evergreen fern; groundcover for naturalized areas.
CT 90'	<i>Prunus serotina</i> * Black Cherry	White:5 Black:8	-	Excellent tree for general foliage purposes; attractive flowers and fruit; wood used in furniture making.
S 9'	<i>Pyrus(Aronia) arbutifolia</i> Red Chokeberry	White:5 Red:9-12	Red	Excellent shrub in moist areas; easy to maintain; brightly colored fruit.
S 3'	<i>Pyrus(Aronia) melanocarpa</i> Black Chokeberry	White:5 Black:9-12	Red	Excellent shrub in moist areas; mass and naturalized plantings.
CT 60'	<i>Quercus bicolor</i> Swamp White Oak	- Acorns: 9-12	Yellow- Red	Excellent tree for moist or wet soils; not as refined as <u>Quercus alba</u> .

TABLE 8 (Continued)

HABIT HEIGHT	GENUS SPECIES COMMON NAME	FLOWERS FRUIT	AUTUMN COLOR	LANDSCAPE COMMENTS
CT 75'	<i>Quercus palustris</i> * Pin Oak	- Acorns:9-12	Scarlet	Easily moved because of fibrous root system; specimen tree.
S 9'-15'	<i>Rhododendron viscosum</i> Swamp Azalea	White:6-7 -	Orange	Fragrant; late bloomer; good for swampy locations.
S 6'	<i>Rosa palustris</i> Swamp Rose	Rose:6 Red:9-11	-	Grows readily in wet or swampy areas.
S 18'	<i>Salix discolor</i> Large Pussy Willow	Silvery- Yellow:2-3 -	-	Excellent in marshy areas; early blooming; mass plantings; generally only 5'-10'.
S 12'	<i>Sambucus canadensis</i> * American Elderberry	White:6 Blue: -9	-	Excellent shrub for naturalized plantings and wildlife food supply.
UT 60'	<i>Sassafras albidum</i> * White Sassafras	- Black:9-10	Scarlet	Excellent small tree; fragrant foliage and bark; roots provide flavoring for Sassafras Tea.
S, GC 3'-6'	<i>Symphoricarpos orbiculatus</i> Indian Currant	- Red:9-12	-	Suckers and spreads easily; bank plantings; full sun or partial shade; wildlife cover and food.
CT 150'	<i>Taxodium distichum</i> Bald Cypress	- -	-	Excellent specimen in moist areas.
E-T 60'	<i>Thuja occidentalis</i> American Arborvitae	- Cones:9-12	-	Excellent specimen, foundation plant for 2-3 story buildings, hedges, and windbreaks.

### CHAPTER III

#### ORGANIZATIONAL STRUCTURE, HERBARIUM, RECORDS SYSTEM, LIBRARY, AND LABELING RECOMMENDATIONS

##### ORGANIZATIONAL STRUCTURE:

The organizational structure of a campus arboretum will vary depending on the institution involved. It can be managed by a single department or a college, an independent committee, a grounds and maintenance division, a city, county or state committee, or any other combination which the particular institution may develop.

The most workable system seems to be an independent committee representing various departments of a college and its community. The arboretum under this type of management is not subject to the personal prejudices or mismanagement of resources probable when under a single department. One example of a successful operation is the Arthur Hoyt Scott Horticultural Foundation of Swarthmore College, Swarthmore, Pennsylvania. In this case, the Foundation's Director reports on administrative matters directly to the President of the College or his agent. An independent Presidential Committee, composed of representatives of the local community serves to more closely coordinate the Foundation's activities to the College and the general public. This Committee advises the Director in those areas of activity which relate to the general public. This Committee also makes recommendations on

the improvement of the Campus landscaping and the maintenance of plant collections. According to Oppe(16, 17), this has proven to be a satisfactory method of administration at their institution.

On the other hand, according to Heeps(18), the organizational structure of the Morris Arboretum, Philadelphia, Pennsylvania, has not been as successful because it is under the Department of Biology which is responsible for the administration of funds to the Arboretum. Funds allocated to the Arboretum are in turn administered by the Director of the Arboretum. Consequently, each time the administration of the Department of Biology or the Director of the Arboretum changes, so may the philosophy of the arboretum and the allocation of funds for the arboretum's development and maintenance. In addition, if an arboretum is funded by a city, county, or state organization, changes in administration or cuts in appropriations can severely affect the arboretum's maintenance and development as when under a single department of a college. An independent committee, however, could solicit funds and invest monies to provide for the continuous development of an arboretum as do the Friends of the Arnold Arboretum at Harvard University, Cambridge, Massachusetts(19).

#### HERBARIUM:

During the first three years, a thorough analysis of the existing plant material should be undertaken to provide information for the accession of and preservation of the native flora at Charles County Community College. Specimens should be collected, pressed, identified and catalogued for future use of faculty, staff and students of the

College. As an ecological arboretum, it would be advisable to record and conserve those native plants indigenous to the site. An herbarium and a records system would be a valuable asset in a study of the long-range effects of campus development on the native flora.

Collection of specimens along line transects through the various soil types would provide a basic inventory of the indigenous flora. At a later date, a more detailed collection of herbarium specimens could be undertaken as funds and personnel are available.

The collection of flora at the present time is very important in providing a record of existing plant material on the site. The existing college facilities have been built on land previously used in tobacco production and consequently the flora of the site has not been changed to an appreciable degree. A collection of herbarium specimens should be completed before further construction is undertaken on the site. The herbarium records could eventually form a basis of a manual of the flora of Charles County or Southern Maryland.

All herbarium specimens should be stored in fireproof and pest-proof cabinets. All labeling and herbarium records should follow the International Code of Botanical Nomenclature. Information relating to herbarium techniques may be found in an article entitled "Herbarium Techniques at Longwood Gardens" by Donald G. Huttleston(20).

#### RECORDS SYSTEM:

Since the Arboretum of Charles County Community College is to serve as an example of the ecological approach to landscape development of a campus arboretum, consideration should be given to the devel-

opment of and maintenance of a records system. This system should provide information relating to: 1) indigenous plant material; 2) introduced native plants; and 3) records of the effects of campus construction on the indigenous and introduced plant material. These records could be a single 3" x 5" card on each plant listing genus, species, common name, family, nativity, height, source, location in collections, and ecological data, or it could follow the standardized system now being promoted by the Plant Records Center of the American Horticultural Society(see sample card: Figure 10). It is recommended that Charles County Community College follow the Plant Records Center system so that the information could be made available to arboreta, botanic gardens, and parks throughout the United States. This system, developed under the direction of Robert D. MacDonald at the University of Tennessee and the John J. Tyler Arboretum will eventually provide a national data bank of information relating to the living plant collections of horticultural institutions throughout the United States(21, 22).

In order to participate in this system, the College will have to purchase the standard accession cards and The Accession Manual. There is a one-time cost of \$ 35.00 for the Manual(with revisions and supplements provided free of charge as the system develops) and the standardized cards range from \$ 3.00 to \$ 5.00 per one hundred cards, depending upon the type and quantity ordered(23). Because of limited personnel and financial resources, the College would not have to fill out these cards completely at the beginning of the Arboretum, but could later add

the additional information as resources were available. At some future date, these accession cards could be microfilmed by the Plant Records Center. Further information concerning the type of reports available and the cost of services can be found by consulting the article by Brown and MacDonald(24).

All newly acquired native plants to be used in the Arboretum should be given an accession number which should appear on all plants and file cards relating to the group introduced. Records on seeds, bulbs and scions can be placed in a temporary or limbo file until germination or movement to the permanent collection at which time they could be accessioned and placed in the master file system.

One method of assigning accession numbers would be to use the last two digits of the current year followed by arabic numbers in sequence as the plants are received in the Arboretum during the year. For example, the first plant received in 1973 would be assigned the number 731 with those following numbered respectively. These numbers should be imprinted on a permanent rather than a temporary label or tag. With the use of wooden stakes or labels, accession numbers can be lost when the stakes rot or are broken. An inexpensive type of permanent accession tag would be "Berryhill Aluminum Labels"(see Table 9), on which the information can be hand embossed or written on the surface, whereas the most expensive would be the brass, machine-embossed labels.

