PART ONE

MASTER PLAN REPORT

CHAPTER 1.0

EXISTING CONDITIONS / BACKGROUND TO THE PLAN

1.1.0 Existing Conditions (1994)

The main academic and research campus of the Virginia Polytechnic Institute & State University (Virginia Tech) is part of a complex built and natural environment, encompassing approximately 2,200 acres in the town of Blacksburg. Located in the mountainous region of southwestern Virginia, Blacksburg is bordered by the Jefferson National Forest on the north and surrounded by agricultural land to the south and west. Combined, these surroundings form an environment characterized by dramatic changes in topography and distant views of the Blue Ridge and Allegheny Mountains.

1.1.1 Land Holdings

In addition to the main campus, Virginia Tech maintains other significant land holdings in Blacksburg and surrounding Montgomery County (See Figure I-1). These holdings support the University's diverse educational programs, agriculture and forestry in particular, and include: the Price's Fork Research Station, 118 acres; the Turkey Research Station, 80 acres; the Fisburn property, 1,132 acres; the Moore Farm, 246 acres and the Whithorne-Kentland (Kentland) Farm, 1750 acres. Of these, the Kentland Farm is specifically addressed as a part of this Master Plan (See Chapter 6). It is the expectation of this Master Plan that the current use of the Moore Farm, the Turkey Research Station, the Fishburn property, and the Price's Fork Research Station will continue into the foreseeable future. The University has other land holdings throughout the Commonwealth of Virginia which support its research and extension missions. These land holdings are not the subject of this Master Plan.

1.1.2 Site & Topography Description (Main Campus)

The development pattern of the Virginia Tech main campus is both formed and dominated by the dramatic topography and natural systems of the region. The academic core of the campus, in particular, has been shaped by the system of ridges, valleys and streams which characterize the surrounding terrain.

Of particular importance to the development pattern are the three forks of the Stroubles Creek East Branch which traverse the main campus: North Stroubles Creek, Central Stroubles Creek, and South Stroubles Creek. While each of these forks enter the campus at different points, they each converge to form one stream channel near the 460 By-pass. The North and Central forks converge on the Duck Pond, a siltation and storm water detention basin, to form an important campus amenity (See Figure I-2).

North Stroubles Creek enters the campus near the intersection of Price's Fork Road and Stanger Street where it flows through a detention pond before entering underground conduits. The creek daylights at West Campus Drive where it merges with the Central Fork near the Duck Pond.

Central Stroubles Creek enters the campus near the intersection of College and Otey Streets and is channelled through underground conduits, passing beneath the Donaldson Brown Hotel and Conference Center and Eggleston Hall before continuing westward beneath the Drill Field. It daylights near West Campus Drive where it merges with the Duck Pond.

The South Fork parallels Southgate Drive in a box culvert, daylighting at Duck Pond Drive. From there, it flows westward to merge with the main stream channel near the 460 By-pass.

The North and Central forks of Stroubles Creek flow within designated floodplains. The upper reaches of the North Fork lie within a 500-year floodplain extending from Stanger Street to West Campus Drive where its designation is intensified to 100-year status.

An extensive 100-year floodplain on the Central Fork of the creek extends from Otey Street to the Duck Pond. Buildings located in the floodplain, the Donaldson-Brown Hotel and Conference Center, the Eggleston Quadrangle and War Memorial Hall have been subject to flooding.

1.1.3 Existing Campus Form/Character

The 2,200 contiguous acres of main campus can be divided into three distinct zones according to visual character and form. (It should be noted that these zones of visual form and character do not necessarily correspond to functional zones). The first zone, the campus core, is generally bounded on the north by Price's Fork Road, on the east by Main Street, on the south by Washington Street, and on the west by West Campus Drive. It encompasses a majority of the academic, research, support and residential space of the University. The structure of the core, defined by the large central open space of the Mall, the Drill Field and the Duck Pond, in combination with a system of quadrangles, make this the most densely built and campus-like of the three zones (See Figures I-3 and I-4).

The second zone can be described as a transition area in which the higher density land use patterns of the core give way to a low-density pattern of land uses including the golf course, Special Purpose Housing Area (Greek letter organizations), College of Veterinary Medicine, extensive parking areas (Cage Lot), and athletic fields. Spatially this zone lacks an overall unifying concept or theme.

The third zone is the most rural in character encompassing a variety of agricultural land uses including crop and pasture land, livestock facilities and the Dairy Complex. It is in this zone that the University's origins as a land grant institution are most apparent. The zone also includes the University Airport and research areas.

1.1.4 Core Campus Structure

There are several primary aspects of form that account for the basic spatial structure of the core campus. These include the bowl shaped topography upon which the campus rests, the arrangement of buildings in upland areas in groups with similar size, shape, materials and alignment, and the central, unifying design of the Mall, Drill Field and Duck Pond open spaces. Collectively, these aspects of form create a campus that has an overall unity and coherence. The landscape in the core area can be classified into four general compositional types; monumental spaces and parklands, quadrangles and plazas, interstitial linkage spaces, and building edge landscapes that lie between buildings and streets (See Figure I-5).

The design of the monumental open space spine including the Mall, Drill Field, and Duck Pond is a strong composition that artfully exploits the existing terrain. It achieves campus unity through centrality and dominance. Structurally, the Mall is the weakest component of the three elements. The Main Street terminus is inadequate and the Mall itself is tentatively defined both in terms of buildings and planting.

The system of quadrangles and plazas which characterize the academic and residential areas of the core is a strong repetitive theme that creates a pleasing sense of order subordinate to the larger monumental spaces. The varied geometry, orientation, landscape treatment and elevations of the quadrangles add a welcome element of variety and complexity to the campus that complement the singular unity and simplicity of the Drill Field. A majority of the quadrangles and plazas are well defined spatially though the quality of their landscape treatment varies. The quadrangles that need structural improvement are Patton Quad which has weak spatial definition; the Library Plaza which is overly complex in its design at the expense of spatial clarity; and Pritchard Quad which requires an adjustment to its scale and edge design.

The matrix of spaces that link the quadrangles and provide access for service constitute another type of campus space referred to here as the interstitial spaces. The interstitial spaces are not nearly as well defined nor consistently treated as the quadrangles or the monumental spaces. Their treatment ranges from very successful as between Dietrick Hall and Slusher Hall, or weak as between Smyth Hall and Slusher Hall.

Building edge landscapes that lie between buildings and streets are important edges that form the front yards of the campus. In general, these landscapes are regular in shape alignment and size, and setbacks are appropriately adjusted for emphasis on significant buildings such as at Burruss Hall. Recognizing the Drill Field Drive edge as a model, the edges at West Campus Drive, Washington Street, Stanger Street and Kent Street are weaker by comparison.

1.1.5 Core Campus Edges

By virtue of the placement of the ceremonial entrance, the Mall, the east side of the campus along Main Street and College Avenue serves as the "front" of the campus. South of the Mall, the east edge is generally well defined with the exception of the Otey Street, Roanoke Street, and Draper Road edges. For the most part, edge conditions south of the Mall are defined by yards, fences and planting that clearly establish a transition between the campus and neighboring land uses. Further, the continuity of streets and pedestrian walks in the area provide for an ordered integration with the Town's commercial and residential areas (See Figure I-6). In comparison, in the area north of the Mall (Turner Street to Price's Fork Road), campus edge conditions are ambiguous and less continuous.

The Washington Street edge follows a ridge line forming a natural seam in the land use pattern of the campus. The north side of Washington Street is defined by the high density residential uses of the core campus. To the south, the street's edge definition is weakly defined by surface parking and athletic land uses. The building walls created by the residential buildings on the north clearly establish an institutional identity.

On the western side of the core, West Campus Drive acts as a barrier between academic buildings such as Litton-Reaves and the academic and residential buildings located south of the Drill Field. Topographically, the Grove (the president's house) and, Hillcrest and Wallace Hall are linked to buildings located south of the Drill Field; West Campus Drive disrupts this connection.

The park surrounding the Duck Pond forms a naturalistic edge to the Drill Field and the core. It serves as a visual terminus for the core and introduces a pastoral character that is both a traditional attribute of the campus and a desirable amenity in the face of increasing density. The park also frames powerful views of the regional landscape to the west.

The Price's Fork Road edge is the primary front door to the campus even though its design does not strongly manifest the attributes of a graceful arrival. The Price's Fork Road edge serves as the functional entrance to the core campus. As such it is dominated by automobiles and has the character of suburban development.

1.1.6 Macro-Campus Structure

Beyond the core area defined by Washington Street, Main Street, Price's Fork Road, and West Campus Drive, the spatial coherence of the campus is less clear. This results from inconsistencies and weaknesses in the design of campus edges, campus approach roads and buildings groups; the bisecting effect of the 460 By-pass; and the fact that major roads such as West Campus Drive, Duck Pond Drive and Southgate Drive sometimes run cross-grain to the topography. The dissonance between topographic form and

road alignments generally make the landscape less legible, especially when other factors such as vegetation and architectural form do not play a unifying role.

The 460 By-pass is the most divisive element. It renders all the land to its west separate and disassociated from the campus and introduces the activity of a major highway into the University's agricultural research area. It forms both a psychological and physical barrier between campus land uses.

The design of the macro-campus edges, gateways and approaches does not follow a unified theme or set of organizing ideas. Consequently, the identity of the University is not expressed in a consistent way that might signal common purpose or improve the order or beauty of the landscape.

1.1.7 Macro-Campus Land Uses/Zones

Major dividing lines in the macro-campus include Stroubles Creek, the 460 By-pass, Tech Center Drive and Southgate Road. Within the land units defined by these major dividing lines there are a number of land use, topographic and vegetation changes that further define a set of zones such as the College of Veterinary Medicine and the Special Purpose Housing Area.

The character and land uses in the different zones are diverse, including agrarian open space, golf course, Special Purpose Housing Area, academic facilities, research facilities, athletic buildings and play fields, major parking lots and naturally wooded areas.

The facilities within a given zone generally have an internal order among themselves; however, from zone to zone there is not a master plan that meaningfully connects the parts visually or functionally. The general condition is that facilities are scattered in the landscape and connected with a set of roadways that form a rough and incomplete grid pattern around the core campus.

1.2.0 Background to the 1994 Master Plan Update

Several information sources were reviewed during the planning process to inform and provide guidance to the planning effort. They included review of the 1983 plan; site reconnaissance, interviews and workshops carried out as part of the master planning process; and the Master Plan goals and objectives identified by the University.

1.2.1 1983-93 Master Plan Review

As noted above, analysis of the core campus today reveals a strong development pattern structured by the Drill Field, the Mall and a system of academic and residential quadrangles. This spatial organization, however, was for a short while ignored in the planning and design of the campus. During the late 1960s and early 1970s, buildings such as Derring and Cowgill were constructed on the periphery of the academic core with no relation or ties

to the existing spatial structure. The trend during this period was to construct object buildings that consumed space rather than buildings that defined space.

The 1983 plan sought to reverse this trend and integrate buildings such as Derring and Cowgill into the campus structure. To that end, the plan initiated the infill concept. The infill concept called for refocusing campus development in the core by concentrating new development in and around existing buildings. Consequently, the concept was instrumental in resurrecting the quadrangle building approach and added a contemporary sensibility regarding preservation of existing buildings.

In addition to repairing the campus spatial structure, the concept was also intended to address a variety of other planning issues such as conserving campus land, maintaining a pedestrian-scale campus, leveraging investment in existing infrastructure, and allowing for flexible increments of development.

Since 1983, several buildings have been constructed in accordance with the plan. Of particular note are the buildings which have successfully tied Cowgill into the quadrangle system of the campus: the Johnston Student Center and Hancock Hall. These buildings, in combination with Burruss and Cowgill, have defined Cowgill Plaza as a space and have established a precedent for extending the campus fabric. Similarly, the Johnston Student Center, in combination with the Pamplin Hall infill, has assisted in integrating Derring into the campus structure, although less successfully. South of the Drill Field, the addition of Payne Hall to the Pritchard Quad area has also helped establish a precedent for using building projects to bring proportion, edge definition and human scale to poorly defined quadrangles.

1.2.2 The Master Planning Process

The planning process, which commenced in December of 1993, was undertaken in four stages. During the first phase, an extensive inventory of the existing physical conditions of the campus was carried out; and, interviews were conducted with University administration, staff, and the University community at large. Additionally, comments and suggestions from the University community were solicited via the e-mail system and questionnaires distributed by the Office of the University Architect. During the second phase, concept alternatives and priority siting strategies were developed for accommodating the building program outlined in the University's Six-year Capital Outlay Plan (1994-2000). Two rounds of siting alternatives were developed for the outlay program elements which were, in turn, evaluated in a series of workshops and presentations conducted at the University. During the third phase, Concept Refinement, the building siting decisions and conceptual ideas of the plan were further developed and refined. The concept plan was also presented to the Art and Architecture Review Board during this phase. In the fourth phase, the work culminated in the development of the Master Plan described in this report.

In each of the four phases, the work was structured around a series of workshops, typically held once during each month of the planning effort, in which intensive reviews were conducted, and planning directions affirmed. The University's Building Subcommittee, executive administration and community representatives provided direction to the consultants at each stage of the process. Several public forums or "open house" reviews were conducted to expose the planning process to the wider campus community, and to solicit ideas and concerns.

The Master Plan which evolved from the planning process described above provides a general framework for campus planning over the next ten year period (1994-2004). It is intended to guide incremental development such that it contributes to the overall design integrity of the campus. Architectural and landscape guidelines developed as part of the process describe broad design goals for campus development and provide recommendations for achieving those goals over time. The guidelines are based on the design principles which make Virginia Tech a unique place. They are ultimately intended to direct and inform future design initiatives in a manner consistent with the existing pattern of campus development and consistent with the goals and objectives of the Master Plan.

As a general guide or roadmap for development, the Master Plan does not provide exhaustively detailed design solutions for proposed campus spaces, facilities or landscape initiatives. Specific design solutions are to be explored through the development of precinct plans which focus on smaller campus areas/spaces (and attendant guidelines), and individual project sites. Precinct plans allow for a great degree of flexibility in developing the campus in accordance with the Master Plan framework.

1.2.3 Significant Planning Themes and Issues

Several significant recurrent themes and issues emerged from the interviews, site reconnaissance, data analysis, questionnaire review, and workshop sessions held during the planning process. The themes listed below are those that surfaced with enough regularity and emphasis that they were regarded by the consultants as a broad measure of how people view the campus and what they expect to be addressed in planning for its future.

Design Issues

- A high value is attached to the campus open spaces of the Drill Field, Duck Pond and academic and residential quadrangles, all of which are considered to be central to the character and image of the Virginia Tech campus. It is the view of many that these spaces should be enhanced with public art and landscape improvements. Conversely, interstitial areas between the well defined campus spaces are perceived to be in much greater need of enhancement.

- A high value is placed on the scenic vistas and views of the regional landscape and rural character of the Virginia Tech campus, each of which are considered to be central to the character of the campus.

- There is a perception that the campus lacks both formal and informal gathering spaces which could serve to bring the campus community together. It was observed that the location of Squires Student Center in relation to major academic buildings and problems of access, design and an overall lack of public space in the Newman Library contribute to this perception.

Development Site Selection Issues

- There is a need to consider the walking distances and the class change interval when siting academic buildings. Many cited the long walking distance between the major classroom facilities in McBryde and Litton-Reaves to be problematic (See Figure I-7).

- The availability of parking is considered to be an important factor in the site selection process.

- There is a high value placed on the preservation of the rural character of the campus.