As plants are received, accession numbers can be assigned and a record of the scientific name, common name, source, and cost can be

filed in a ledger until permanent cards can be made. All plants received from a different source and/or at a different time from the same source should be given a new accession number even though they may be identified as the same genus and species.

It would not be feasible to accession all of the existing native material on the Campus. However, as Campus construction is carried out in the various areas of the Campus, those plants retained around these buildings should be accessioned and included in the master file. A numbering system utilizing the letter C would indicate the specimen was an indigenous plant of the site. Each plant so accessioned would follow in numerical order starting from C 1.

As in many other areas of arboretum development, the extent of a records system will depend on the resources available to the institution involved. Cross-reference files on living, dead, common name versus scientific name, deleted material, nursery plants, greenhouse plants and other breakdowns can be used at the College when deemed necessary and when financial resources are available. The more elaborate the system used, the more time consuming and expensive it becomes. A simple file system such as a 3" x 5" card, a ledger or the standard cards available from the Plant Records Center (PRC) would serve the College in its initial development of the Campus Arboretum. As indicated before, it is recommended that the College utilize the PRC system because of its standardization and its potential for mass distribution to other educational institutions.

**LIBRARY:**

For college use and the use of those groups participating in the development of the Arboretum, a practical horticultural library is essential. A working reference library is necessary to the proper identification and nomenclature and to provide cultural information needed for the educational aspects of the Campus Arboretum. It need not be a collection of rare editions but a selection of reference books deemed necessary for their educational purposes relating to horticulture and ecology.

In the establishment and procurement of the library collections, the librarians from Dumbarton Oaks, Washington, D.C.; Longwood Gardens, Kennett Square, Pennsylvania; Massachusetts Horticultural Society, Boston, Massachusetts; and the National Arboretum, Washington, D.C. can be asked for assistance. A guide useful in the establishment of an horticultural library is "Basic Books for the Library," by Gordon P. DeWolf, Jr.(25).

In the development of this library, consideration should be given to the use of 16 mm and 35 mm microfilm, microfiche, aperture cards and microprint. The use of these micro-information retrieval systems could reduce the cost of herbals and botanical works if they are available in these forms as well as reduce the space necessary for shelving of books, horticultural magazines, nursery catalogues and botanical works. The College already has a number of microfilm readers in their main library, therefore the Arboretum personnel could use them either in the library or request that one be sent to their

headquarters.

#### LABELING SYSTEM:

In addition to a records system, the development of a labeling system would be a valuable educational project of an arboretum. Without proper identification and labeling, an arboretum cannot provide information relevant to its collections for visitors. Each type of labeling has its own merits depending on aesthetics, cost, and personnel available for their production and maintenance. Inexpensive wooden labels(untreated or not naturally rot resistant) are not recommended for display labels because of their susceptibility to heaving, rotting, and breakage after weathering. Regardless of the type selected, they should be attractive and reflect somewhat the image the institution is trying to portray. For example, in a rustic garden, routed wooden labels are appropriate whereas in formal gardens, the engraved laminated plastic or Metalphoto labels would be more appropriate.

The cost of labels for an arboretum will vary depending on the type selected, amount of information needed per label, aesthetic quality required, availability of personnel for production of labels, number of labels made per year in conjunction with investment in equipment, and the space available for equipment.

A summary of various forms of exterior arboretum labels can be found in Table 9. This information was abstracted from the special labeling issue of the American Association of Botanic Gardens and Arboretum(26). Further information on sources, landscape use, and other types of labels used at various institutions in the United States

and Canada may be found in this booklet.

If the College develops an arboretum of native plants, they could use an informal and rustic type of labeling. For example, routed wooden labels (redwood, cypress, or chemically treated wood) would blend in with the naturalistic surroundings of the Arboretum. These labels can be made with an electric router without a large investment in materials or equipment. A routed redwood label with recessed letters painted white or yellow would not only be attractive but would be easy to read from a distance. Compared to other types of labels (Table 9), these would be durable, easy to make with unskilled labor, and could be made during winter months when arboretum work is limited.

Labels should be provided for trees, shrubs, vines and ground-covers used in the Arboretum. All plants introduced into the Arboretum should carry individual labels listing the accession numbers and the genus species. However, in mass plantings, only one display label (routed wood) would be necessary for each planting bed. Because of its limited financial resources, it is recommended that the College utilize the "Berryhill Aluminum Labels" for placing accession numbers on introduced and indigenous plants. These labels are inexpensive and easily typed or written on. They are somewhat hard to read, but since these are for arboretum personnel only, this would not affect their usefulness.

The long range cost of a labeling system will depend not only on the durability of the label, but also on their susceptibility to vandalism. It would be desirable for all display labels to be attached

to wooden stakes in front of specimens or mass plantings. However, if vandalism problems arise then labels for trees could be attached above the reach of visitors and shrub labels could be attached to stakes set in concrete.

The dissemination of information to the public in an arboretum comes a great deal from its labeling system. Regardless of the type selected, it should be attractive, durable, and easily read. In addition, bulletin boards placed around the Campus could provide space for charts, photographs, blooming periods and landscape use of plants within the arboretum, and additional information relating to the arboretum's goals and purposes.

TABLE 9

## EXTERIOR ARBORETUM LABELS

A summary of exterior labels available for arboretum use. These label types and information relating to their usefulness were selected from the special issue on labeling (Quarterly Newsletter, Issue #63: April-July, 1965) conducted by the American Association of Botanic Gardens and Arboreta.

Type of Label	Type Material	Durability	Cost of Label (Excluding Labor)	Labor Required	Equipment Needed	Comments
Dymo	Vinyl Tape	Brittle in cold weather	Depends on length 1/2" x 12' rolls @ \$ 1.65	Minimum	Dymo Tapewriter Model 11 @ \$ 49.95	Fast, inexpensive
Dymo	Aluminum Tape	Long lasting	1/3" x 12' rolls @ \$ 1.95	Minimum	Dymo Tapewriter Model 11 @ \$ 49.95	Fast, inexpensive
Metalphoto	Photosensitive anodized aluminum plates	Ten Years +	Approx. \$ 1.50 if by employee - \$ 2.50 - \$ 3.00 if done commercially	Time Consuming Layout	Lettering Set Metal Plates from Metalphoto Corp.	Easily read. Negative can be reused.
Fiberglass		12 - 15 Yrs.	Approx. \$ .98 including aluminum stake & labor	Medium	Typewriter Laminator	Medium cost - can include more information than most other types
Engraved Laminated Plastic	Polyvinylchloride	3 - 10 Yrs.	Very expensive when equipment included. Cost decreases as number of labels increases.	Time consuming layout and engraving	\$ 300 - \$ 400 plus cutters and plastic stock	Attractive - formal. Expensive to utilize unless a large number of labels is to be produced.
Plastic	Plastic - painted with chrome green vinyl ink, white lettering	4 Yrs. +	Approx. \$ .10	Minimum if member of staff can letter fast. Plastic must be cut and painted.	Plastic, ink, lettering set	Attractive, inexpensive, informal

TABLE 9 (Continued)

## EXTERIOR ARBORETUM LABELS

Type of Label	Type Material	Durability	Cost of Label (Excluding Labor)	Labor Required	Equipment Needed	Comments
"Dream"	Acid Etchant Zinc Label	5 Yrs.	\$ 13.33/1000 including etchant & stylii	Minimum, handwritten with etchant	Zinc labels Wood stylii Acid	Small identification tag for mass plantings Informal Must be careful with acid etchant
Berryhill Aluminum	Cardboard-backed Aluminum	to 20 Yrs.	\$ 20.00/1000	Minimum	Label and pencil for identing legend	Good shrub label, accession label, Inexpensive, difficult to read
Hartley Shrub Label	Anodized Aluminum Surface	Short term as will girdle stems of trees or shrubs in 2-3 Yrs.	\$ 11.02/1000	Minimum	Label China Marking Pencil	Inexpensive shrub label Short term use
Routed	Wood: redwood, cypress or chemically treated wood	Long lasting	Depends on wood used, whether painted, stained etc. Medium priced.	Time con- suming in lettering & routing.	Router Approximately \$ 40 - \$ 60	Informal Naturalistic

## CONCLUSION

It is recommended that the Trustees of Charles County Community College incorporate an arboretum of native plants in their master plan as proposed in this thesis. By preserving as much of the indigenous flora as possible (Tables 1, 3, 5, 7), an arboretum will have been established at the College. The existing plant material found in the surveys conducted on June 20, 1972, can serve as the basis for a collection of native plants developed according to the various soil types of the Site. Additions to the flora can be made by selecting plants recommended for the various soil types in Tables 2, 4, 6, and 8.