- A primary concern in the selection of buildings sites is the condition and capacity of the campus infrastructure, storm water drainage in particular. Concerns about the flooding problems at the Donaldson-Brown Hotel and Conference Center were expressed on several occasions

Transportation and Parking Issues

- It is perceived that infill development has resulted in a net loss of convenient parking and service access to campus buildings, particularly in the academic core.

- There is a need to better plan for delivery, service and emergency vehicle access to campus buildings. Access is particularly problematic at Burruss, Cowgill, G. Burke Johnston, the Upper Quad and several residential buildings south of the Drill Field.

- Traffic, parking and pedestrian/vehicular conflicts are perceived to be problematic on Drill Field Drive.

- West Campus Drive is perceived to be over-designed for its location and purpose, resulting in excessive vehicular speeds and dangerous pedestrian crossings.

- There is a need to reorganize and expand the bike route system to reduce bike/vehicular and bike/pedestrian conflicts.

Arrival Sequence Issues

- Wayfinding is perceived to be difficult for visitors due to an unclear entry sequence resulting from inadequate signage, weak campus edge definition, and the lack of identifiable entry nodes.

- There is a desire to locate visitor services near the campus core rather than on the periphery of campus.

Campus Edges/Community Relations Issues

- There is a need to clearly define campus edges in order to improve the campus entry sequence and perimeter image.

- There is a need to provide more on-campus housing for Greek organizations.

Utilities/Infrastructure Issues

- There is a need to thoroughly address storm water drainage in order to resolve existing flooding problems and prevent problems with future construction.

- There is a need to develop a strategy to air condition campus spaces utilized during the summer.

Kentland Issues

- The acquisition of the Kentland Farm is viewed both as a way to allow agricultural land on the main campus to be utilized for other purposes, and as a way to consolidate agricultural operations previously located on leased property.

Ecological Goals

- Three ecological goals were identified during the public participation process which helped to inform and guide the master planning process:

1) To develop education objectives for the campus environment (To demonstrate and interpret environmental research and management, and to enhance field study opportunities).

2) To develop resource efficiency and conservation objectives for the campus. (To economize on energy and materials expenses, and to minimize environmental impacts).

3) To develop environmental rehabilitation objectives for the campus. (To enhance air, water, soil, vegetation, and habitat values where appropriate).

1.2.4 Goals and Objectives of the 1994 Master Plan

Prior to the consultant team's involvement, the University identified seven goals and objectives that were to be addressed in the Master Plan. In combination with the recurrent themes noted above, they in turn informed and directed the planning effort.

1) Formulation of a clear set of Guidelines and Standards for Design of Campus Facilities (buildings, landscape, and other site improvements) that can be used by the University and its consultants for future projects. The guidelines documentation should be organized in such a way that it can be produced as a "stand-alone" manual for project consultants.

2) Identification of Future Development Sites on campus and formulation of rules for the selection of sites for development, including appropriate uses, density, affinities and relationships to other sites and functions, and special provisions with respect to infrastructure, circulation, and environmental and visual characteristics.

3) Formulation of a Transportation and Parking Strategy for the campus that describes, at a conceptual level, the improvements and operational measures deemed necessary to adequately and compatibly accommodate the transportation/parking needs of the campus and surroundings.

4) Development of a plan framework and design guidelines for a clear, unified Arrival Sequence for the campus, including gateways, graphic way-finding, clarity of movement, hierarchy of entries (ceremonial/public, functional/utilitarian) and treatment and use of areas adjacent to principal entry corridors.

5) Definition of Campus Perimeters and Edges with respect to land use compatibility, relationship to off-campus environment and demonstrated need for property acquisitions or dispositions.

6) A review and assessment of Campus Utilities to the extent that such utilities will impact or be impacted by future campus development in terms of general capacity, alignment and location of trunk utility corridors, environmental or regulatory considerations. The utilities review should provide a means of measuring the implications of various plan alternatives and identifying likely phasing implications for plan implementation.

7) Formulation of a diagrammatic Land Use Master Plan for the Whitethorne-Kentland Farm property, based on the delineation of the historical farmstead site and on the determination by the College of Agriculture & Life Sciences as to the appropriate relationship between soil types, topography and orientation and the functional needs of programs and uses to be located on the site.

CHAPTER 2.0

CAMPUS FACILITIES PROGRAM

2.1.0 Enrollment

Both current and projected enrollment are discussed below in terms of the impact each will have on future space requirements at the University.

2.1.1 Current Enrollment

In the fall semester of 1993 the University reported a head count enrollment of 23,865, and a full time equivalent (FTE) enrollment of 23,755 (comprised of 22,346 full time students and 1,519 part-time students). The close correlation between headcount and full-time equivalent enrollment is indicative of high levels of utilization for academic, social, recreational, and parking facilities. Typically, a high ratio of full-time enrollment relative to headcount infers that a large proportion of the student population is engaged in on-campus activity over the length of the school day. Lower ratios of full-time equivalent enrollment normally result in more pronounced peaks of facilities use, leaving periods of the day when facilities are underutilized relative to the population that they are designed to accommodate. This would suggest that at Virginia Tech, the student population utilizes or occupies various facilities fully from morning to evening. The current shortfall of space at Virginia Tech under State Council for Higher Education in Virginia (SCHEV) guidelines amplifies the level of facilities utilization that is, at least in part, a consequence of the proportion of full-time enrollment experienced at the University.

2.1.2 Projected Enrollment

The University's Enrollment Plan, adopted by the Board of Visitors on August 13, 1993 outlines a short-term (through circa 1997) course of undergraduate and graduate enrollment stabilization. Long-term enrollment objectives stated in the plan call for the University to "indicate a willingness to allow on-campus enrollment to begin a slow, controlled increase to a maximum size of 25,000 students on the Blacksburg campus...." The timing and rate of the increase to achieve the 25,000 level is indicated as being determined by the "availability of adequate human, material, and financial resources." For the purposes of the Master Plan, the enrollment level of 25,000 was considered to be the planning target in testing the capacity of the campus to accommodate future growth.

2.2.0 Space Needs Projections-Educational and General Space

Based on data compiled in 1993, the University encompassed approximately 4,450,200 assignable square feet (ASF) and 6,895,100 gross square feet (GSF) of building area. As noted above, the University has compiled a space analyses in accordance with SCHEV space planning guidelines to determine the magnitude of the overall space shortfall. Such analyses have, in recent biennium plans, consistently revealed significant space deficits in educational and general space. (SCHEV projections exclude residential, athletic, student activities and other auxiliary space categories).

2.3.0 Space Provision Strategy

To resolve the current space deficit, the University plans to increase its total space inventory through a coordinated effort of facility renovation/conversion and new construction. Conceptually, this effort is guided by the Integrated Space Plan and the University's Six Year Capital Outlay Plan (1994-2000).

2.3.1 Integrated Space Plan

To help redress the significant space shortfalls on the Virginia Tech campus, the University has developed a strategy know as the Integrated Space Plan. As documented in the University's April 4, 1991, paper entitled "Meeting the University's Space Needs: An Integrated Proposal", the Integrated Space Plan is a significant initiative relative to the Master Plan for several reasons. First, it sets a definitive framework for change affecting several locations on the campus. Second, it creates a new set of dynamics and affinities that will bear on the long-term organization of the campus. And third, it is a principal foundation of the Six Year Capital Outlay Plan (described below) accommodated in the Master Plan.

The document cites the University's existing and projected space deficit, particularly in laboratory space, but also in library space and general purpose academic space, noting the difficulty in resolving the deficiencies through state-appropriated new construction in the light of the Commonwealth's fiscal circumstances. Thus, the Integrated Space Plan seeks to redress the anticipated space shortfall largely through a program of conversion and renovation of residential space to general purpose academic space, enabling the institution to concentrate new construction requests on specialized projects such as laboratories and library space.

The plan consists of a series of proposals bracketed in three parts. The first part, calls for the construction of a high density library storage facility to replace leased space and to release space in the Newman Library for other uses. It also calls for the provision of additional space in the Newman Library. The second part calls for the conversion of the Upper Quad dorms Brodie, Major Williams, Monteith, Rasche, Shanks, and Thomas to academic uses in the Colleges of Education and Arts and Sciences. It also calls for the conversion of Shultz and Henderson Halls to house academic space. The third part calls for the construction of specialized facilities, particularly laboratories, for the science and engineering disciplines.

At this writing, several initiatives had been undertaken to further the Integrated Space Plan. Major Williams Hall was in the process of being converted to academic use. Payne Hall, with 270 beds, had been constructed on Pritchard Quad as the first increment of replacement of beds that will be displaced with the conversion of the Upper Quad residences. Construction was underway on the Library Storage Facility. A Dorm and Dining Master Plan had been prepared, in large part to study the options and criteria by which the Upper Quad housing could be replaced. A Residence Halls

Pre-planning Study had been completed, defining a program and schematic design for replacement residences (encompassing approximately 1,000 replacement beds).

2.3.2 Six Year Capital Outlay

The University's Six Year Capital Outlay Plan serves as the programmatic basis for the Campus Master Plan Update. The Capital Outlay, encompassing the biennia 1994-96, 1996-98, and 1998-2000, represents approximately 1.9 million gross square feet of new construction on the Blacksburg Campus. The Capital Outlay Plan also includes conversions, renovation projects, site and safety improvements, however, as the Master Plan focuses primarily of siting new facilities, only those elements involving new construction are listed below in Table II-1.

Program elements in the Table are organized by the biennium in which they are to be submitted to state review agencies for possible consideration by the state legislature.

Table: II-1: Capital Outlay Plan for the Main Campus and Kentland

(New construction only. Note that capital outlay requests which are not sited on the main campus or Whitehorne-Kentland are not included in this Table).

	GSF	# Floors
Capital Outlay Projects authorized prior to 1994-96		
University Services Building	80,000 GSF	4
College Avenue Parking Deck (500 spaces)	180,000 GSF	4
1994-96 Biennium Educational & General (E&G)		
Student Health and Fitness Center	139,624 GSF	2
Four Student Residence Halls	325,000 GSF	3-4
Dining Hall	27,500 GSF	1-2
Special Purpose Housing-Phase III (Maximum of 15 houses)	150,000 GSF	2
1996-98 Biennium E&G		
Upper Quad Additions	31,400 GSF	3
Library Infill	45,500 GSF	3
Chemistry/Physics: Phase II	101,500 GSF	3
Creative Arts Center: Phase I	85,500 GSF	2
Cook/Chill System	6,600 GSF	1
Undergraduate Classroom Facility	80,120 GSF	3-4*
Veterinary Medicine Addition	7,600 GSF	1**
Multipurpose Livestock Arena	68,200 GSF	1
Creative Arts Parking Deck (500 cars)	180,000 GSF	3
Faculty Club	20,000 GSF	1-2
1996-98 Biennium (Research)		
Agriculture & Forestry Research Facility	101,667 GSF	4-5
Food Processing Pilot Plant	10,000 GSF	1
1998-2000 Biennium E&G		
Engineering Technology Center	86,500 GSF	3
Other Projects (not included in the Capital Outlay)		
Stanger Street Parking Deck (500 cars)	180,000 GSF	5
Kentland		
General Purpose Facility	13,000 GSF	1
Repair Facility	9,600 GSF	1
Total	***1,929,311 GSF***	

**Note: Programmatic requirements and need for the Undergraduate Classroom Facility is under consideration and has not been specifically sited in the Master Plan. It could be sited at any of several expansion sites.*

***Note: The program requirements for the Veterinary Medicine Addition are under review. It may be accommodated as new construction at the main Veterirnary Medicine Complex, and/or ressignment of space at the Price's Fork Road location. It has not been specifically sited in the Master Plan.*

2.3.3 Description of Program Elements

Each of the program elements identified in Table II-1 are described below.

University Services Building

This facility will house University support functions currently located in Burruss Hall, elsewhere on campus, and in leased space.

Parking Garage (College Avenue)

Approved prior to the 1994-96 biennium, this 500 car garage will provide additional spaces in the underserved Donaldson-Brown Hotel and Conference Center and downtown area. Construction of the garage may be a joint effort between the Town of Blacksburg and the University with 140 spaces being designated for Town use.

Student Health and Fitness Center

The health component of the center is to become the new home for University Health Services and Counselling Services. It will include office, record keeping, examination rooms, and other support spaces currently located in Henderson Hall.

The fitness component will accommodate the University's intramural team, dual sport, aquatic, and individual fitness activities. The program includes a multi-court gymnasium, fitness rooms, equipment storage/locker rooms, fitness center/lounge, aquatics center and administrative support areas.

Residence Halls

As part of the integrated space plan, the dormitories located on the Upper Quad are proposed for conversion to academic, classroom, office and research space. Consequently, approximately 1,400 beds will be displaced. Several independent residence halls have been programmed to replace approximately 1,000 of these displaced beds. A dormitory master plan independent of this study is considering further the program mix and phasing of the proposed residence halls.

Dining Hall

This facility is intended to replace the Shultz Dining Hall which will be displaced as part of the Upper Quad Conversion.

Special Purpose Housing Area: Phase III

It is proposed that additional campus land be leased to University fraternities and sororities for the development of group houses in this area of the campus. Phase III proposes up to 15 additional houses be constructed each with a capacity of approximately 35 students.

Upper Quad Additions

As part of the Upper Quad conversion, small additions containing vertical circulation, lobby and lecture/seminar spaces will be added to Brodie, Rasche and Shanks.

Library Infill

The proposed library infill program includes microfilm storage and reading room; student/faculty study center (24 hour access); multimedia classroom; library instructional services laboratory; viewing room; faculty offices; group study/research rooms; graduate study carrels; adaptive technology lab for persons with disabilities; and general reading space.

Chemistry/Physics: Phase II

The proposed Chemistry/Physics buildings are intended to accommodate research and undergraduate programs currently housed in inadequate and unsafe facilities in Davidson Hall and Robeson Hall or remotely located in Derring Hall. The program includes class laboratories; classrooms; non-class laboratories; office space; general use; physics service and research. A Pre-planning study has been completed for this project

Creative Arts Center

The Creative Arts Center will contain a major performance space, rehearsal spaces, exhibition and experimental spaces, and will bring together within one facility the instructional, research, public service, and support programs of the visual arts, the performing arts, and various media endeavors. Phase I of the Center will include a major theater for instrumental and choral concerts and an art gallery. The program includes a 1,400 seat theater lobbies and public areas; theater production and support areas; art gallery; gallery support, and administrative areas.

Cook Chill Facility

The Cook Chill Facility will provide space for the advanced preparation and storage of food under refrigeration for distribution to dining facilities throughout the campus. Centralized operations and advance preparation are intended to cut food waste and increase the productivity of food service employees. The proposed facility entails retrofitting and additions to the Southgate Food Processing Facility.

Undergraduate Technology-based Classroom Facility

Currently the University lacks classrooms that can accommodate the evolving trend toward larger average class sizes and technically sophisticated teaching methods. This proposed facility will provide large capacity classrooms and will integrate the technology and equipment necessary for changing and expanded teaching methods. The facility is intended to serve all nine colleges of the University.

Veterinary Medicine Additions

This facility includes teaching, research, and support space for the College of Veterinary Medicine. (It will possibly be accommodated in renovated space).

Multipurpose Livestock Arena

This facility is intended to provide space to teach livestock laboratory classes and hold livestock events, judging contests and field days. Currently no arena exists.

Parking Garage (Creative Arts Center)

Proposed in conjunction with the Creative Arts Center, this 500 space garage will provide parking for events during evenings and on weekends, and provide spaces for faculty and staff relocated to the Upper Quad as a result of the proposed conversion from residential to academic uses.

Faculty Club

Intended to serve faculty and staff members who interface with the public such as University Development, Virginia Tech Foundation, and Alumni Association, this facility will include dining facilities and a central reception area for receiving guests.

Agriculture and Forestry Research Facility

This facility will provide new state-of-the-art laboratories necessary to further the core research in emerging technologies in Agriculture and Forestry. It will include office space, laboratory, and laboratory support areas.

Food Processing Pilot Plant

Proposed as an addition to the Food Science Building, this facility will house a modern muscle foods lab. It is to include a state-of-the-art pilot plant equipment and support laboratories to meet current and future needs. The current processing plant will be renovated to support teaching, research, and extension activities.

Engineering Technology Center

This facility will allow for the consolidation of the Engineering Departments and will move College of Engineering space allocations toward conformance with the SCHEV Guidelines. The facility will include offices; teaching and research labs (including television teaching network labs); and, associated support spaces for the College of Engineering.

Parking Garage (Stanger Street)

Provided as an alternative for relocating parking displaced by infill development in the academic core, and for providing additional parking to meet projected increases in demand, this facility is planned to accommodate 500 cars.

Kentland General Purpose Facility

Incorporating classroom/conference space, general use laboratories, walk-in cold room, refrigerated seed storage, seed treatment lab, plant preparation lab, soil lab/prep room, and support spaces, this facility is intended to provide academic and research space currently unavailable at Kentland.

Kentland Equipment Repair Facility

This facility will include a mechanical shop, equipment repair areas and storage spaces necessary to support the Kentland Farm operations.

CHAPTER 3.0

FRAMEWORK FOR CAMPUS DEVELOPMENT

3.0 FRAMEWORK FOR CAMPUS DEVELOPMENT

3.1.0 Background: The 1983 Plan

The 1994 Master Plan for Virginia Polytechnic Institute and State University is, among other things, an update of the 1983-1993 Master Plan: Concepts, Data, and Strategies for Implementation prepared by the Office of the University Architect in 1983. It is instructive to summarize the essential elements of the 1983 plan and the extent to which those concepts continue to be applicable as a framework for the 1994 Master Plan.

The 1983 Plan concentrated largely on the core area of the campus as generally defined by Main Street, Price's Fork Road, the Dairy and Poultry complexes south of Southgate Drive, and a line just to the west of the College of Veterinary Medicine. The plan did not encompass the campus lands on either side of the Route 460 By-pass or south toward the Virginia Tech Corporate Research Center. The emphasis of the Plan was on the location and organization of open spaces, building sites, circulation, utilities and land uses within the area described above. As such, the Plan was a clear and cogent statement for continuing to concentrate development of an integrated area that reinforces the established order of the campus. The concept of infill was an essential building block of the 1983 Plan calling for the placement of new buildings on interstitial sites within the established development fabric so positioned and designed as to shape new, more intimate open spaces. The 1983 Plan also promulgated the presentation, landscape and upgrading of major campus open spaces, notably the Mall, the Drill Field and the Duck Pond area. The Plan projected the improvement of areas at the campus edges and entries in order to convey a better arrival experience. The implementation of the above elements of the 1983 Plan has, thus far, resulted in not only a relatively efficient, land-conserving development pattern, but also an urban design framework which is more unified and reflective of the traditional qualities of the Virginia Tech campus.

3.1.1 Response to the 1983 Plan

The 1994 Master Plan embraces the infill concept set forth in the 1983 plan as a way of continuing to shape and unify the spatial order of the campus, and as a way of achieving more effective utilization of the land and maintaining walkable distances. The Master Plan advances the infill concept with the articulation of the architectural and landscape architectural guidelines for design and placement of future buildings and site improvements. The 1994 Master Plan expands on the 1983 ideas of open space enhancement for important spaces such as the Mall, Drill Field and Duck Pond area by emphasizing the continuity of those spaces and their function as the central, open space system for the campus as a whole. The continuity of these spaces are maintained in the Master Plan while recognizing their distinctiveness (particularly of the Mall). The 1994 Master Plan also advances the 1983 notion of improving campus edges and entries, but in a broader context than was defined in the 1983 Plan. The 1994 Master Plan, described in greater detail below, seeks to reintroduce a native landscape pattern that ties the campus to the larger regional environment.

The most significant conceptual departures that the Master Plan makes from the 1983 Plan lie largely in the expanded context of the plan which encompasses all of the contiguous University properties to and beyond the Route 460 By-pass. The 1994 Master Plan also considers related regional developments such as the proposed cross campus connector, the Airport and the Virginia Tech Corporate Research Center. Consequently, greater emphasis is given in this plan to matters pertaining to regional land use, circulation, open space and infrastructure than was portrayed in the more limited geographical focus of the 1983 Plan. A second contextual variation from the 1983 Plan is the extent to which the current plan represents a more intensive linkage between the campus and downtown Blacksburg through proposed new facilities, programs and site improvements. The 1994 Master Plan also is quite distinct from the 1983 Plan in its emphasis on the siting of specific facilities program designed to accommodate a targeted enrollment level of 25,000 students. While the 1983 Plan established coherent structure for campus development, it was not based on the accommodation or impacts of a defined program.

3.2.0 Major Determinants of the 1994 Plan

In addition to the framework set by the 1983 Plan, there are other major determinants of the current plan described herein. Not the least of the determinants is the established spatial structure and organization of the campus as manifested in the natural terrain, the landscape and the man-made development fabric. Among those factors are the following:

- Ridges and Valleys: The campus is laid out in accordance with a well-defined pattern of ridges and valleys. The central "valley" is the Stroubles Creek drainage basin in which the Drill Field and the Duck Pond are located. The basin, which is largely an open landscaped area, is flanked on the north and the south by ridges on which much of the core campus development has taken place. The ridge to the north accommodates the academic core zone from West Campus Drive to Main Street. The ridge to the south encompasses the bulk of the University's residential and athletic/recreational facilities as well as several academic facilities, principally the College of Agriculture and Life Sciences and the College of Veterinary Medicine. The valleys, or drainage basins, north and south of the two ridges converge on the Stroubles Creek basin west of the campus core, further accentuating the ridges as the predominant land forms of the campus. The 1994 plan reinforces the pattern of development and infill on the ridge areas and maintenance of the open space environment (park-like open land, play fields and agricultural fields) in the valley areas.

- Town Fabric: The campus and the Town of Blacksburg come together in a relatively seamless way in the downtown area along streets such as College Avenue, Otey Street, Main Street and Stranger Street. That is, the scale, texture and intensity of devel-

opment in these areas is such that the campus and town blend with and complement one another. The “town edge” affords a diverse and energetic environment for retail, food service, residential and entertainment activity that lends to the life of the campus. For those reasons, it is an environment that should be protected and strengthened. The 1994 Master Plan calls for program infill and urban design improvements that will add to the vitality and amenities on the downtown side of the campus. Not the least of the changes envisioned for the area is the strengthening of the Mall with new facilities at its edges. In support of further downtown/college development, the need for a more detailed precinct plan of the Architecture Annex area has been identified. Specifically, it is recommended that this area be further studied to determine the type and scale of uses that would benefit both the Town of Blacksburg and University. The Architecture Annex area could, for instance, be considered for the development of facilities which would benefit from its location on the Town/Campus boundary (such as the expansion or relocation of the Donaldson Brown Hotel and Conference Center).

- Quadrangles and Courtyards: The Virginia Tech campus is organized as an interconnected system of quadrangles and courtyards following the traditional Oxford model that many American institutions have adopted. By and large, it has been carried out to exceptionally good effect, creating a variety of large and small contained spaces that are human in scale, often connected in delightful ways. Some areas are less successful in this regard. Pritchard Quad is somewhat overscaled and many spaces, such as that between Derring and Pamplin, are dominated by automobiles. Nonetheless, the system of pedestrian spaces (or, more pertinently, the policy of siting buildings to shape such spaces) is an appropriate framework that lends to the unity and amenity of the campus. The 1994 Master Plan emphasizes the creation of new quadrangles and courtyards and the enhancement of existing ones by building, siting and landscape improvements.

The over-arching conclusion of the Master Plan, based on the determinants summarized above, is that the next generation of campus development should continue to be concentrated in and around the core area. There is adequate land to accommodate the program needs of the campus through prudently designed infill which not only utilizes the land resources effectively but also improves the sense of amenity and spatial order. At the same time, the preservation and enhancement of surrounding open lands buttresses the relationship to the regional landscape and avoids wasteful sprawl of campus facilities.

3.3.0 Plan Framework for the 21st Century

The 1994 Master Plan framework for the 21st century rests on two complementary themes: continued concentration of development in the core and enhancement of the open rural environment at the periphery of the core area (See Figure III-4 for framework planning concepts).

3.3.1 Maintaining the Village/Countryside Balance

The two themes of the Master Plan framework reflect the two distinct, contrasting landscapes of Virginia Tech which consists of an active and coherent "village" atmosphere at its core, surrounded by an agricultural greenbelt. The two landscapes echo an important characteristic of the University as an institution, which is its role as a place where research and instruction in advanced technology is coupled with its tradition as a land grant campus. The Master Plan is thus predicated on maintenance of the "village/countryside balance" as an essential expression of what the Virginia Tech campus should be in the 21st century. Maintaining this balance also supports the ecological goals of developing educational opportunities in the campus environment by maintaining agricultural and forest land; by more efficiently utilizing campus land; and, is consistent with the goal of enhancing air, water, soil, vegetation and wildlife habitats.

3.3.2 Core/Village Development

The bulk of program development for the Six-Year Capital Outlay Plan (1994-2000) and other projects envisioned by the University (See Chapter 2) will be accommodated in the core area of the campus generally defined by Washington Street, West Campus Drive, Perry Street and downtown Blacksburg. The concentration of development within the core area is intended to accomplish the following ends:

- Reinforce the campus core as an active, lively "village" environment.
- Continue the development of pedestrian-scaled quadrangles and courtyards by siting new buildings on infill locations or at the edges of open spaces.
- Maintain reasonable walking distances within the academic area, between the academic and residential areas, and between the campus and downtown.
- Minimize the need for extension of utilities.
- Avoid sprawl and utilize the land resource efficiently.
- Utilize sustainable development practices to reduce the energy consumed by buildings, by maintenance practices, and by transportation related to campus activity.

The siting of the proposed development program reflects the analysis that there is adequate capacity to accommodate the 1.9 million square foot program within the core in a way that strengthens the established spatial organization and improves the connections between the various precincts within the campus core. This will be accomplished by siting future buildings in such a way as to complete existing quadrangles, create new quadrangles, and form new edges against major campus open spaces such as the Mall and the Drill Field. The location of facilities also reinforces existing land use patterns for academic, residential and service uses (See Figure III-1).

The concentration of program development within the core area will allow for the retention of suitable walking distances between major campus destinations. Most of the proposed new academic facilities will be located within the 10-minute academic class change zone defined by West Campus Drive, Perry Street, the Library and the north end of the Agriculture Quad. Residential facilities, except those to be sited in the Special Purpose Housing area west of the Golf Course, will be located in or near established student housing areas. The proposed Creative Arts Center will be located north of the Mall at the junction between the academic zone and downtown, and the Student Health & Fitness Center will be located on the south side of Washington Street within ten minutes "walking" distance of most of the on-campus student residences (See Figure I-8).

The principal consequence of focussing development within the core (and of making the attendant improvements in the pedestrian/open space environment) will be the displacement of surface parking in the core area. Up to 1,200 parking spaces will be preempted if all of the proposed facilities are constructed. While some of the displaced spaces can be accommodated in peripheral lots, the expected parking demand and the land limitations are such that structure parking will need to be provided on the east end of the campus adjacent to downtown Blacksburg in any event. Refer to Chapter 4 for an elaboration of the strategies for the location of structure parking.

A fundamental aspect of the 1994 Master Plan is the preservation and enhancement of the major and secondary open space system around which the core is organized. The open space system will continue to complement the areas of more intensive development providing visual contrast and order as the campus becomes more urbanized. The primary open space system will be the sequence consisting of the Mall, the Drill Field and the Duck Pond area, which will continue to provide vistas into and out of the campus as well as a rich variety of memorable spatial experiences. Existing secondary quads and courtyards will be retained and augmented by the placement of proposed buildings.

3.3.3 Countryside/Greenbelt

The agricultural and pastoral landscape between the Route 460 By-pass and the campus core area will be retained largely as a greenbelt linking the campus with the surrounding regional environment. Much of the existing agricultural uses will remain indefinitely. The retention of agricultural lands recognizes the practical need for support of undergraduate agricultural instruction and the long-term need for a contiguous and diverse land resource to support the land grant mission as it evolves in the future.

The Master Plan proposes to enhance and integrate the spatial experience of the campus as approached from the Southgate entry with a program of reforestation along the approaching roads and around disparately-scaled perimeter uses such as parking lots and large-scale athletic facilities. The reforestation program will consist of high-canopy native tree plantings on a naturally-mulched ground surface. In addition to the practical effect of reducing high-maintenance turf grass along campus roads, the reforestation program will connect existing clusters of woods at Duck Pond Park, the Smithfield Plantation and other areas at the campus periphery (See Figure III-2). The reforestation program will be implemented with full consideration of security and safety concerns as well as significant viewsheds.

The pastoral landscape at the western edge of the campus also will be enhanced by landscape improvements along the Stroubles Creek basin below the Duck Pond. The improvements will include creek edge reforestation and could include the creation of a pond and wetland by impounding an area adjacent to the creek downstream from Duck Pond Drive, possibly as an element of the stormwater management system for the basin. The effect of the Stroubles Creek improvements will be to extend westward the continuous open space system made up of the Duck Pond, Drill Field and the Mall, effectively drawing together the village/countryside aspects of the campus. The golf course remains as part of the pastoral edge of the campus, as do the play fields south of Washington Street.

The 1994 Master Plan envisions one area of new development within the greenbelt between the Route 460 By-pass and the campus core. The established Special Purpose Housing area on the northwest corner of the campus near the intersection of the Route 460 By-pass and Price's Fork Road will be expanded to include up to 440 new beds for student housing. The student housing will be built in small-scale increments similar to the Greek letter organizations already located in the area and will be arranged around a common open space. The development will displace some of the agricultural fields north of Stroubles Creek.

The 1994 Master Plan also recommends that damaged landscapes, such as the campus landfill, be considered for further land reclamation initiatives, research and demonstration projects.

The concept for campus organization and development reflected in the Master Plan is one that fundamentally reinforces established land use patterns and campus character by concentrating development in the active "village/core" of the campus and by maintaining the pastoral qualities of the campus perimeters (See Figure III-4).

3.4.0 Development Sites

The facilities program to support enrollment growth to 25,000 students will provide the impetus for campus development into the 21st century. The siting of program elements will be critical in shaping and reinforcing the spatial integrity of the campus and strengthening the connections between the various districts of the campus. This section of the Master Plan describes how the siting of each project is intended to reinforce the structure of the campus. Figure III-4 illustrates the conceptual framework for accommodating the proposed Master Plan program of facilities.

3.4.1 Near-term Projects (1994-2000)

Most of the near-term program elements described in Chapter 2 are proposed to be located in the core area of the campus on sites that are in close proximity to uses or functions of a similar nature. Certain proposed program elements occupy locations that are relatively fixed because the program is an addition to an existing facility or because there is a functional linkage with nearby facilities. Such "fixed" locations are noted in the site descriptions below which are listed in the approximate sequence in which the program elements currently are anticipated to be developed (See Figure III-1):

Buildings Under Construction

The following projects were under construction at this writing, and are indicated in the accompanying plan diagrams as existing buildings:

- Biotechnology (between Seitz and Engel)
- Major Williams Conversion (Upper Quad)
- Library Storage Facility (north of Airport)
- Fiber Optics Research Laboratory (Plantation Road)
- Airport Terminal Building

Buildings Approved for Construction

The following projects at this writing had received approval to proceed with design and construction:

- New Engineering Building (east of Whittemore—construction to begin early in 95).