In addition, setting up the Arboretum as an independent organization has certain advantages as stated in this thesis herbarium, records system, library, and labeling system are all essential to the development of an arboretum of native plants.

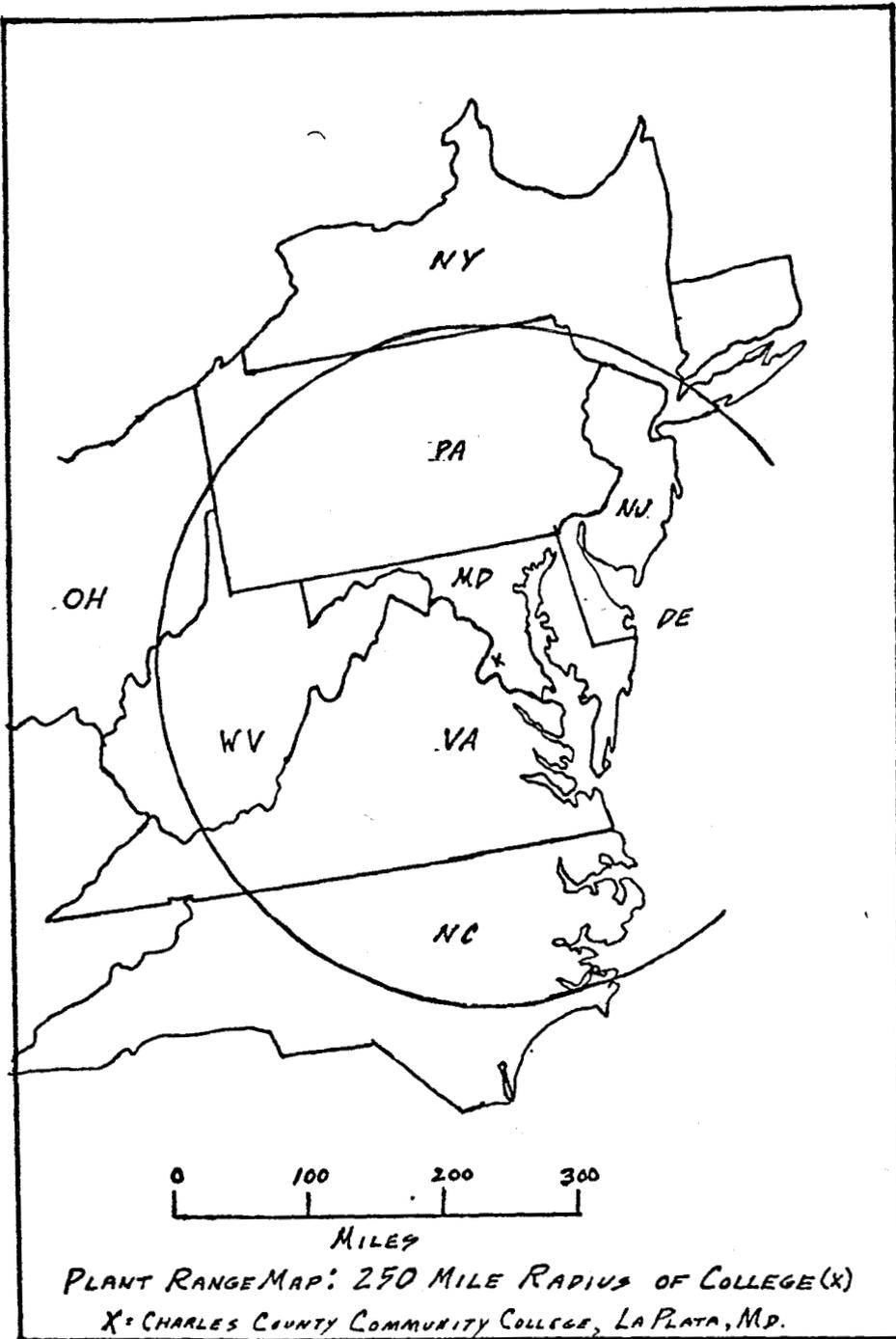
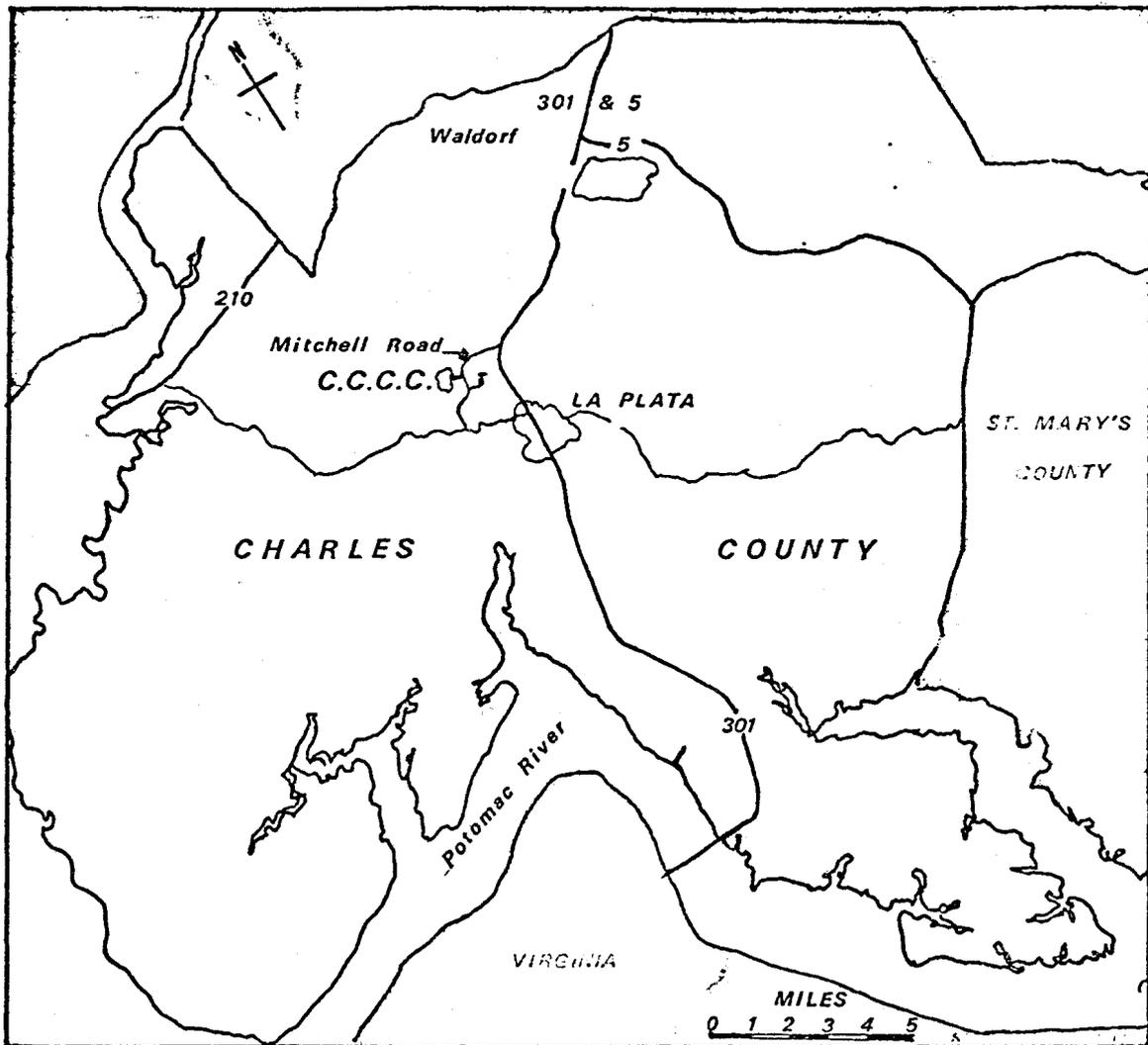


Figure 1. Plant Range Map



CHARLES COUNTY COMMUNITY COLLEGE, LA PLATA, MARYLAND

Figure 2. Location Map

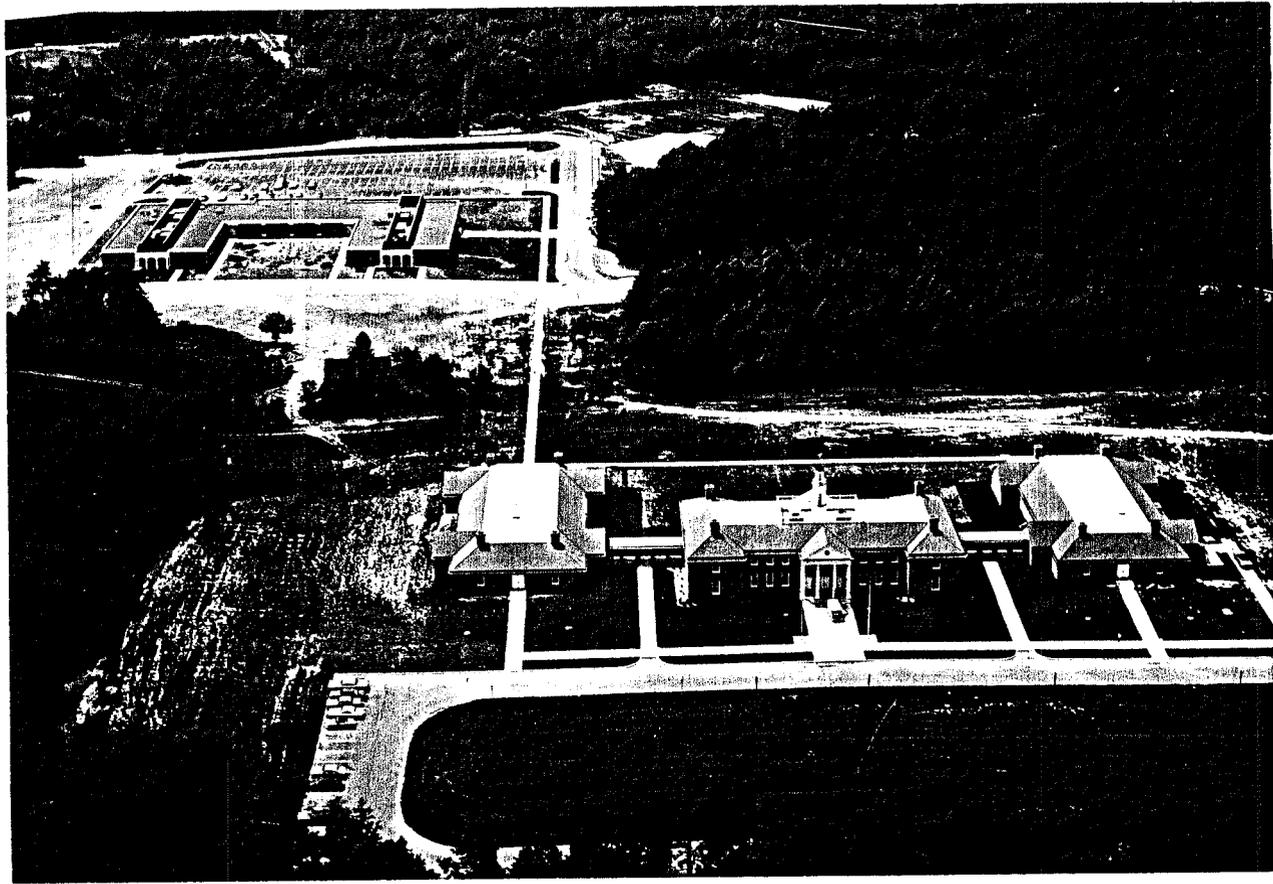


Figure 3. Aerial Photo: May 1970

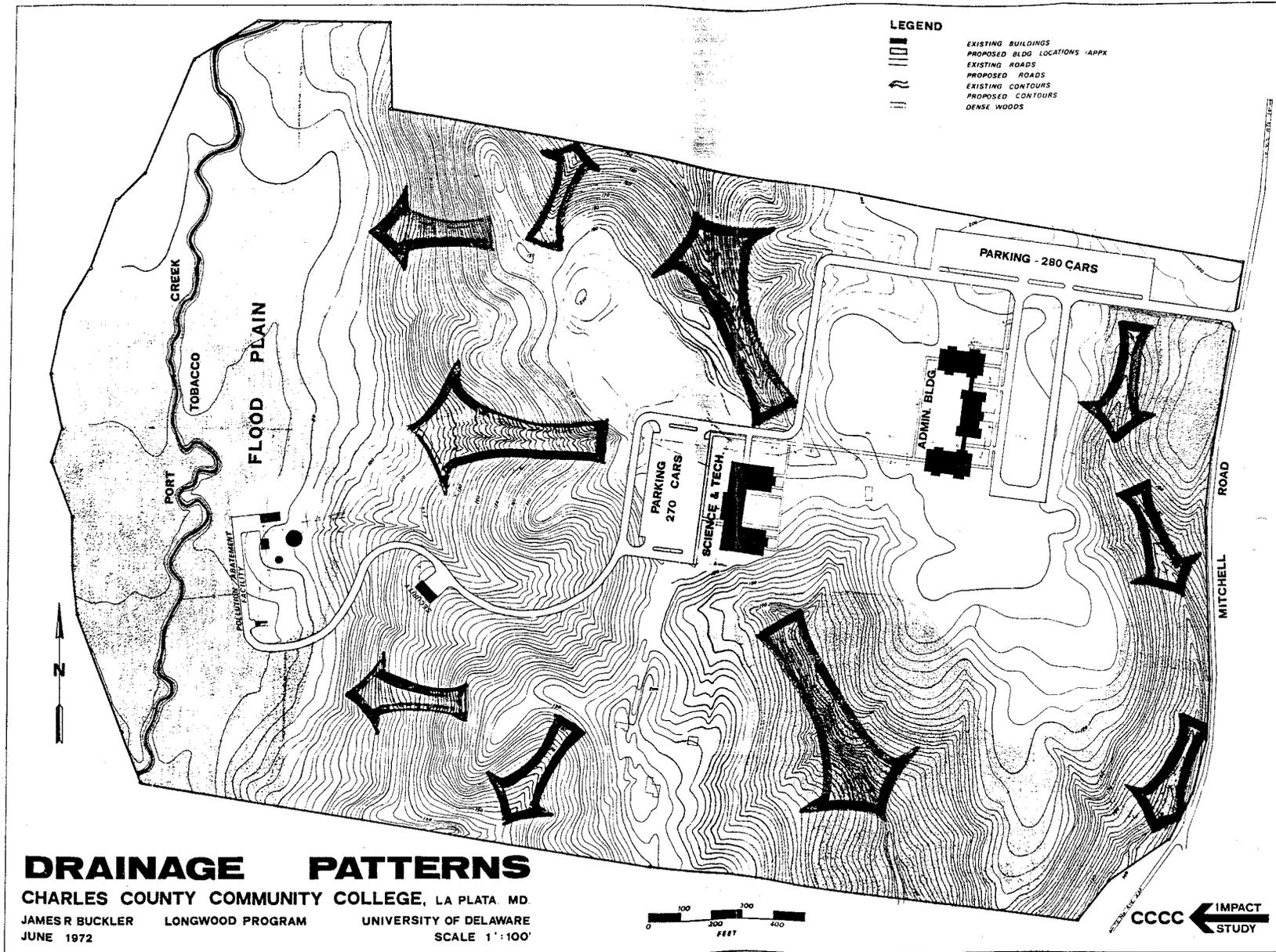


Figure 4. Drainage Patterns Map

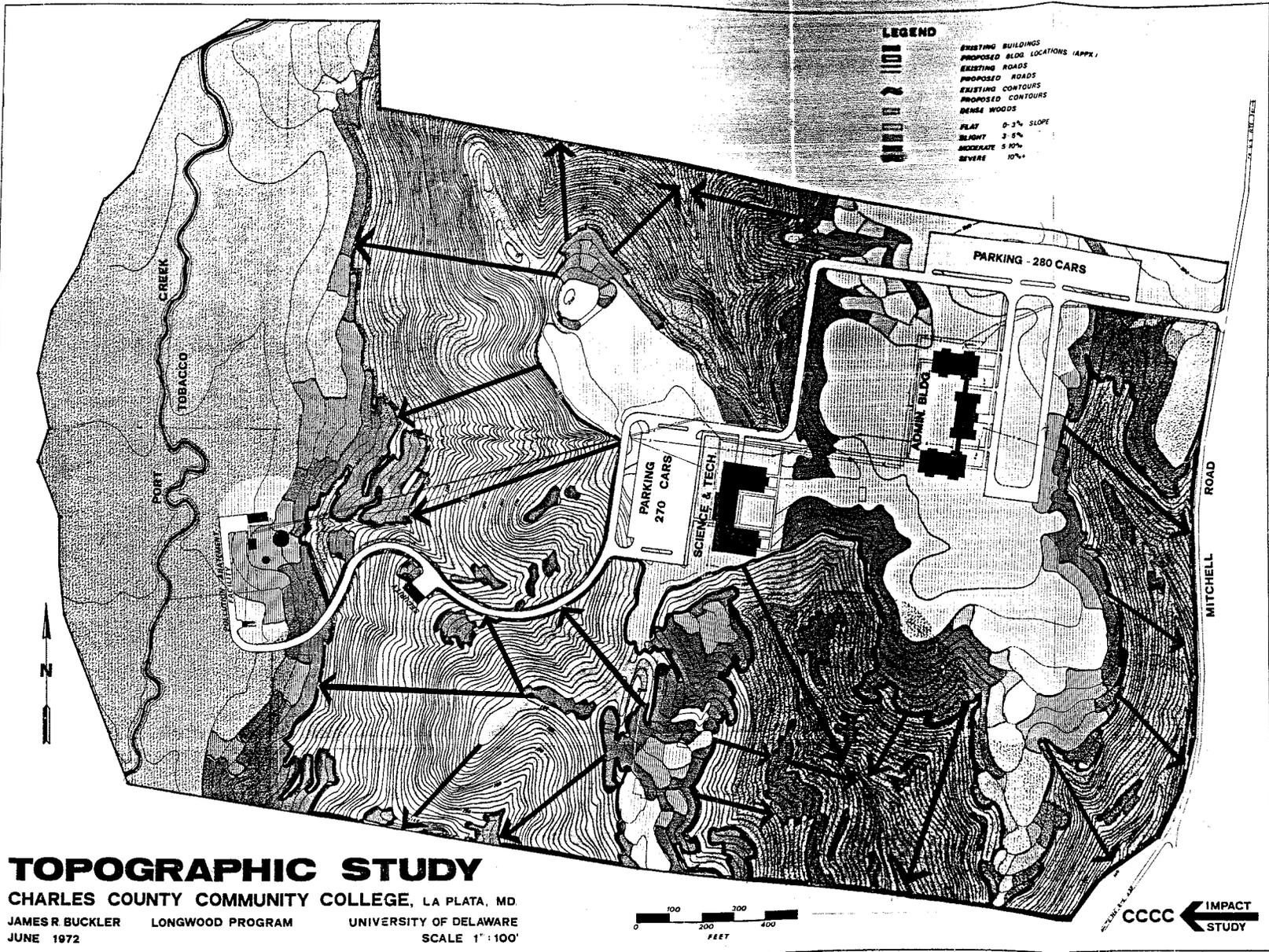


Figure 5. Topographic Analysis Map