- Architecture Addition: New space for architecture will be constructed north of Burruss Hall on two levels below the grade of Cowgill Plaza.

Approved Six Year Capital Outlay Projects

The following are other Capital Outlay projects approved prior to the current 1994-2000 Capital Outlay Planning period:

- University Services Building: an office building to accommodate the consolidation of various administrative and student service functions is proposed for a location on the south side of College Avenue adjacent to the parking structure described above. The facility will be designed for offices with high-volume direct services to students on the street level and will include an inviting entry plaza at the corner of College and Otey diagonally across from Squires. The ground floor will be above the Stroubles Creek floodplain.

- College Avenue/Otey Street Parking Structure: The parking structure for 500 cars is proposed for the existing Donaldson Brown parking lot site at College Avenue and Otey Street. The site is set back from College Avenue by 60 feet to retain a site for the University Services Building. The structure will serve multiple needs including that of Donaldson Brown Center, Squires Student Center, the proposed Student Services Building and additional parking for businesses in downtown Blacksburg, as well as staff/faculty parking for the east end of the campus. The ground floor level will be designed with the recognition that it may be flooded occasionally due to its location in the upper Stroubles Creek floodplain. Parking is a permitted use in such circumstances.

1994-2000 Approved Capital Outlay and Other Anticipated Projects

The following projects for the planning period 1994-2000 have been approved by the state and sited as described below:

- Student Health and Fitness Center: The Student Health and Fitness Center, currently under design, will be located on a site south of Washington Street at the end of West Campus Drive. The facility is intended to become a campus landmark, anchoring the residential environment of south campus and forming an active link to the recreation and athletic fields south of Washington Street. The facility is configured to form a physical connector with the Rector Field House and to frame a new all-purpose playing field on axis with Lane Stadium.

- Two Residence Halls (on the Mall): Two resident halls will be sited parallel to and on the north side of the Mall. The buildings will be positioned to flank a formal entry passage to the Upper Quad symmetrical with Lane Hall at the top of the slope. The ground floor of the residence halls, accommodating common use spaces and resident office space, will present an active face to the

Mall, complementing Squires. The location will enable the retention of 24-hour residential vitality in the northeast sector of the campus as the Upper Quad is converted to academic use.

1994-2000 Capital Outlay and Other Anticipated Projects

The following projects have not yet been approved or funded for construction. They are sited in the Master Plan as described below:

- Two Residence Halls (at Pritchard Quad): Two residence halls will be positioned in Pritchard Quad so as to form two quads, one north of the new residence halls and one to the south. The resident halls will replace beds displaced by the Upper Quad conversion.

- Special Purpose Housing: The Master Plan accommodates 15 building sites of a scale that replicate the existing Greek letter houses in the area, arranged on a ring road configuration that also forms a common open space for the housing on the site.

- Balance of Upper Quad Conversion: six halls (including Major Williams) will be converted from residential to academic use for Education and Arts & Sciences at such time that the replacement housing described above is available for occupancy. As with the Major Williams project, the sites are fixed. Additions for lobbies, vertical circulation and special instruction space will be made.

- Dining Hall: Intended to replace dining space displaced by the conversion of Shultz Hall, this facility has not been located in the Master Plan pending other programmatic decisions. A potential location has been identified on the first floor of the proposed Mall residence halls.

- Library Infill: The Library infill project will be sited in a “bridge” structure over the Mall, linking the existing Newman Library and other common functions of the Mall with the academic core to the north. The location will reinforce the Library as a centerpiece of the University, creating a dramatic “portal” into the campus and strengthening the physical ties with academic and research functions.

- Chemistry-Physics Phase II: The Chemistry-Physics complex will be developed in two increments on sites north and east of Davidson and Robeson Halls. This site is fixed by virtue of the functional linkages that must be maintained with Davidson. The proposed siting solution is conceived to make the buildings part of an integrated ensemble with the other building on the northwest corner of the Drill Field such that they will appear as facets of a single building framing this important corner.

- Creative Arts Center: The proposed Creative Arts Center, which will contain 1,400 seat performance space an art gallery, will be located to the north of the intersection of the Mall and Main Street where it will offer high visibility and activity for the downtown Blacksburg connection to the campus. The second phase of the project will include the conversion of the Shultz Dining Hall to art instruction and studio space. The project, which is in preliminary design at this writing, will act as an anchor for the academic area because of its instructional functions. It will be linked to the academic zone by the converted Upper Quad complex and will maintain an affinity with arts spaces in Squires and Henderson.

- Parking Garage: A proposed parking structure associated with the development of the Creative Arts Center will be located at the southwest corner of Main Street and Turner Street. The 500 space facility will serve increased staff/faculty demand operative by the conversion of the Upper Quad, as well as accommodate events taking place at the Creative Arts Center. The prominent location of this facility along Main Street requires careful architectural design and programming to ensure that it forms an appropriate campus edge and contributes to the pedestrian life of Main Street (Ideally commercial uses could be located on the street level of this structure).

- Cook/Chill Facility: This proposed food preparation facility will be located adjacent to the existing food processing facility east of Lane Stadium. The site is fixed due to the functional relationship between the facilities.

- Undergraduate Classroom Facility: Listed in the Capital Outlay for 1996-98, this project has not been specifically sited in the Master Plan pending a determination of whether it should be constructed as proposed. Should the project receive approval, it will be located on one of the future academic sites identified in the core.

- Veterinary Medicine Addition: At this writing, program options for the Veterinary Medicine Additions were being reviewed. Additions (and/or reassignment of space) at the main complex on Duck Pond Drive as well as a the satellite facilities on Price's Fork Road near the Golf Course are being considered.

- Multipurpose Livestock Arena: The Arena will be located on Plantation Road where livestock can be readily transported to the facility and where there is adequate access and space for parking during livestock events and field days.

- Faculty Club: There are several options for the location of a future faculty club, including new space on the Mall or in or near the Architecture Annex. A specific site will be determined based on further refinements of budget and program requirements unidentified at this writing.

- Agriculture and Forestry Research Facility: The facility will be located on site between Cheatham and Seitz, where it will provide a programmatic bridge for research activity in Agriculture and Forestry and define a new quadrangle.

- Food Processing Pilot Plant: This project involves an addition to the Food Science and Technology Building.

- Engineering Technology Center: The site proposed for the Engineering Technology Center is north of and parallel to Turner Street effectively extending the existing engineering complex eastward to form, with the New Engineering Building (under design at this writing), a future Engineering Quad.

- Visitor Center: A new facility is proposed adjacent to the Virginia Tech Golf Course at the intersection of Price's Fork Road and West Campus Drive to provide orientation and parking information for first-time visitors to the campus.

- Whitethorne-Kentland Phase I and II: Improvements at the Whitethorne-Kentland Farm west of the main campus will include a general purpose facility including classroom-conference, office, laboratory and support space, and an equipment repair facility. The primary facilities will be sited as part of a "farmstead" complex in the vicinity of the existing historic farm house in the center of the Whitethorne-Kentland property.

3.4.2 Guidelines for Future Development Site Selection

Several expansion sites are identified in the core and peripheral areas of the campus for the accommodation of future facilities beyond those identified in the Six Year Capital Outlay Plan (1994-2000) (See Figure III-1). To ensure that the uses and design expression for development on these sites support the Master Plan goals and objectives, guidelines for matching sites with proposed uses are provided. The guidelines are organized into six categories: environmental, functional, campus form, socio-cultural, circulation/parking, and infrastructure.

Environmental

The topography, drainage patterns and soil conditions of a site should be considered in relation to the geometry and footprint area required for a proposed facility. In no case should buildings be sited such that they obstruct drainage patterns.

Solar access to a site should be analyzed to coordinate appropriate building orientations with urban design and landscape concepts as well as surrounding facilities (shade, shadow).

Prevailing winds should be analyzed to ascertain how proposed facilities should be configured to provide shelter and to ensure that the proposed facility does not negatively impact the wind conditions around adjacent facilities.

Existing trees and shrubs on a site should be analyzed for their aesthetic contribution to the site, to the surrounding context, and in terms of the mircro-climatic conditions they establish.

Functional

The uses proposed for future development sites should be supportive and compatible with those in the surrounding context. This guideline is intended to establish synergies that are supportive of campus programs and to ensure that operational efficiencies are achieved.

The walking distances and times between a proposed use and other facilities/affinities should be considered in the site selection process, especially for academic facilities which must be sited to respond to the ten minute class change interval.

The affinities of a proposed use should be considered in the site selection process.

Impacts on surrounding facilities such as noise, air quality, service frequency, hours of operation, etc., should be considered in the site selection process.

Campus Form

Sites should be developed in accordance with the planning concepts identified in Figure III-4. Proposed development should establish architectural and landscape edges, entry points, provide views to the surrounding regional landscape or significant campus architectural landmarks, and define new campus spaces (quadrangles), or further define existing quadrangles or spaces such as the Mall.

Sites and proposed facilities should be analyzed to determine their importance as landmarks on the campus.

Views to and from a site should be analyzed to ensure that they are acknowledged in the design of the proposed facility.

Sites should be analyzed in terms of their importance to the interface of campus land uses and adjacent town land uses and how proposed facilities will provide an appropriate transition.

Socio-cultural

Uses proposed for a particular site should be assessed for their overall contribution to the collegiality of the campus, i.e., in terms of their contribution to the activity and life in the surrounding precinct/space. This guideline is intended to ensure that the campus development provides spaces for social interaction and to ensure that the campus remains a lively place for learning.

Activities which are 24 hour in nature should be sited to contribute to the life and safety of a particular campus area.

The archeological, historic and symbolic resources of a site should be considered in relation to the proposed use to ensure that such resources are not negatively impacted by the development.

Circulation and Parking

The vehicular (including bicycle) and pedestrian access necessary to serve a proposed facility should be considered in relation to adjacent sites and land uses noting how the facility may impact circulation patterns in the area as a whole.

The parking requirements for a proposed facility should be analyzed in relation to the parking supply available within a five to ten minute walk to the site.

Service requirements for a proposed use should be considered in relation to the degree and type of access possible to the site.

Changes to the overall circulation patterns of the campus as a result of the development of a particular use on a site should be considered.

Access for persons with disabilities should be considered for the site itself and the relation of the site to the accessible routes and parking areas serving the site.

Infrastructure

The estimated loads for the proposed use should be analyzed in relation to the capacity of the infrastructure and physical plants serving the site. Proposed facilities should also be coordinated with the alignment of major trunk lines and utility corridors.

3.5.0 Future Growth Strategy

The concept for future campus growth, beyond the accommodation of the Near Term Program for the Six Year Capital Outlay and other related projects, consists of selective infill in the core area north and south of the Drill Field and of expansion northward into the B Lot. The strategy would accommodate up to 700,000 gross square feet. While more space is pro-

grammed than is required at this time, several sites are recommended to be earmarked for particular uses at such time as demand requires. Among such specified sites are the following (See Figure III-3):

- Future Residential Halls: The northeast corner of West Campus Drive and Washington Street should be reserved for a future resident hall group. The site should be configured so as to form a new quadrangle that spatially connects the residential area with the Student Health and Fitness Center and the recreation fields south of Washington Street.

- Stanger Street Parking Garage: In the event that the University decides to replace parking displaced by future development on the north side of campus with a parking structure, a 500 space facility is recommended at the intersection of Perry and Stanger Streets. (Note shuttle lots and demand reduction strategies are alternatives identified in Chapter 4).

- Future Academic/Research Space: Sites for future academic and research facilities are indicated in prominent infill locations north of Derring, in the B Lot, adjacent to the New Engineering Building and proposed Engineering Technology Center, and on the east end of the Drill Field (as an extension of the proposed library addition). The sites adjacent to and in the B lot area straddle major storm water and sanitary lines as well as a flood area. The development of the area will have to be pre-planned in conjunction with improvements and realignments of the drainage and sanitary system to avoid conflicts. Nonetheless, the proximity of the area to the academic science and engineering core facilities is such that it should be regarded as a critical academic reserve area (See Figure I-8). Other expansion sites identified in the plan include the area west of Price Hall in the Agricultural Quad and the site of the Architecture Annex. Development of the Architectural Annex site requires a concentrated precinct study to determine new programmatic uses appropriate for the site. For example, the site could possibly be used for expansion of the Donaldson Brown Hotel and Conference Center.

The long-term scenario for campus growth beyond the accommodation of building sites, envisions that development should continue to occupy the ridges north and south of the Drill Field while the Stroubles Creek basin would remain and is to be enhanced as a park-like open space corridor for the University. Thus, the upper area of the golf course eventually may be developed, as might the area north and west of Litton-Reaves and Wallace. Such a strategy for very long-term growth is put forth principally to define zones of development versus areas that should be set aside as permanent open space. Development of the peripheral areas is not advocated until or unless there is a future imperative for their use (See Figure III-3).

3.6.0 External Development Factors

The long term development pattern of the Virginia Tech Campus will be strongly influenced by several external factors, any one of which could significantly affect the shape of the campus. Among those influencing factors are the proposed Cross Campus Connector, future airport expansion, expansion of the Corporate Research Center and the possibility that the Route 460 By-pass could become a leg of a prospective Interstate Highway 73. A summary of these factors and Master Plan positions are discussed below.

3.6.1 Cross Campus Connector

The highest priority highway project for the Town of Blacksburg is the development of a cross campus connector road that would extend Southgate Drive east to connect with South Main Street in Blacksburg and west to serve future development beyond the Route 460 By-pass (See Figure IV-11). A new grade separated interchange is also proposed in conjunction with the roadway at the intersection of the 460 By-pass and Southgate Drive.

The University's Board of Visitors adopted a resolution in 1990 that would allow for such a road corridor provided that:

- the impact to University property and programs is minimized;
- proper pedestrian access by overpass/underpass to University property on either side of any new roads is provided at no cost to the University;
- construction of a grade-separated interchange where the roadway intersects the 460 By-pass is completed;
- Southgate Drive is closed at the point where it crosses the eastern boundary of the present campus;
- a link to development areas in the western part of Blacksburg and Montgomery County is established; and,
- the roadway is constructed as one single project.

The Town has stated that the road is needed to provide access to the University; to link existing and proposed development areas in east Blacksburg with those on the west in the Hethwood area; and to provide convenient access from east Blacksburg to the 460 By-pass. Such a roadway could have a growth-inducing effect which could in turn significantly impact the campus, particularly if it were to generate traffic volumes comparable to those on Price's Fork Road.

In the event that plans for the proposed connector road are implemented, it is recommended that its alignment follow existing Southgate Drive from the 460 By-pass, turning south along the western boundary of the German Club property, following the northern edge of the Airport to connect to Hubbard Street. This issue is discussed further in Chapter 4.

3.6.2 Airport Expansion

A study to determine the implications of future expansion of the airport was undertaken concurrently with the preparation of this Master Plan.

Based on the runway extension delineated in the Airport Master Plan, the following impacts are noted. First, it would require the realignment of Tech Center Drive (the existing alignment could be maintained provided it was, at great expense, placed in a tunnel beneath the runway). Second, it would require relocation of Dairy Complex facilities. Third, it could require the relocation of the seismograph. And fourth, the terrain requires considerable fill to construct the runway extension at the same level as the existing runway (See Figure III-3).

Further study of these impacts is documented in the Airport Master Plan. These impacts not withstanding, the land use portion of this campus Master Plan recognizes the need to preserve adequate land area to accommodate the proposed expansion of the airport. It is important that the area delineated for the airport expansion remain agricultural land (or other compatible uses) until the expansion occurs. The Airport Master Plan seeks to maintain land for the future expansion of the runway in the six to ten year time frame.