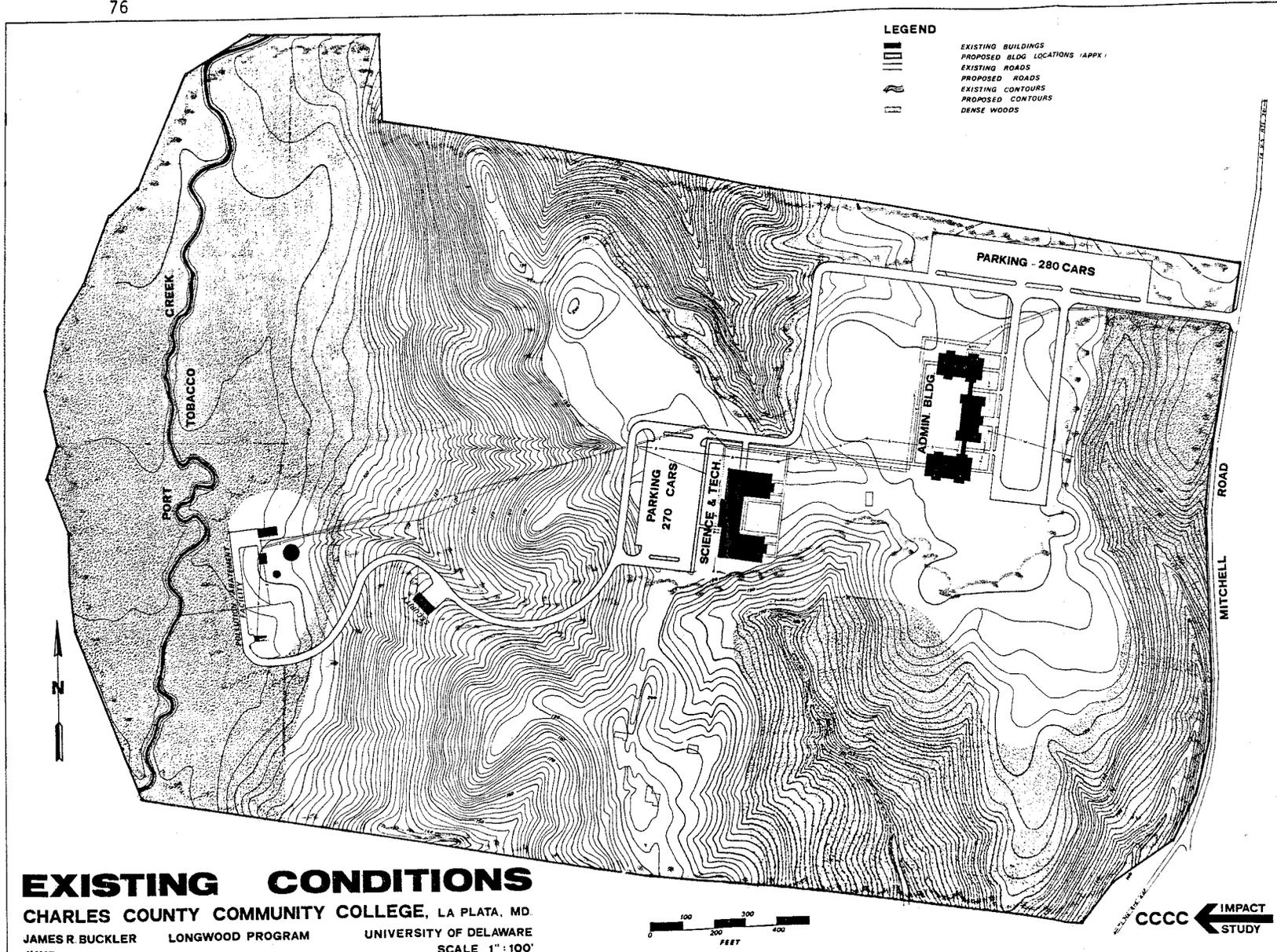


Figure 7. Existing Conditions Map

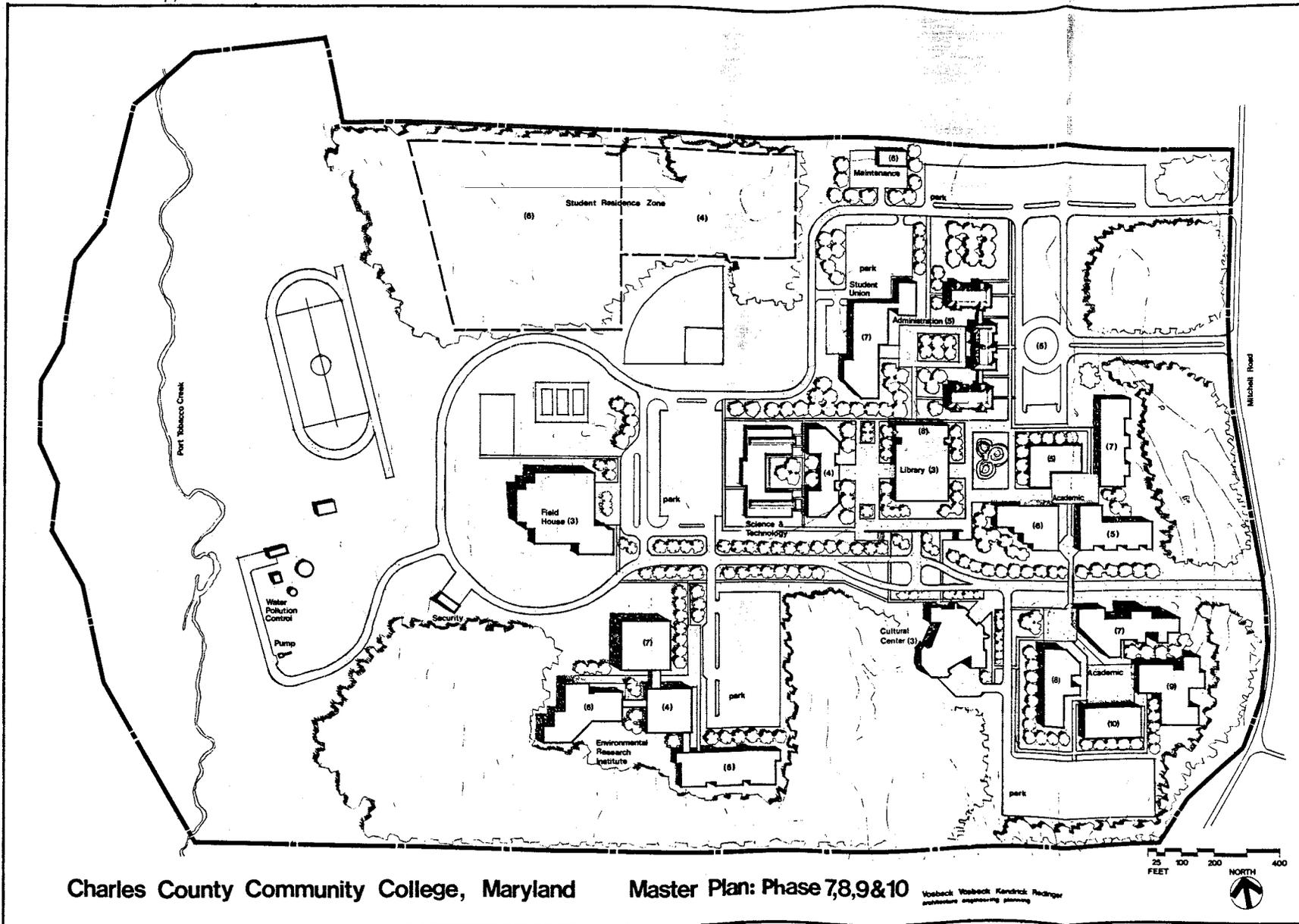


Figure 8. Existing Master Plan: Vosbeck, Vosbeck, Kendrick and Redinger

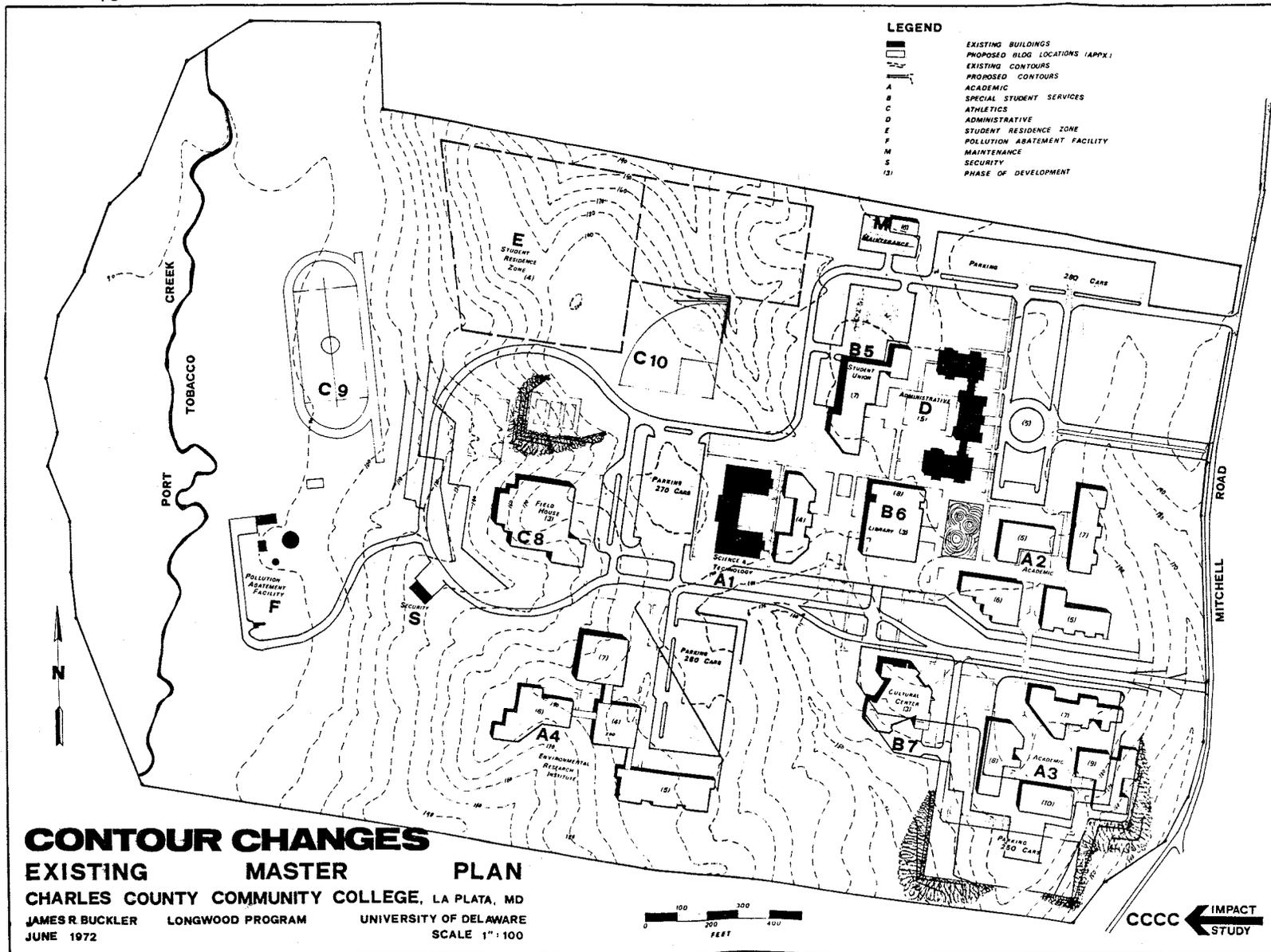


Figure 9. Contour Changes: Existing Master Plan



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## APPENDIXES\*

- \* Appendixes I through VI were abstracted from the book entitled: Soil Survey, Prince Georges County, Maryland(U.S.D.A. Soil Conservation Service: Maryland Agricultural Experiment Station. Washington, D.C.: Government Printing Office, 1967.). These appendixes were valuable in the soils, drainage, and topographical analysis of this thesis.

**APPENDIX I**  
**LIMITATIONS OF SOILS FOR RECREATIONAL USES**

Soil Series & Map Symbols	DEGREE AND KIND OF LIMITATION FOR				
	Service Buildings In Recreational Areas	Paths & Trails	Athletic Field & Other Intensive Play Areas	Picnic & Extensive Play Areas	Campsites (Tents & Trailers)
103 D-3 SASSAFRAS	Moderate: Slope	Slight	Moderate to Severe: Slope; Gravelly	Moderate: Slope	Moderate: Slope; Gravelly
103 E-3 SASSAFRAS	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope	Severe: Slope
105 D-3 CROOM	Severe: Slope	Moderate: Slope	Severe: Slope	Moderate: Slope	Severe: Slope; Gravelly
161 A-1 BELTSVILLE	Moderate: Seasonally High Water Table	Slight	Severe: Very Slow Permeability	Slight	Severe: Very Slow Permeability
161 B-1L, B-2 BELTSVILLE	Moderate: Seasonally High Water Table	Moderate: Silty	Severe: Very Slow Permeability	Slight	Severe: Very Slow Permeability
161 C-2, C-3, C-3-8 BELTSVILLE	Moderate: Slope; Seasonally High Water Table	Moderate: Silty	Severe: Slope; Very Slow Permeability	Moderate: Slope	Severe: Very Slow Permeability
216 C-3 AURA	Moderate: Slope	Slight	Moderate to Severe: Slope; Gravelly	Moderate	Moderate: Slope; Gravelly
216 D-3 AURA	Moderate: Slope	Moderate: Slope	Severe: Slope; Gravelly	Moderate: Slope	Severe: Slope; Gravelly
581 A BIBB	Severe: Flood Hazard; Poor Drainage	Severe: Flood Hazard; Poor Drainage	Severe: Flood Hazard; Poor Drainage	Severe: Flood Hazard; Poor Drainage	Severe: Flood Hazard; Poor Drainage
701 B-1 703 B-1 OCHLOCKONEE	Slight	Slight	Slight: Slope	Slight	Slight
714 B-1, B-2 IUKA	Moderate: Seasonally High Water Table	Slight	Moderate: Seasonally Wet	Moderate: Seasonally Wet	Moderate: Seasonally Wet

## APPENDIX II

### DESCRIPTIONS OF THE SOILS AND ESTIMATES OF THEIR ENGINEERING PROPERTIES

Soil Series & Map Symbols	Description of Soil & Site	Depth from Surface Inches	Reaction pH	Shrink- Swell Potential
103 D-3, E-3 SASSAFRAS	Except that the surface layer contains less silt and clay and no gravel in some places, these soils are like Sassafras gravelly loam (well-drained gravelly loams over 2-1/2' of sandy clay loam, underlain by loamy sand that contains gravel in places; 5' or more to water table.	10 - 40	4.5 - 5.0	Low
105 D-3 CROOM	Somewhat excessively drained gravelly loams that have a very hard, compact subsoil and substratum; 5 feet or more to water table.	0 - 48	0.06 - 0.20	Low
161 A-1, B-1L, B-1, B-2, C-2, C-3, C-3-8 BELTSVILLE	Moderately well to well drained fine sandy loams and silt loams over a dense, impervious, compact layer, (fragipan); underlain by sand, silt, clay or gravel; 1 to 2 feet to a water table seasonally perched above the fragipan.	0 - 14	4.0 - 5.0	Low
216 C-3, D-3 AURA	Well-drained gravelly loams over firm gravelly subsoil; underlain by a gravelly very hard substratum; 5 feet or more to water table.	13 - 30	4.0 - 5.0	Low
581 A BIBB Silt Loam	Poorly drained silty to sandy loam on flood plains; consists of recent alluvium washed from coastal plains sediment; 0-1' to seasonally high water table; subject to flooding.	0 - 36	4.0 - 5.0	Low
701 B-1 703 B-1 OCHLOCKONEE	Well-drained sandy loams and silt loams in upland depressions; consists of recent alluviums that washed from the coastal plain and extends to a depth of 45", below 45" the properties are highly variable; 3' or more to water table.	0 - 45	5.1 - 6.0	Low
714 B-2 IUKA	Moderately well-drained sandy loams, fine sandy loams, and silt loams on flood plains or foot slopes; consists of recent alluvium washed from the coastal plain; underlain by gravel in places; 1 to 2 feet to seasonally high water table; subject to flooding in most places.	0 - 30	4.0 - 5.0	Low

## APPENDIX III

### SUITABILITY OF SOILS AS ENGINEERING MATERIALS

Map Symbols & Soil Series	Suitability for When Wet	Earthwork When Frozen	Susceptibility To Frost Action	Depth From Surface Inches	Topsoil	Suitability As Source Of Sand	Suitability As Source Of Gravel	Roadfill
103 D-3, E-3 SASSAFRAS	Fair	Good	Moderate	0 - 10	Generally Good, but Fair in gravelly	Unsuitable	Unsuitable	Unsuitable
				10 - 40	Not Rated	Unsuitable	Fair in gravelly areas	Good
				40 - 48	Not Rated	Fair	Locally Fair to Good	Good
105 D-3 CROOM	Good	Good	Low	0 - 120	Poor to Fair	Unsuitable	Unsuitable to Good	Unsuitable to Good
161 A-1, B-1L, B-1, B-2, C-2, C-3, C-3-8 BELTSVILLE	Poor	Unsuitable	High	0 - 14	Fair	Unsuitable	Unsuitable	Unsuitable
				14 - 50	Not Rated	Unsuitable	Unsuitable	Poor
				50 - 72	Not Rated	Unsuitable	Locally Fair	Poor to Fair
216 D-3 AURA	Fair	Fair	Low	0 - 13	Fair	Unsuitable	Unsuitable	Unsuitable
				13 - 30	Not Rated	Unsuitable	Fair	Good
				30 - 96	Not Rated	Unsuitable	Good	Good
581 A BIBB	Poor	Unsuitable	High	0 - 36 36 - 54	Fair Not Rated	Unsuitable Unsuitable	Unsuitable Unsuitable	Poor Poor to Fair
701 B-1 703 B-1 OCHLOCKONEE	Fair	Fair	Moderate	0 - 45 45 - 60	Fair to Good Not Rated	Unsuitable Variable	Unsuitable Variable	Fair to Good Variable
714 B-2 IUKA	Poor	Poor	High	0 - 30 30 - 48	Fair to Good Not Rated	Unsuitable Variable	Unsuitable Variable	Poor to Fair Good but Variable in areas of local alluvium

## APPENDIX IV

### ENGINEERING INTREPRETATIONS OF SOILS

Map Symbols & Soil Series	SOIL FEATURES THAT AFFECT				Suitable Type of Pond
	Drainage Systems	Irrigation	Terraces or Diversions	Waterways	
103 D-3, E-3 SASSAFRAS	Not needed	Moderate moisture-holding capacity; medium infiltration	Moderately erodible; good stability	Moderate moisture-holding capacity; moderate fertility	Impounded
105 D-3 CROOM	Not needed	Low moisture-holding capacity; medium infiltration	Highly erodible; very good stability	Low moisture-holding capacity; low fertility	Impounded
161 A-1, B-1L, B-1, B-2, C-2, C-3, C-3-8 BELTSVILLE	Very slow permeability; highly erodible	Moderate moisture holding capacity, very slow infiltration; impeded drainage	Highly erodible; fair stability; seepage above fragipan	Moderate moisture-holding capacity; moderate fertility; seepage above fragipan	Impounded
216 C-3, D-3 AURA	Not needed	Low moisture holding capacity; medium infiltration	Highly erodible; very good stability	Low moisture-holding capacity; low fertility	Impounded
581 A BIBB	Moderate permeability; moderately erodible	Variable moisture holding capacity; poor infiltration; poor drainage	Moderately erodible; poor stability	Variable moisture-holding capacity; moderate fertility	Impounded or Excavated
701 B-1 703 B-1 OCHLOCKONEE	Not needed	Moderate to high moisture holding capacity; medium infiltration	Highly erodible; poor stability	Moderate to high moisture-holding capacity; low fertility	Impounded
714 B-2 IUKA	Moderate to moderately slow permeability; highly erodible	Moderate to high moisture-holding capacity; moderate to moderately slow infiltration; impeded drainage	Highly erodible; poor stability	Moderate to high moisture-holding capacity; low fertility	Impounded or Excavated