3.6.3 Virginia Tech Corporate Research Center

The Virginia Tech Corporate Research Center (VTCRC) is located west of the airport. The site is not accessible directly from the Route 460 By-pass, but is linked by way of Tech Center Drive which intersects with Southgate Drive on the south end of the campus. Although there appears to be ample land to accommodate growth of the VTCRC beyond the turn of the century, the complex ultimately may require land for long range growth. The direction identified for the growth would be north and west, into the area currently utilized by the College of Agriculture for crop and pasture land. Such expansion is predicated upon replacement of agricultural land uses elsewhere. Of equal importance would be the ability of the University to maintain the “pastoral” entry environment to the campus at Southgate. Should the VTCRC ultimately expand toward Southgate, it will be critical for the University to retain broad setbacks and native landscape edges so that development does not intrude on the character of the campus perimeter (See Figure III-3).

Long-term plans to direct VTCRC growth toward Southgate Drive will be limited by the preservation of the land adjacent to the Dairy Complex for future expansion of the Airport.

3.6.4 Interstate 73 Corridor

Various corridor alignments were at this writing being studied for the proposed Interstate Highway 73 between Michigan and South Carolina. Among the options being studied, is a corridor that would incorporate the

460 By-pass through Blacksburg. Such an option would improve accessibility to Blacksburg and would spur economic development in the region. There would, however, be an impact on the campus created by greater traffic and its attendant environmental effects on campus land uses adjacent to the highway, and by the growth-inducing pressures on surrounding land. The overall campus environment would be subjected to increased traffic, noise and air pollution.

CHAPTER 4.0

CIRCULATION AND PARKING

4.0 CIRCULATION AND PARKING

4.1.0 Introduction

This chapter reviews the existing and proposed conditions of the campus pedestrian circulation routes, wheelchair accessible routes, bicycle circulation system, campus access routes, public transportation services, vehicular circulation system, and parking supply and demand. It also provides recommendations for long-term circulation and parking improvements.

4.2.0 Pedestrian Circulation System

The primary goal of the 1983 Master Plan, with regard to pedestrian circulation, was to foster safety and convenience and to provide barrier-free circulation routes for persons with disabilities. In support of this goal, the Master Plan identified three strategies for organizing campus pedestrian routes: prioritization, separation and integration. Prioritization involved the designation of a primary pedestrian and accessible circulation route hierarchy, taking into account pedestrian/vehicular conflicts in the system. The second strategy involved the separation of pedestrian routes from other forms of circulation, especially bicycles. Integration involved techniques for addressing safety concerns associated with the interface of vehicular and pedestrian circulation routes, placing particular attention on the legibility and accessibility of crosswalks. The 1983 Master Plan also sought to improve access for persons with disabilities by incorporating site improvements with new infill building projects and by providing vertical access within structures to facilitate site grade changes.

Implementation of the 1983 Master Plan's secondary goal of providing a convenient pedestrian system relied on three strategies: concentration, comfort, and accommodation. Concentration of facilities through infill development was viewed as a way to minimize walking distances between buildings. Comfort was to be provided through the provision of sheltered walkways, atriums and portals. Accommodation was addressed through the provision of amenities such as kiosks and seating at primary and secondary pedestrian nodes.

4.2.1 Existing Conditions

Since 1983 numerous improvements to the pedestrian circulation system have been completed resulting in a safer and more accessible campus. There are, however, areas in which pedestrian/vehicular conflicts have yet to be resolved.

Pedestrian vehicular conflicts are particularly problematic on West Campus Drive where numerous pedestrians cross from the academic facilities (Litton-Reaves, Wallace) and from Blacksburg Transit stops located on the west side of the road to the academic core on the east. The wide cross-section of this roadway (one travel lane in each direction with a continuous central turning lane) encourages speeding and dangerous maneuvers by motorists. Combined with the lack of proper bus turnout lanes and a central

median (pedestrian refuge area), the cross-section creates one of the most dangerous pedestrian crossings on campus. To illustrate, motorists have been observed using the central turning lane to pass buses which have stopped to unload passengers.

During class change intervals, pedestrian flow at crosswalks surrounding the Drill Field, while not particularly dangerous, inhibit the flow of vehicular traffic; a situation which is consistent with the concept of a pedestrian-oriented campus. Pedestrian/vehicular conflicts are more problematic during periods of low pedestrian traffic flow as a result of the roadway configuration and the location of crosswalks makes it difficult for motorists to see single or small groups of pedestrians.

4.2.2 Proposed Conditions

The 1994 Master Plan seeks to foster safety and convenience and provide barrier-free access by extending primary pedestrian routes; by improving the accessibility of the campus pedestrian circulation system; by expanding the bicycle pathway system (intended to minimize the bicycle/pedestrian conflicts); and by resolving key pedestrian/vehicular conflicts. The Master Plan also supports the 1983 Plan's secondary goal of siting proposed facilities in accordance with the infill development concept by siting proposed and future academic buildings within the ten minute class change interval (See Figure I-8); by identifying portals along proposed or existing circulation routes; and, by identifying opportunities for providing vertical circulation in buildings to improve site accessibility (See Figures IV-1 & IV-2).

Recommendations for addressing the safety and accessibility of the pedestrian circulation system include improvements to West Campus Drive, Drill Field Drive, Stanger Street and general improvements in pedestrian route alignments and conditions. These improvements are described below.

Recommended improvements to the pedestrian/vehicular interface on West Campus Drive include: the construction of protected bus turnout lanes positioned to encourage pedestrians to walk behind, rather than in front of buses (passing motorists cannot see passengers which cross from in front of the bus); clear demarcation of the travel lanes and crosswalks; construction of a central median with protected turning lanes; and, the installation of rumble strips to discourage speeding.

In response to pedestrian/vehicular conflicts around the Drill Field, it is recommended that crosswalks be designated by material differentiation and be made more visible to approaching motorists by removing directly adjacent parking spaces.

The pedestrian crossing at Stanger Street is to be simplified by reconfiguring the intersection as a "T" rather than a "Y". This will result in one point of pedestrian/vehicular conflict rather than the existing two.

4.3.0 Campus Accessibility

Virginia Tech has long been committed to providing access for all persons regardless of disability in the most integrated fashion possible. As an institution that receives federal funding for programs, the University has been governed by section 504 of the Rehabilitation Act since 1973, and more recently by the Americans with Disabilities Act of 1990 (ADA). As noted in Section 4.2.0, one of the primary goals of the 1983 Master Plan was to provide for an accessibility campus circulation network. That goal is primary to the 1994 Plan as well.

4.3.1 Existing Conditions

The topographic conditions which give the Virginia Tech campus its unique qualities also make it difficult to provide adequate access for persons with disabilities. Difficulties in providing access to all areas of the campus are primarily a result of the isolated plateaus which characterize the geography of the campus and organize the campus land use pattern. These plateaus are relatively flat and bounded by ridges (typically 15 to 25 feet of elevation change at slopes exceeding 1:10). In general, the academic core north of the Drill Field and residential quads south of the Drill Field are located on single yet separate plateaus. Thus, a person can typically carry out most of their daily activities within individual plateaus without having to cross ridgelines. There are, however, program and support affinities associated with the academic core which are located on separate plateaus. For example, the Newman Library is not easily accessible from the Upper Quad area. Travel between plateaus is typically accomplished via some form of vehicle, either automobile or the para transit service operated by Blacksburg Transit.

4.3.2 Proposed Conditions

Since the passage of the ADA in 1990, the University has been engaged in a review of existing facilities for compliance with the new regulation and has developed the requisite ADA Transition Plan. The Transition Plan outlines the physical changes necessary to provide access to all University programs and prioritizes site access improvements. Projects are prioritized first for improvements to travel routes within each of the plateaus, and second for travel routes connecting plateaus. Projects within a specific plateau are to be given priority over improvements which would facilitate access between plateaus because they have the potential of more positively impacting daily life. Within individual plateaus, improvements are prioritized according to major and minor route designations.

The Transition Plan outlines in detail each area that is to be upgraded to improve access for persons with disabilities. Figure IV-2, Wheelchair Accessible Routes, diagrams the existing circulation system, the barriers to access which currently exist, and proposed improvements to the system for accessibility. The general goal for providing accessible circulation is to en-

sure that the accessible routes follow as closely as possible primary pedestrian routes. Where the primary route cannot be closely paralleled, signs directing pedestrians to accessible routes are to be provided. In instances of extreme topographic changes, accessible pedestrian routes may be developed by utilizing elevators in both existing and proposed buildings. Provision of accessible routes is to be considered in the siting of proposed new facilities (See Figure IV-2).

4.4.0 Bicycle Circulation

The primary goals with regard to bicycle circulation in the 1983 Master Plan were to provide a safe and convenient bicycle circulation system, and to provide permanent secure storage areas for bicycles. To that end, the plan designated a bicycle circulation route hierarchy consisting of bicycle trails, lanes and shared roadways. Bike trails are routes located off-street, and bike lanes are routes located in designated lanes on public roads.

Since 1983, the use of bicycles as a means of transportation within the campus as well as to and from the campus has continuously grown. The 1994 Master Plan supports the bicycle circulation goals of the 1983 Plan by establishing a safe and convenient network of pathways linked with those designated by the Town of Blacksburg and Montgomery County, and by making recommendations for locating bicycle storage areas.

4.4.1 Existing Conditions

The periphery of the Virginia Tech campus is served by an extensive system of bike trails and bike lanes. The system, however, does not extend into the core campus to serve academic facilities and residential halls. Consequently, cyclists must utilize roadways and sidewalks to reach major campus destinations (See Figure IV-3).

Although numerous bike parking locations are provided, they are sometimes sited near building entries away from streets; this is a situation more common in residential zones of the campus. As a result, students often utilize sidewalks to reach parking locations, creating numerous bicycle/pedestrian conflicts.

4.4.2 Proposed Conditions

In the 1994 Master Plan, it is recommended that the existing town bikeways be further extended onto the campus to provide better access for commuters and resident students, and that minor extensions be made to the town system. It is also strongly recommended that the University encourage bicycle commuting to help reduce the demand for parking on campus (See Figure IV-4).

The following bikeways and improvements are proposed:

- Improved bikeway along Plantation Road. This is to be coordinated with proposed improvements to the 460 underpass and general improvements proposed for Smithfield/Plantation Road.
- Off-street extension of bikeway along West Campus Drive.
- Construction of a new bikeway bisecting the south campus residential quads.
- Designated on-street bikeways on Drill Field Drive, Kent Street, Stanger Street, Perry Street, Stadium Drive and the Mall.
- Extension of bikeways into the center of the academic core via routes on Turner Street and the parking lot west of the Johnston Student Center.
- Construction of off-street bikeways on the north side of Washington Street and parallel to relocated Spring Road.
- Reorganization/relocation of the bicycle parking areas so as to be directly linked to the proposed on-campus bikeways. The intention is to discourage students from riding along sidewalks to reach bike parking areas.

In densely developed areas of the campus where the construction of dedicated bikeways is not possible, it is recommended that the concept of shared pedestrian/bikeways be studied for possible application. Such routes should be clearly marked to encourage the necessary caution and restraint by both pedestrians and cyclists. The sidewalk leading from Pritchard Quad to the Drill Field east of the Memorial Gym is one possible route where shared pedestrian bikeways might be employed. Bike circulation in the north-south directions across the Drill Field also requires further study to verify if shared paths or dedicated bikeways need to be established.

4.5.0 Vehicular Circulation

The 1983 Master Plan supported a goal of vehicular safety relying on the strategies of prioritization, separation and integration. Of all of the campus circulation systems (pedestrian, bicycle, public transport) private vehicular circulation was given the lowest priority, the intent of which was to ensure that motorists deferred to pedestrians and cyclists at points of potential conflict. The strategy of separation was utilized to provide dedicated circulation routes for each of the transportation modes on campus. The interface of the various campus circulations systems was addressed through integration techniques such as changing materials at crosswalks, providing adequate sight lines and signs.

The strategies utilized in the 1983 Plan are carried forth in the 1994 Master Plan with the intent of continuing previous efforts to provide for a safe total circulation system.

4.5.1 Existing Conditions

As shown in Figure IV-5, the campus is accessible from the surrounding regional and local roadway network via the Route 460 By-pass on the west, via Price's Fork Road from the north and via Main Street from the east. In 1994, these roadways provide convenient and relatively congestion-free access to the University.

The capacity of the existing campus road network is generally adequate to meet the internal circulation needs of the University. It is characterized by predominantly two-lane discontinuous roadways, few of which provide continuous flow through the campus. Several key intersections on Southgate Drive, Tech Center Drive, Spring Road, Stadium Drive, Washington Street and West Campus Drive are closely spaced and offset from one another resulting in driver orientation and traffic safety problems (particularly for visitors), capacity limitations, and inconvenient traffic patterns/routes through the campus. While perhaps frustrating for motorists, the limitations and inconvenient traffic routes serve to help limit the amount of traffic passing through the campus.

At present, 10 intersections on and adjacent to the Virginia Tech campus operate at capacity at level of service "E" or "F" during peak hours. Level of Service (LOS), an expression of a quality driving condition, is designated in a range from "A" which provides free flow and no traffic delays to "F" which involves vehicle back-ups and traffic jam conditions. Level of Service "C", a condition of stable flow characterized by average traffic delays, is a desirable for the design of new facilities. Level of Service "D", with somewhat greater delays, may be tolerated for short periods during peak travel times. Capacity (LOS "E") represents a condition of maximum possible flow and is controlled by the alignment of the cross-section design features of a roadway or intersection.

Significant traffic congestion on the Virginia Tech campus is limited to a few intersections near concentrations of parking during the peak 30 minutes between 4:30 and 5:00 PM when faculty, staff and commuting students leave campus for the day. Of particular note, is the intersection of West Campus Drive and Price's Fork Road.

4.5.2 Recommended Roadway Improvements

Several roadway improvements are recommended in the Master Plan. Each improvement is illustrated in Figure IV-6 and described below.

- West Campus Drive: Existing traffic congestion and safety problems along West Campus Drive will be addressed through the following actions:

1) Construction of left turn lanes within a planted median to more safely separate northbound and southbound traffic, minimize the impedance of left turning vehicles to through traffic and create a refuge for pedestrians.

2) Construction of bus turnouts that will allow buses to stop without blocking traffic.

3) Location of all bus stops at the far side (to the south) of marked crosswalks, thereby encouraging passengers to cross West Campus Drive behind the bus.

4) Clearly demarcate of travel lanes and crosswalks.

5) Installation of rumble strips to discourage speeding.

6) Enforcement of posted speed limits.

It is also recommended that the University consider closing part of West Campus Drive as a possible solution to some of the pedestrian safety problems in the Hillcrest to Litton-Reaves stretch of the roadway. The University may wish to study this alternative in the future.

The siting of the Student Health and Fitness Center at the foot of West Campus Drive precludes the extension of West Campus Drive to the south and eliminates the intersection of Stadium Drive with Washington Street. This will break the continuity of the on-campus road network, requiring motorists to make multiple right and left turns to cross the campus. It will also preclude West Campus Drive from becoming more of a thoroughfare, thereby reducing vehicle/pedestrian conflicts and mitigating existing traffic operations problems.

- Special Purpose Housing: Access to and circulation around the expanded Special Purpose Housing area will be provided by a loop road at the end of Oak Lane. Two alternatives are proposed for emergency access to the area. The first involves the construction of a roadway connecting the proposed loop road to Price's Fork Road, and the second involves the construction of a road connecting the loop road with Smithfield Road. These roads will be reserved for the exclusive use of emergency vehicles.

- Duck Pond Drive: The north terminus of Duck Pond Drive consists of two 2-lane, 2-way intersections with West Campus Drive. Turning movements at these intersections are unclear, awkward and unsafe. It is recommended that Duck Pond Drive be realigned to form a single intersection with West Campus Drive directly opposite the driveway to the parking lot located south of Derring Hall.

- East West Parking Lot Road: This road will provide east-west access through the B Lot. Today, this road extends between West Campus Drive and Stanger Street. It will divert traffic generated by the B Lot from Perry Street, resulting in fewer vehicle/pedestrian conflicts and better integration of the proposed future academic building with the main campus.

- Perry Street/Stanger Street Intersection: A turning lane will be added to Perry Street as part of the construction of the New Engineering Building. This additional lane will enable buses to travel on eastbound Perry Street to turn right onto southbound Stanger Street without encroaching on through traffic northbound on Stanger Street. This is particularly important since Perry Street may become a local access and bus circulator route in the future.

- Stanger Street/Drill Field Intersection: This improvement will simplify and rationalize the Stanger Street/Drill Field Drive intersection by consolidating two access point into one access point to Drill Field Drive. It also provides greater separation between the Stanger Street intersection and the heavily-used pedestrian crosswalk.

- Spring Road Realignment: Spring Road currently intersects Southgate Drive approximately 300 feet west of Tech Center Drive. This forces motorists on Tech Center Drive to turn left onto Southgate Drive, right onto Spring Road and left or right onto Washington Street to access the main campus. Thus, the short segment of Southgate Drive between Tech Center Drive and Spring Road carries both through traffic on Southgate Drive and north-south traffic between the Virginia Tech Corporate Research Center and the main campus. This awkward offset will be eliminated by realigning Spring Road directly opposite Tech Center Drive.

4.6.0 Public Transport Routes/Stops

The Virginia Tech campus is currently served by several routes on the Blacksburg Transit system; a system which has been instrumental in reducing the overall demand for commuter parking on the campus.

4.6.1 Existing Conditions

Blacksburg Transit (BT) provides excellent bus service between all major housing concentrations in the Town and the Virginia Tech campus. The Tom's Creek, Main Street and Hethwood/Windsor Hills all routes enter the campus at the Mall, West Campus Drive and Stanger Street. In addition, there is a Special Purpose Housing on-campus shuttle. Service is generally provided from 7:00 AM to 1:00 AM, at half-hour headways. Student activity fees are used to support the BT service. Consequently, Virginia Tech students, faculty and staff ride prepaid.

Buses are routed along the Kent Street, North Drill Field Drive, West Campus Drive and Washington Street loop for on-campus circulation during the day. They are routed on South Drill Field Drive near student housing at night.

BT service is an excellent alternative to the automobile. When BT service was initiated in 1983, commuter student parking demand decreased by 37 percent according to the parking study conducted in 1988 for the University by Chance Management Advisors and Walker Parking Consultants. In the future, BT service may also provide shuttle service between campus and peripheral or remote parking lots.

4.6.2 Proposed Conditions

The Master Plan proposes no major changes to the Blacksburg Transit routes through the campus. However, should shuttle service within the campus be increased to serve remote parking areas, an analysis of the routes may be necessary. Minor adjustments to bus stops are proposed along West Campus Drive to address pedestrian/vehicular conflicts. Other bus stops may need to be relocated to better respond to campus pedestrian circulation routes and population densities as the campus precincts are developed according to the Master Plan. It is recommended that the University encourage use of BT in conjunction with other alternative transportation modes as a means of further reducing the overall demand for commuter parking.

4.7.0 Access & Wayfinding

Access to the campus from the regional and local roadway network is addressed in the Master Plan to ensure that visitors are directed to locations where they may be greeted and directed to their campus destination. The Master Plan also seeks to designate entry routes and arrival sequences that enhance the overall experience of visiting the campus.

4.7.1 Existing Conditions

There are three major approaches to the Virginia Tech campus each having its own particular character, function, and opportunities for enhancement. The first approach is the historical/formal approach via Main Street to the east end of the Mall. The second is along the 460 By-pass to Southgate Drive. The third is off Price's Fork Road into the B Lot (See Figure IV-7).

Main Street to the Mall

The approach via Main Street provides a sense of history; it leads through a potentially charming rural Virginia town; it provides glimpses of the College Avenue shops; and it provides access to the campus at a point where orientation to the campus plan is best accomplished, at the end of the Mall. (By comparison the Southgate Road approach meanders towards no particular point where visitors can easily stop and orient themselves to the core campus).

The Route 460 By-pass to Southgate Drive

Existing signs on the 460 By-pass direct visitors to the Virginia Tech Campus via Southgate Drive. Through a series of turns, access is provided to the central campus from Southgate Drive via Duck Pond Drive and West Campus Drive. This indirect path to the academic core is confusing and unclear for the first-time visitor, especially for those who do not stop at the Visitor Center on Southgate. Furthermore, this sequence is visually disjointed with views of fields, unrelated buildings and service yards.

The Price's Fork Road Approach to the North Parking Lot (B Lot)

The Price's Fork Road approach is an important functional everyday entry to the campus. While this approach offers convenient access and parking, it does not present the most positive image of the University. Buildings along this edge are the least reflective of the architectural character of the campus.

4.7.2 Proposed Conditions

It is recommended signs on the 460 By-pass be changed to direct visitors to the Price's Fork/West Campus Drive entrance where a new visitor center would be constructed. Southgate Drive would continue to serve as the entrance to the College of Veterinary Medicine, Cassell Coliseum, and Lane Stadium. A temporary sign system is suggested at this entrance for specific instructions during sporting events, freshman orientation, and other special events. At such a time that the proposed improvements and additions to the Mall have been completed, it is recommended that the University consider directing first-time visitors to the campus via South Main Street.

4.8.0 Campus Parking

The 1983 Master Plan goal, with regard to parking, called for the provision of adequate, appropriately located and effectively designed parking facilities which were safe and convenient. That Plan also supported the concept of perimeter parking with strong pedestrian access. Since that time, the University has constructed two large parking facilities in accordance with that concept, the B-Lot located north of the academic core, and the C-Lot located west of Litton Reaves and Wallace.

At present, there are a sufficient number of spaces to meet the overall parking demand, but too few spaces are available to avoid long searches for empty spaces. Due to the uneven distribution of spaces around the campus, there are significant parking deficits in the Downtown (Zone D), Upper Quad (Zone B), South Campus (Zone C), and North Campus (Zone A) areas (See Figure IV-8).

4.8.1 Existing Supply

The Virginia Tech campus currently has 12,265 on and off-street parking spaces and an effective parking supply of 11,215 spaces. Effective parking supply may be defined as 90 percent of available faculty/staff, commuter student, and visitor spaces, and 95 percent of available resident commuter spaces. Effective supply is utilized in the review of campus parking to model conditions during peak parking demand periods. To avoid long searches for parking spaces during such periods, approximately five to ten percent of the total supply must be available. As shown in Table IV-1 and Figure IV-8, the effective supply for each parking user group category is as follows: 4,280 (or 38 percent) are faculty/staff spaces, 3,753 (or 34 percent) are commuting student spaces, 2,841 (or 25 percent) are resident student spaces and 341 (or three percent) are visitor spaces.

In Table IV-1 "demand" refers to the number of parking spaces required to adequately accommodate faculty/staff, commuter students, resident students, and visitors during peak times. Demand takes into account those who are present at peak times and those who are auto drivers as opposed to passengers or transit riders. "Adjusted demand" refers to those who park on-campus as opposed to off-campus. Based on surveys conducted in 1988, approximately 97 percent of all faculty, 90 percent of all staff, 88 percent of all commuter students, 90 percent of resident students, and 100 percent of all visitors who drove to campus parked on-campus.

Adequacy refers to the difference between effective supply and adjusted demand. A negative number indicates that there are too few parking spaces to adequately accommodate demand. Conversely, a positive number indicates that there are more than enough parking spaces to adequately accommodate demand.

It should be noted that the University's parking space categories have been consolidated in the compilation of Table IV-1 and subsequent tables in this chapter. Specifically, the "general" space category, which includes unmarked spaces available to all user groups, and wheelchair accessible spaces are categorized as faculty/staff, commuter student, resident student, or visitor spaces according to the predominant use in a particular lot. Teaching assistant spaces are included in the faculty/staff category and metered spaces are included in the visitor category. Service vehicle spaces are not included in the parking counts.

Table IV-1

Existing (1994) Parking Adequacy Based on Effective Number of Spaces

Zone	Type of Parking	Effective Supply	Adjusted Demand	Adequacy
A	Faculty/Staff	1,210	1,228	(18)
North	Commuter Students	1,782	2,178	(396)
Campus	Resident Students	0	0	0
	Visitors	62	123	(61)
	Subtotal	**3,054**	**3,529**	**(475)**
B	Faculty/Staff	436	249	187
Upper	Commuter Students	0	80	(80)
Quad	Resident Students	0	540	(540)
	Visitors	38	25	13
	Subtotal	**474**	**894**	**(420)**
C	Faculty/Staff	964	752	212
South	Commuter Students	597	1,046	(449)
Campus	Resident Students	0	2,053	(2,053)
	Visitors	61	75	(14)
	Subtotal	**1,622**	**3,926**	**(2,304)**
D	Faculty/Staff	334	370	(36)
Downtown	Commuter Students	0	612	(612)
	Resident Students	0	0	0
	Visitors	161	324	(163)
	Subtotal	**495**	**1,306**	**(811)**
E	Faculty/Staff	270	166	104
Wallace/	Commuter Students	826	381	445
Animal	Resident Students	0	32	(32)
Science	Visitors	17	17	0
	Subtotal	**1,113**	**596**	**517**
F	Faculty/Staff	455	90	365
Vet. Med/	Commuter Students	521	269	252
Cage	Resident Students	1,944	0	1,944
	Visitors	3	9	(6)
	Subtotal	**2,923**	**368**	**2,555**
G	Faculty Staff	65	32	32
Stadium	Commuter Students	27	87	(60)
	Resident Students	897	0	897
	Visitors	0	3	(3)
	Subtotal	**989**	**122**	**866**

Table IV-1 (continued)

Existing (1994) Parking Adequacy Based on Effective Number of Spaces

Zone	Type of Parking	Effective Supply	Adjusted Demand	Adequacy
H	Faculty Staff	546	285	261
Maint.	Commuter Students	0	0	0
Building	Resident Students	0	0	0
	Visitors	0	28	(28)
	Subtotal	**546**	**313**	**233**
Total	Faculty Staff	4,280	3,172	1,108
	Commuter Students	3,753	4,653	(900)
	Resident Students	2,841	2,625	216
	Visitors	341	604	(263)
	Total	**11,215**	**11,054**	**161**

The existing parking supply is concentrated in the North and South Campus areas rather than disbursed throughout the campus. Faculty/staff parking is located primarily in the North and South Campus areas, commuter student parking is concentrated in the lots south of Price's Fork Road (B Lot) and resident parking is concentrated in the Cage and Stadium areas.

4.8.2 Existing Demand

There is an existing demand for 11,054 on-campus parking spaces. This demand accounts for the fact that some motorists will park off-campus even with adequate parking on-campus. It is estimated that three (3) percent of all faculty, 10 percent of all staff and commuter students, and 12 percent of all resident students will park off-campus.

The current demand is for 161 fewer spaces than the effective supply. Thus, there is a sufficient number of spaces to meet current parking demand. As shown in Table IV-1, there is an overall surplus of 1,108 faculty/staff spaces and 216 resident student parking spaces; there are overall deficits of 900 commuting student spaces and 263 visitor spaces. The largest parking deficits are in South Campus (Zone C) and Downtown (Zone D), as shown in Table IV-1.

Parking occupancy observations made by the University's Parking Services staff indicate that most parking lots are full from 8:00 to 10:00 AM. Empty spaces are available, however, on the periphery of the campus in the Coliseum, Shultz, Lower Stanger, Cage (I), and C Lots, and in the faculty and staff portion of the B Lot.

4.8.3 Displacements

Approximately 905 existing parking spaces will be displaced by the proposed Creative Arts Center, Turner Street pedestrian plaza, New Engineering/Engineering Technology Center, Chemistry/Physics building, new residence halls, Spring Road realignment, landscape improvements around the Performing Arts Building, and Stanger Street/Drill Field intersection reconfiguration. (Another three (3) service vehicle spaces will also be displaced by these improvements). Potential future parking garages at College and Otey Streets and on the Stanger lot would displace another 309 surface parking spaces. Thus, the Six Year Capital Outlay program accommodation would displace approximately 1,200 existing spaces (See Table IV-2 and Figure IV-9).

Table IV-2

Net Future Additional Effective Spaces

Zone	Type of Parking	Displaced Spaces	New Spaces	Net Change	Effective Net Change
A	Faculty/Staff	(357)	0	357	(321)
North	Commuter Students	0	0	0	0
Campus	Resident Students	0	0	0	0
	Visitors	0	0	0	0
	Subtotal	**(357)**	**0**	**(357)**	**(321)**
B	Faculty/Staff	(331)	500	169	152
Upper	Commuter Students	0	400	400	360
Quad	Resident Students	0	0	0	0
	Visitors	(34)	100	66	59
	Subtotal	**(365)**	**1,000**	**635**	**572**
C	Faculty/Staff	(42)	0	(42)	(38)
South	Commuter Students	0	0	0	0
Campus	Resident Students	0	0	0	0
	Visitors	0	0	0	0
	Subtotal	**(42)**	**0**	**(42)**	**(38)**
D	Faculty/Staff	(91)	0	(91)	(82)
Downtown	Commuter Students	0	140	140	126
	Resident Students	0	0	0	0
	Visitors	(89)	220	131	118
	Subtotal	**(180)**	**360**	**180**	**162**
E	Faculty/Staff	0	0	0	0
Wallace/	Commuter Students	0	0	0	0
Animal	Resident Students	0	0	0	0
Science	Visitors	0	0	0	0
	Subtotal	**0**	**0**	**0**	**0**

Table IV-2 (continued)

Net Future Additional Effective Spaces

Zone	Type of Parking	Displaced Spaces	New Spaces	Net Change	Effective Net Change
F	Faculty/Staff	0	0	0	0
Vet. Med/	Commuter Students	0	0	0	0
Cage	Resident Students	0	0	0	0
	Visitors	0	0	0	0
	Subtotal	**0**	**0**	**0**	**0**
G	Faculty Staff	(222)	0	(222)	(200)
Stadium	Commuter Students	0	360	360	324
	Resident Students	(48)	0	(48)	(46)
	Visitors	0	0	0	0
	Subtotal	**(270)**	**360**	**90**	**79**
H	Faculty Staff	0	0	0	0
Maint.	Commuter Students	0	0	0	0
Building	Resident Students	0	0	0	0
	Visitors	0	0	0	0
	Subtotal	**0**	**0**	**0**	**0**
Total	Faculty Staff	(1,043)	500	(543)	(489)
	Commuter Students	0	900	900	810
	Resident Students	(48)	0	(48)	(46)
	Visitors	(123)	320	197	177
	Total	**(1,214)**	**1,720**	**506**	**453**

4.8.4 Additional Demand

Overall parking demand under the Master Plan will increase by 356 spaces (from 11,054 to 11,410 spaces), based on prevailing travel characteristics. This increase is attributable to an increase in enrollment from 23,800 to 25,000 students (See Table IV-3).

A total of 1,101 net additional spaces are required to replace the 905 existing spaces displaced by the Six Year Outlay Plan (not including the spaces that would be displaced by parking garages), and accommodate the demand for 356 spaces generated by additional students, given the current surplus of 161 spaces.