## APPENDIX V

### ENGINEERING INTERPRETATIONS OF SOILS

Map Symbols & Soil Series	SOIL FEATURES THAT AFFECT			
	Pipeline Construction And Maintenance	Road Or Highway Location	Sites for Ponds Or Reservoirs	Dikes, Levees And Embankments
103 D-3, E-3 SASSAFRAS	Slight corrosion potential; Good stability	Good stability; Moderate frost action; Slope	Seepage moderate in subsoil, high in substratum	Good stability; moderately erodible; high maximum dry density
105 D-3 CROOM	Slight corrosion potential; Very good stability	Very good stability; Slope	Moderate seepage	Very good stability; Highly erodible; very high maximum dry density
161 A-1, B-1L, B-1, B-2, C-2, C-3, C-3-8 BELTSVILLE	Perched water table; Moderate corrosion potential, fair stability	Perched water table; fair stability; severe frost action; slope	Seepage very low in fragipan, low to moderate in substratum	Fair stability; highly erodible, high maximum dry density
216 C-3, D-3 AURA	Slight corrosion potential; Very good stability	Very good stability; slope	Moderate seepage	Very good stability; highly erodible, very high maximum density
581 A BIBB	Seasonally high water table; high corrosion potential; poor stability	Seasonally high water table; flood hazard; poor stability; severe frost action	Low to high seepage; constant source of water	Poor stability; moderately erodible, low to high maximum dry density
701 B-1 703 B-1 OCHLOCKONEE	Water table at depth of 3' or more; slight corrosion potential; poor stability	Water table at depth of 3' or more; poor stability, moderate frost action	Variable seepage	Poor stability; highly erodible; medium to high maximum dry density
714 B-2 IUKA	Seasonally high water table; moderate corrosion potential; poor stability	Seasonally high water table; poor stability; flood hazard in places; severe frost action	Moderate seepage; constant source of water in places	Poor stability, highly erodible, medium to high maximum dry density

## APPENDIX VI

### LIMITATIONS OF SOILS USED FOR COMMUNITY DEVELOPMENT

#### DEGREE AND KIND OF LIMITATION FOR

Soil Series & Map Symbols	Foundations for Homes of Two Stories or Less	Landscaping And Earth Movement	Streets & Parking Lots	Material for Sanitary Landfill	Home Gardens
103 D-3 SASSAFRAS Sandy Loam: 10-15% Slope Severely Eroded	Moderate: Slope	Moderate: Slope	Moderate for streets; Severe for parking lots: Slope	Slight	Severe: Slope
103 E-3 SASSAFRAS Sandy Loam Eroded Land Steep	Severe: Slope	Severe: Slope	Severe: Slope	Slight	Severe: Slope
105 D-3 CROOM Gravelly Loam 8-15% Slope	Moderate: Slope	Severe: Slope	Moderate to Severe for streets; Severe for parking lots: Slope	Slight	Severe; hard subsoil: Slope
161 A-1 BELTSVILLE Silt Loam 0-2% Slopes	Moderate: Perched Water Table Impeded Drainage	Moderate; Seasonally Wet	Moderate; Seasonally Wet	Slight	Moderate; Seasonally Wet
161 B-1L, B-1, B-2 BELTSVILLE Silt Loam 2-5% Slope Moderately Eroded	Moderate: Perched Water Table Impeded Drainage	Moderate; Seasonally Wet	Moderate; Seasonally Wet	Slight	Moderate; Seasonally Wet; Slope

## APPENDIX VI (Continued)

### LIMITATIONS OF SOILS USED FOR COMMUNITY DEVELOPMENT

Soil Series & Map Symbols	DEGREE AND KIND OF LIMITATION FOR				
	Foundations for Homes of Two Stories or Less	Landscaping And Earth Movement	Streets & Parking Lots	Material for Sanitary Landfill	Home Gardens
161 C-2, C-3 BELTSVILLE Silt Loam 5-10% Slope Moderate to Severely Eroded	Moderate: Perched Water Table; Impeded Drainage	Moderate: Seasonally Wet	Moderate: Seasonally Wet	Slight	Severe: Seasonally Wet; Slope
216 C-3 AURA	Slight	Moderate: Hard Subsoil	Slight for Streets; Moderate for Parking Lots: Slope	Slight	Severe: Hard subsoil; Slope
216 D-3 AURA Gravelly Sandy Loam, 5-15% Slope Severely Eroded	Moderate to Severe: Slope	Severe: Slope	Moderate to Severe for Streets; Severe for Parking Lots: Slope	Slight	Severe: Hard subsoil; Slope
581 A BIBB Silt Loam	Severe: High Water Table; Flood Hazard; Poor Drainage	Severe: High Water Table; Flood Hazard; Poor Drainage	Severe: High Water Table; Flood Hazard; Poor Drainage	Slight	Severe: High Water Table, Flood Hazard; Poor Drainage
701 B-1 703 B-1 OCHLOCKONEE Fine Sandy Loam Local Alluvium 0-5% Slopes	Slight	Slight	Slight	Slight	Moderate: Slope
714 B-1, B-2 IUKA Sandy Loam Local Alluvium	Moderate: High Water Table; Impeded Drainage	Moderate: Seasonally Wet	Moderate: Seasonally Wet	Slight	Moderate: Impeded Drainage; Slope

## APPENDIX VII

PROPOSED PHASE DEVELOPMENT OF CHARLES COUNTY COMMUNITY  
COLLEGE THROUGH THE YEAR 1986

The following information is an abstract from the Master Plan Booklet prepared in September, 1970, by the Architectural Engineering Firm of Vosbeck, Vosbeck, Kendrick, and Redinger of Alexandria, Virginia, for Charles County Community College, La Plata, Maryland. This information pertains to the proposed phase development of Charles County Community College through the year 1986. Phases 1 and 2 have already been completed(see Figure 7), and Phases 3 through 10 are numbered[eg. (3)] on the buildings in Figures 8 and 9. The development of the College is anticipated by the firm as follows:

## PHASE 3:

Within the next five years, construction on the Field House, Library and Cultural Center is anticipated. The Field House is a multi-use facility to accommodate varsity, intramural and other recreational activities. The Library will house 50,000 volumes and will serve 625 students through Phase 8, when expansion to 100,000 volumes and 1,250 readers is anticipated. The Cultural Center will house the Art, Drama and Music Departments. It will provide an 800 seat theatre. The road between building complexes A 1, A 2, A 3, A 4, B 6, and B 7 is to be included in this Phase.

## PHASE 4:

To be completed in 1978, the total student accommodation will be 1,400. 105,000 square feet of classroom space is provided. Student

residence units for 250 will be completed. The Environmental Research Institute will be housed in its first 25,000 square feet of space.

PHASE 5:

An additional 400 students and 50,000 square feet of academic space will be added by 1979. The present Administration area will expand to the entire Phase 1 structure and academic space will move to a new building. The Environmental Research Institute will gain 25,000 square feet.

PHASE 6:

By 1980, an increase of 400 students will bring enrollment to 2,200, and an additional 30,000 square feet of academic space will be complete. The student residence area will be completed with 250 units to house a total of 500 students.

A new Maintenance Building with central supply and receiving will replace the present structure, which will become campus security.

The Environmental Research Institute will expand to 75,000 square feet.

PHASE 7:

By 1982, 800 new students are expected with an additional 60,000 square feet of new space completed. Total enrollment will be 3,000 students.

The Environmental Research Institute will be completed, totally 100,000 square feet.

A Student Union with a Health Center is included in this phase.

**PHASE 8:**

An enrollment of 800 students and 60,000 square feet of academic area are to be present and in use by 1984.

The Library will expand to 100,000 volumes; and a reader capacity of 1250 in 1984.

**PHASE 9:**

An additional 800 students will be served by 60,000 square feet of new academic space by 1986.

**PHASE 10**

With the addition of 400 new students, enrollment will reach a maximum of 5,000 men and women. 30,000 square feet of classroom space will bring total classroom space to 375,000 square feet. Roads, walks, parking and landscaping will be complete. Parking will be provided for about 1,600 cars.