The need for these additional spaces may be fully or partially offset by the parking and traffic management actions discussed below.

Table IV-3

Future Parking Adequacy Based on Effective Number of Spaces

Zone	Type of Parking	Effective Supply	Adjusted Demand	Adequacy
A	Faculty/Staff	888	898	(10)
North	Commuter Students	1,782	2,608	(826)
Campus	Resident Students	0	0	0
	Visitors	62	90	(28)
	Subtotal	**2,732**	**3,596**	**(864)**
B	Faculty/Staff	588	766	(178)
Upper	Commuter Students	360	123	237
Quad	Resident Students	0	91	(91)
	Visitors	97	77	21
	Subtotal	**1,045**	**1,057**	**(11)**
C	Faculty/Staff	926	610	316
South	Commuter Students	597	1,158	(561)
Campus	Resident Students	0	2,433	(2,433)
	Visitors	61	61	(0)
	Subtotal	**1,584**	**4,262**	**(2,678)**
D	Faculty/Staff	252	324	(72)
Downtown	Commuter Students	126	539	(413)
	Resident Students	0	0	0
	Visitors	279	319	(41)
	Subtotal	**657**	**1,182**	**(526)**
E	Faculty/Staff	270	166	104
Wallace/	Commuter Students	826	336	490
Animal	Resident Students	0	32	(32)
Science	Visitors	17	17	0
	Subtotal	**1,113**	**551**	**562**
F	Faculty/Staff	455	90	365
Vet. Med/	Commuter Students	521	237	284
Cage	Resident Students	1,944	0	1,944
	Visitors	3	9	(6)
	Subtotal	**2,923**	**336**	**2,587**
G	Faculty Staff	(135)	32	(167)
Stadium	Commuter Students	351	76	275
	Resident Students	851	0	851
	Visitors	0	3	(3)
	Subtotal	**1,067**	**111**	**956**

Table IV-3 (continued)

Future Parking Adequacy Based on Effective Number of Spaces

Zone	Type of Parking	Effective Supply	Adjusted Demand	Adequacy
H	Faculty Staff	546	285	261
Maint.	Commuter Students	0	0	0
Building	Resident Students	0	0	0
	Visitors	0	28	(28)
	Subtotal	**546**	**313**	**233**
Total	Faculty Staff	3,791	3,172	619
	Commuter Students	4,563	5,078	(515)
	Resident Students	2,795	2,556	239
	Visitors	519	604	(86)
	Total	**11,668**	**11,410**	**257**

4.8.5 Proposed Supply Alternatives

At least two (2) alternatives are available for providing these additional spaces: (1) construct new shuttle parking lots on the periphery of the campus; and (2) construct new parking garages adjacent to core campus buildings (See Figure IV-10).

Shuttle Lots

Peripheral or remote parking with shuttle bus service is an alternative to providing more infill parking that has proven successful on other campuses. Shuttle bus service is currently provided by the Special Purpose Housing and Campus Circulator routes at 20 and 30-minute headways, respectively.

In order to be competitive with walk times, 10-minute shuttle bus headways probably would be more appropriate, particularly since the shuttle bus routes are circuitous due to the one-way counter-clockwise circulation around the Drill Field. Shuttle buses also would add to existing vehicle-pedestrian conflicts around the Drill Field.

In the near-term, the best shuttle bus lot location is the existing Cage Lot due to its direct access to Washington Street. Approximately 900 additional spaces can be provided by expanding the existing Cage Lot to the west. These spaces plus another 201 spaces in the existing Cage Lot could provide the 1,101 spaces needed to meet future parking needs. The 201 resident student spaces displaced in the Cage Lot would be relocated to new lots constructed on the west and south sides of campus. For example, approximately 360 spaces could be provided in two (2) new lots located north of the poultry houses, east of Tech Center Drive, and south of Southgate Drive.

The most likely shuttle bus route would use Washington Street, to West Campus Drive, to Drill Field Drive, to Stanger Street, to Perry Street, to West Campus Drive to return to the Cage Lot. This route would conveniently connect the shuttle and Cage Lots to both student housing and academic buildings. The round trip distance on this route is approximately 14,000 feet or 2.65 miles; round trip time is approximately 25 minutes at an average speed of eight miles per hour and a five-minute allowance for passenger boardings/alightings and recovery time. Three (3) buses would be needed on this route in order to maintain maximum 10-minute headways.

Garages

Three (3) potential parking garage sites have been identified in the campus facilities plan. These include: (1) a four-level, 500-space garage at College Avenue and Otey Street in the Downtown area of campus; (2) a three-level, 500-space garage at Main Street and Turner Street adjacent to the proposed new art center; and (3) a five-level, 500-space garage on Stanger Street opposite the New Engineering Building. Approximately 140 of the 500 spaces in the College Avenue/Otey Street Garage could be controlled by the Town of Blacksburg to supplement parking in the downtown commercial area.

These garages would add 1,360 spaces to the University's parking supply. Combined with the 360 surface spaces north of the poultry houses, a total of 1,720 spaces would be added to the supply as shown in Table IV-2. This represents a net additional 506 parking spaces, given the 1,214 spaces displaced by the Six Year Program. Given that some empty spaces are required to avoid long searches for an empty space, 453 effective net parking spaces will be added to the overall parking supply.

The future effective parking supply will, therefore, be 11,668 spaces (i.e. 11,215 + 453), as shown in Table IV-3. Future demand is 11,410 spaces resulting in an overall surplus of 258 parking spaces.

Of the 1,000 spaces provided in the Main Street/Turner Street and Stanger Street garages, it is recommended that 500 spaces be provided for faculty and staff, 400 spaces for commuter students, and 100 spaces for visitors. Of the 360 spaces provided for University use in the College Avenue/Otey Street garage, it is recommended that 140 spaces be provided for faculty and staff, and 220 spaces for visitors. Alternatively, 140 spaces could be allocated to commuter students instead of faculty and staff. The 360 surface parking spaces north of the poultry houses should be allocated to commuter students.

4.9.0 Parking and Traffic Management Actions

A broad range of parking and travel demand management actions are available to influence parking demand and traffic, rather than continuing to expand the supply of parking and roads. There are alternatives to widening

existing roads, installing new traffic signals, constructing more new roads, constructing new or expanded parking facilities and operating expanded shuttle bus service.

These suggestions take into account the following facts:

1) Current parking charges are nominal but in line with those charged at most universities in Virginia.

2) Virginia Tech has a relatively abundant parking supply.

3) Blacksburg Transit (BT) is a very viable alternative to the automobile.

4) The Virginia Tech campus is friendly and inviting; heavy-handed actions to manage parking demand are to be avoided.

The following actions are suggested for consideration:

1) Reserve choice faculty/staff (F/S) and Commuter Student (CS) spaces for car pools.

2) Designate selected F/S and CS lots for car pools only.

3) Provide free parking permits for registered car pools. Increase parking fees for non-carpoolers as a means of cross subsidizing carpoolers.

4) Provide ride-matching services to F/S who live far from campus and commute by auto.

5) Charge higher parking fees for close-in lots and lower fees for remote lots.

6) Increase parking fees as an incentive to use BT and disincentive to driving. This probably would be most effective if a daily cash fee is charged.

7) Limit the supply of on-campus CS parking spaces as an incentive to car-pool or use BT and as a disincentive to driving alone. This may require more vigorous enforcement of on and off-campus parking regulations to prevent spill-over parking.

8) Prohibit resident freshmen and/or sophomores from keeping an automobile on campus. This will free up spaces in the resident student (RS) lots for F/S and CS.

9) Continue to expand BT service routes and hours in response to off-campus development.

10) During the freshmen orientation process, emphasize BT as an alternative to driving.

11) Provide new and improved on and off-campus bikeway and pedestrian facilities to promote non-motorized modes as an alternative to driving.

12) Stagger F/S work start and quit times to spread peak traffic demands.

13) Expand the campus bicycle circulation network and encourage bicycle commuting.

4.10.0 Long-Term Roadway and Parking Recommendations

The following recommendations are provided on long-term roadway projects and estimated parking demand. The specific roadway projects discussed are not expected to occur during the timeframe of this Master Plan.

4.10.1 Duck Pond Drive Extension

Should it become necessary in the distant future to direct campus growth onto the existing golf course, it is proposed that Duck Pond Drive be extended to the north. The extension is intended to serve the new development areas and create an alternate parallel route that would divert some through traffic from West Campus Drive.

4.10.2 Cross Campus Connector

The cross campus connector is the highest priority road improvement project for the Town of Blacksburg which plans to put $1.8 million a year of its urban allocation fund toward the project beginning in 1997. As currently envisioned, the connector is intended to serve an arterial function similar to that of Price's Fork Road. As such it is to become a second major east-west four-lane arterial linking east Blacksburg with the 460 By-pass and future development planned to the west in the Hethwood area. It appears that the rationale for the road is primarily based on the opportunity for future economic development and the alleviation of traffic on residential streets in east Blacksburg. The connector is also intended to provide access to Virginia Tech from the east and south.

At this writing, VDOT and the Town have not yet conducted detailed traffic analyses such as origin/destination studies. Traffic counts along the existing east-west link through the campus, Southgate Drive, do not indicate that a road of the intended capacity is necessary (See Figure IV-11). Nonetheless, funds have been appropriated for engineering studies. VDOT, however, does not intend to begin its analysis until the University has selected an alignment for the roadway.

Observations of the intended functions of the connector within the surrounding regional context suggest that existing and planned roadways may in fact address the traffic issues the roadway is proposed to resolve. The desired access from east Blacksburg to the 460 By-pass is already accomplished via Southgate Drive. And planned regional roadway projects could potentially provide convenient access to the Hethwood area. For instance, the new 3A interchange proposed at the junction of Business 460 (South Main Street) and the Route 460 By-pass could possibly provide better access to Hethwood via Route 657. This route would appear to be more convenient in that it could provide good access to the retail centers to the south in Christiansburg.

Several roadway corridors have been proposed for the connector. The University's Board of Visitors adopted a resolution in 1990 that would allow for a road corridor (Corridor "A") provided that:

- the impact to University property and programs is minimized;
- proper pedestrian access by overpass/underpass to University property on either side of any new roads is provided at no cost to the University;
- construction of a grade-separated interchange where the roadway intersects the 460 By-pass is completed;
- Southgate Drive is closed at the point where it crosses the eastern boundary of the present campus;
- a link to development areas in the western part of Blacksburg and Montgomery County is established; and,
- the roadway is constructed as one single project.

Corridor "A" extends Hubbard Street and Country Club Drive onto the Virginia Tech campus traveling through the Turf Center, and along the eastern perimeter of the campus to Southgate Drive. The corridor would incorporate Southgate Drive, crossing the 460 By-pass at or near the existing intersection. West of the 460 By-pass, the road would extend to the western boundary of the University property.

If intended to serve the same arterial function and carry similar traffic volumes as Price's Fork Road, Corridor "A" could create major pedestrian/vehicle conflicts. For example, the existing recreation fields on Southgate Drive would be further isolated from the residential sector of the campus and other recreational facilities. Consequently, the Town would be required to construct pedestrian overpasses as outlined in the Board of Visitors conditional approval of this corridor. Corridor "A" does, however, have the advantage of using the existing Southgate Drive alignment and following the edges of existing land uses to the south and east of Southgate Drive.

Corridor "B" as delineated in Figure IV-11 was identified in an early study by VDOT. This corridor would be possible only if the Airport runway is not extended.

Both Corridor "A" and Corridor "B" involve the construction of a interchange at the point at which they intersect the 460 By-pass and facilitate an eventual westward continuation linking to the Hethwood area. The segments of the connector to the west of the 460 By-pass would introduce yet another seam in the campus agricultural land, not unlike that created by the 460 By-pass. As along the By-pass, the connector would negatively impact agricultural operations by restricting the movement of farm equipment and livestock. Furthermore, it would erode the rural character of the Virginia Tech campus.

Given the likely impacts of a prospective arterial-type road through the south end of the campus, the Master Plan recommends the following:

- A detailed analysis of projected traffic demand based on alternative regional growth scenarios to determine whether an arterial-type capacity is required (i.e. origin/destination studies) for capacity and safety reasons.

- An assessment of the extent to which regional traffic anticipated for the corridor can be accommodated by the redesign of other existing or proposed roadway systems (such as a redesign of the Price's Fork Road/Route 460 By-pass interchange or the interchanges associated with the proposed Route 460 extension or the "smart" highway). The assessment should assume the retention of the existing road network on the south side of campus (Southgate, Tech Center Drive) at a scale that is not disruptive to land and use patterns, but with selective modifications to avoid or minimize traffic through residential neighborhoods east of the campus.

- The determination of a scheme for the accommodation of future traffic demand in the corridor that avoids the impacts cited above and reduces the capital investment so that funds can be reallocated to other Town priorities.

Should the analysis outlined above support the need for a roadway through University property, it should be constructed according to the following criteria.

- The connector corridor should follow a seam in the campus land use pattern that has minimal impact on all University programs, including agriculture. Corridor "A" described above is one such alignment.

- The connector should be designed as a two-lane road and should primarily provide access to the University. It should not be considered a multi-lane arterial highway that would introduce external regional traffic through the campus.

- The connector should only occur in conjunction with other regional roadway improvements designed to channel external traffic away from the campus.

- Bike trails should be constructed along its edges and be safely connected to the town and campus system.

4.10.3 Long-term Parking Strategy

In the long-term, approximately 1,866 additional parking spaces are needed to replace 1,214 spaces displaced by the Six Year Program, replace the 748 spaces displaced by identified future academic building sites that may be displaced in the Derring and B Lots, and accommodate new demand for 356 spaces, given the projected future surplus of 453 spaces. Another six (6) acres of surface parking lots, or a 750-space parking garage, would be required to replace the 748 spaces displaced by unprogrammed future academic buildings sites. These spaces would be required beyond the "build out" of the Six Year Capital Plan (1994-2000). They would most logically be located in the north campus area (See Figure III-3).

CHAPTER 5.0

UTILITIES / INFRASTRUCTURE

5.0 UTILITIES / INFRASTRUCTURE

5.1.0 Introduction

This chapter summarizes the existing conditions of the campus utility/infrastructure systems as well as the improvements required to those systems as a result of the proposed building program. The summary focuses on major line extensions and or improvements. Minor conflicts between proposed building locations and existing lines, and minor line extensions are not discussed.

5.2.0 Storm Water Management

Concurrent with this Master Plan, a detailed storm water study was underway to evaluate the existing campus storm sewer system for quantity control and to make recommendations for the upgrades to the system. The study also will evaluate storm water quality control as defined by the Virginia Department of Environmental Quality, the Division of Soil and Water Conservation. As that study will provide a detailed description of the system capacity, issues related to capacity are not addressed herein. The existing problems and conditions of the system as they are generally understood are, however, described below.

5.2.1 Existing Conditions

In general, the condition of Virginia Tech's storm water management system is acknowledged to be a serious issue due to the concentration of University and town development in the four tributary drainage basins that traverse the campus, and the severe capacity limitations of the primary storm water channels (See Figure V-1).

The four major drainage basins include: North Fork Basin, the Central Fork Basin, Cassell Coliseum Basin and the South Basin. Each of the basins contain segments of the East Branch of Stroubles Creek.

The North Fork Basin is drained primarily by open channels, namely the North Branch of Stroubles Creek. South of Price's Fork Road, the creek is routed under Stanger Street and is carried to West Campus Drive by twin 60 inch reinforced concrete pipes (RCP) (under the B-lot). These pipes, while adequate under normal conditions, are dramatically undersized for 100 year storm conditions.

The Central Fork Basin covers developed areas of Blacksburg as well as the densely developed campus core. Consequently, this fork of Stroubles Creek carries a great deal of storm water runoff. The creek flows through a box culvert which enters the campus near the Donaldson Brown Hotel parking lot where it is routed westward under the hotel and Eggleston Hall. From Eggleston, it runs beneath the Drill Field, emerging west of West Campus Drive where it is discharged into the Duck Pond. This culvert is also understood to be undersized for the 100 year storm condition. In recent years, the inadequate condition of the culvert has led to severe flooding problems at the Donaldson Brown Hotel, the Bookstore and War Memorial Hall.

The Cassell Basin is drained primarily by storm sewer and open channels both of which are discharged west of the Duck Pond. Unlike the North and South Forks, this basin does not have a continuous surface flow. Pipes in the basin range from 15 inch to 48 inch RCP. A critical section of 30 inch pipe conveying storm water under West Campus Drive is inadequate for the estimated ten year runoff.

The South Fork is drained primarily by a box culvert paralleling Southgate Drive to Duck Pond Drive where it discharges into an open channel. The channel joins the North and Central Forks on the east side of the 460 Bypass. The box culvert is currently undersized for the ten year storm condition.

5.2.2 Proposed Storm Water Conditions

Much of the proposed development in the campus core is to be sited on existing parking lots. As a result, the overall increase in runoff attributable to new construction has been minimized. There are, however, a number of new facilities proposed for areas which are currently undeveloped and will therefore contribute to increased runoff including the Library expansion, the Mall dorms/buildings, the future academic building north of the Library, Chemistry/Physics Phase II, Agriculture and Forestry Research Facility, Pritchard Quad dorms, West Campus Drive dorms, Upper Quad additions, the Student Health and Fitness Center, the Special Purpose Housing Phase III, Engineering Technology Center, the Food Processing Pilot Plant, and the Cook/Chill Facility.

The storm water management study underway at this writing is to provide recommendations for improvements to the major trunk lines and detention facilities on the campus (See Figure V-2). Improvements to the secondary lines of the system are, however, provided below.

Improvements to secondary lines include:

- The lines serving Pritchard Hall and the Dietrick Quad are to be rerouted to a line near Seitz Hall in order to divert flow from the Drill Field culvert which is at capacity. This will provide some additional capacity in the Drill Field culvert to handle storm water from the proposed Pritchard Quad housing.

- The storm sewer in the Cassell Basin is inadequate and may require upgrading as a result the increased flow associated with the Agriculture and Forestry Research Facility and the West Campus Drive residence halls.

- Improvements are necessary to the open channel at the Special Purpose Housing site to accommodate the proposed expansion. On-site stormwater detention will be necessary in this area.

To the degree possible, it is the position of the 1994 Master Plan that non-structural, distributed and bio-engineered components be considered in designing storm water management improvements.

5.3.0 Sanitary Sewer System

Main trunk line sanitary sewer connections are provided to the Virginia Tech campus by the Blacksburg-VPI Sanitation Authority (the Authority). The main lines traversing the campus also serve portions of the Town of Blacksburg. With the exception of certain critical segments, the capacity of the Authority lines adequately serve the needs of the University. The on-campus sanitary sewer system is believed to have adequate capacity to accommodate the proposed Master Plan program.

Sewage from the University system discharges into Authority lines and is carried to the Stroubles Creek Wastewater Treatment Plant (the Plant). The Plant has a treatment capacity of 9 million gallons per day (mgd) with usage running at 8 mgd. At the time of this writing, the Plant was being upgraded to 12 mgd.

5.3.1 Existing Conditions

There are four main sewer trunk lines on campus located in each of four major drainage basins. The North Fork Basin is served by a 15 inch line that enters the campus near Old Turner Street and follows a route that roughly parallels the twin 60 inch RCP storm sewer pipes. This line has a critical section that is known to surcharge upstream, especially in periods of high infiltration & inflow (I&I). It is therefore considered to have no additional capacity. The 15 inch line discharges into a 24 inch Authority interceptor line which is not known to surcharge (See Figure V-3).

The Central Fork basin is drained by lines varying in size from 15 inches to 24 inches located beneath the Drill Field which connect to the 24 inch Authority interceptor. Of the lines in this basin, only one located to the north of the Donaldson Brown Hotel and Conference Center (DBHCC) is known to surcharge during periods of high I&I.

The Cassell Basin is drained by 10 and 14 inch lines which eventually merge with the 24 inch Authority interceptor southwest of the Duck Pond. The existing system is adequate.

The South Fork Basin is drained by a 15 inch Authority line that runs parallel to Southgate Drive. This line shows no signs of surcharging and is believed to have additional capacity.

5.3.2 Proposed Conditions

Sanitary sewer demands for several of the proposed academic buildings are based on similar projects recently completed at the University. The estimated sanitary drainage for residence halls is based on the anticipated occupancy

rate of each building. A drainage rate of 75 gallons per day (gpd) per occupant is utilized (Wastewater Engineering: Collection, Treatment, Disposal, by Metcalf and Eddy, Inc., published by McGraw-Hill Book Company).

Overall the campus sanitary sewer system capacity is believed to be adequate to accommodate the proposed Master Plan program, however, there are capacity limitations in certain segments of the trunk lines that traverse the campus. The rate of flow in individual lines is unknown, therefore the remaining capacity available in the system is unknown. Information is available, however, to calculate the theoretical capacity of the lines but the calculation methodology does not take into account inflow and infiltration (I&I) and the deterioration of old lines. Thus, for the purposes of the Master Plan, sewer flows for proposed structures are assumed to be a percentage of the theoretical capacity. For a more accurate assessment of future construction impact on the system, a more detailed study will be necessary.

Several improvements are required to the sanitary sewage system as a result of the Master Plan program (See Figure V-4).

- The proposed Creative Arts Center and University Services Building will have a significant impact on the sanitary sewer branch east of the Donaldson Brown Hotel which currently surcharges during periods of high I&I. It is critical that the surcharge problem be resolved prior to the construction of these facilities. This problem could, however, be mitigated by the anticipated decrease in sewage flows resulting from the conversion of Rasche and Shanks from dormitory to academic uses. If these residence halls are converted prior to the construction of the proposed facilities, there would potentially be no net increase in flow to this line.

- Similarly, the conversion of Brodie and Major Williams would result in no net increase in flow to the line intended to serve the proposed Newman Library expansion. This line is, however, also intended to serve the proposed Patton infill academic building, the Mall residence halls, Library expansion and the academic building north of the Library. Further study of the line is needed to determine the impact on the system. It should be noted that a 1,000 foot sewer extension is necessary to connect the proposed Mall facilities with a line located on the north side of the Drill Field.

- The proposed residence halls on Pritchard Quad will require an extension and an increase in capacity to the 10 inch line serving Lee, O'Shaughnessy, Payne, portions of Owens and War Memorial Hall. This line flows into the 24 inch Drill Field trunk line which will be minimally impacted by the project.

- The proposed Chemistry/Physics Phase II buildings will require a new sewer line to the Drill Field trunk lines.

- The proposed future academic building between the New Engineering Building and the proposed Engineering Technology Center will require a sewer extension to the 15 inch trunk line located in the north basin.

- The proposed Multipurpose Livestock Arena will require the construction of a 1,000 foot sewer line extension to the Central Stroubles interceptor.

5.4.0 Water Distribution System

The University's water supply is provided by the Blacksburg-Christiansburg-VPI Water Authority (the Authority). The Authority's 14 mgd treatment plant processes seven to eight mgd of water.

5.4.1 Existing Conditions

Authority trunk lines enter the campus at two locations: a16 inch line enters campus at Washington near Kent Street; and, a 12 inch line enters on Old Turner Street near the steam generating plant. Recent fire hydrant tests indicate that the campus system has capacity above its current use. It is one of the few systems on campus not in need of immediate upgrades (See Figure V-5).

5.4.2 Proposed Conditions

Overall, the water distribution system is estimated to have sufficient capacity to accommodate the proposed Master Plan program. Fire hydrant tests conducted on a individual basis for several proposed facilities indicate that, in general, throughout the campus adequate pressure and flow appear to exist. This methodology, however, does not adequately evaluate the total cumulative effect of all of the buildings in the Master Plan program. A detailed model is necessary to fully evaluate the existing system and the improvements needed to support the proposed program. For master planning purposes, water demands for several of the proposed academic buildings are based on similar projects recently completed on campus (See Figure V-6).

5.5.0 Steam Distribution System

The University operates a steam generating plant at the corner of Old and New Turner Streets to provide heat for buildings in the campus core,. Steam is distributed to core buildings via a network of high and low pressure lines routed through an extensive tunnel system (See Figure V-7).

5.5.1 Existing Conditions

At the time of writing, a study to expand the generating plant from 365,000 PPH to 435,000 PPH was underway. Preliminary modeling of the distribution system indicated that existing low pressure lines are adequate to handle the estimated load of the proposed Master Plan facilities.

5.5.2 Proposed Conditions

Preliminary modeling of the system indicates that the proposed upgrade to the steam plant is necessary to provide sufficient capacity for the Master Plan program. However, the final Master Plan configuration had not been modeled at the time of this writing. The specifics of the required upgrade are therefore not provided.

Several tunnels and lines conflict with the sites selected for key elements of the program and will consequently be rerouted. For example, the Creative Arts Center will require the relocation of a major steam tunnel unless the building is designed to span the tunnel and service access is provided within the building (See Figure V-8).

5.6.0 Chilled Water System

The main central refrigeration plant for the campus, the North Campus Chiller Plant (NCCP), is located on Barger Street adjacent to the Blacksburg electrical substation. The NCCP provides chilled water for buildings located north of the Drill Field via a limited distribution network. A satellite chiller located in the Pamplin Hall infill also serves buildings north of the Drill Field. To the south of the Drill Field and Mall, satellite chillers are located in the Squires Student Center, the Donaldson Brown Hotel, War Memorial Gym, Cheatham Hall, Dietrick, Owens, Cassell Coliseum, Litton-Reaves, Wallace and the Veterinary Medicine Complex. Several buildings to the north and south of the Drill Field are not air conditioned.

The analysis of the campus chilled water system described below has been informed by the University's Chilled Water Master Plan.

5.6.1 Existing Conditions

At this writing, the capacity of the NCCP was being upgraded from 2,400 tons to 5,400 tons, with the possibility for an additional 1,500 tons of capacity. Space is also available at Pamplin to accommodate an additional 600 ton chiller. The total load requirement for the buildings located north of the Drill Field is 2,995 tons. The chilled water distribution system leading from the NCCP, especially the deteriorating 30 inch main trunk line, is in need of repair and upgrade (See Figure V-7).

According to the University's Chilled Water Master Plan, the 300 ton chiller and 600 ton cooling tower located in Owens Dining Hall has no additional capacity as a result of expansion at Owens Hall and the construction of Payne Hall.

5.6.2 Proposed Conditions

The planned NCCP upgrade will provide capacity for proposed construction and renovations north of the Drill Field up to the year 1998 with the final 1,500 ton upgrade necessary for development proposed through the year 2002. The ultimate development capacity of the North Campus, including buildings not identified in the Six Year Capital Outlay Plan, results in an estimated load of 9,115 tons. Combined, the NCCP upgrades will not provide adequate capacity to support this development.

In most cases, existing chilled water lines can be tapped to provide service to proposed buildings. A few major extensions are, however, necessary. An extension to the new 20 inch line intended to serve the Upper Quad is required to serve the Creative Arts Center, Femoyer, Thomas, Shanks, Monteith, Rasche, Shultz, the Mall residence halls and the Library expansion. A second major extension planned for the New Engineering Building is also necessary to serve the proposed Engineering Technology Center and future academic building proposed in that area. Eventually this line could be extended to serve development proposed in the B-lot. The extension will also include water, Communications Network Service and steam lines (See Figure V-8).

Service to two proposed facilities will be provided by sources other than the NCCP. Service to the Chemistry/Physics Phase II facility is to be provided by the Pamplin satellite chiller once distribution improvements have been completed. The proposed University Services Building will be served by its own 130 ton chiller.

Areas south of the Drill Field and west of West Campus Drive are to be served by new satellite chillers as detailed in the University's Chilled Water Master Plan (CWMP). The Master Plan program will require the following upgrades to the proposed regional system described in the CWMP:

- The two 750 ton chillers originally planned for Regional Chiller #3 will need to be upgraded to two 800 ton chillers in response to the estimated load of the West Campus Drive residence halls. It is possible that they could be located in the proposed West Campus Drive Residence Halls provided that adequate chiller space is allocated.

- The proposed Pritchard Quad residence halls will require a 400 ton centrifugal chiller and a 600 ton cooling tower at Owens Hall.

5.7.0 Electrical System

The University's steam plant generates a limited amount of electrical power for use on campus. Most of the University's power is purchased wholesale from the Appalachian Power Company.

5.7.1 Existing Conditions

The campus is served by two substations: the Blacksburg Station located near the North Campus Chiller Plant on Barger Street; and, the South Substation located near the Dairy Science complex. The Blacksburg Substation is currently near capacity, allowing for only two additional buildings north of the Drill Field before a new transformer is required (expansion requires additional land). Two additional buildings can be accommodated south of the Drill Field before two additional circuits are required at the South Substation (See Figure V-9).

As of August 1994, the Blacksburg and South Substations were linked providing dual feed capabilities. This link allows a portion of the south core load to be shifted to the South Substation, thus freeing up some capacity at the Blacksburg Substation.

The electrical distribution system is housed in a multiple duct bank encased in concrete which in many cases lacks expansion capacity. The duct bank also carries communications network lines.

5.7.2 Proposed Conditions

As noted above, much of the proposed Master Plan program is contingent on improvements to the Blacksburg Substation and the addition of two circuits at the South Substation. At this writing, replacement of the 69 kV primary line serving the Blacksburg Substation was being planned. The new line is to be routed along APCO's 138 kV right-of-way located west of the 460 By-pass (See Figure V-10).

5.8.0 Communications Network Services (CNS)

Communications services provided at Virginia Tech may be grouped into the categories of voice, data, Local Area Network (LAN), and video. Voice services include both local and long distance telephone service and Phonemail. Data services include switched digital data, dedicated data, remote routers, dial-line modem pools and Datakit Central Office (C.O.) LAN. Local Area Network services include campus-wide Ethernet, terminal server access to Ethernet, and access to Internet and VERnet. Video services include campus-wide cable television and a satellite teleport (See Figure V-11).

5.8.1 Existing Conditions

Voice and Low Speed Data

Voice and low speed data services are provided by the University owned, operated and maintained Computerized Branch Exchange (CBX). It has the capacity to support a minimum of 15,000 telephones and 15,000 data connections. At this writing, the system supported 11,000 telephones, 10,000 data lines, and 900 trunk lines. The system has the capacity to support several thousand more data lines. However, capacity problems are possible at certain cable centers should substantial increases in the number of connections be required.

The Phonemail voice storage and forwarding system is integrated with the telephone system. There are 8,600 active voice mailboxes utilized by resident students, staff and faculty.

Local Area Networks

Computer to computer communications are provided over the Ethernet LANs. Some of the applications supported include: electronic mail, host computer access, file sharing, print sharing, client-server computing, and access to remote networks.

Ethernet

Ethernet connections are provided to faculty and staff upon request and are provided to off-campus users via dial-in modem pools, a multiplexer network, remote routers and Datakit Central Office LAN. With the exception of Payne Hall, Ethernet connections are not provided in campus residence halls due to inadequate building wiring. As part of the Blacksburg Electronic Village project, direct Ethernet access is being extended into the Town of Blacksburg over the Bell Atlantic network.

Video

There are a total of 5,000 Cable TV connections serving campus residence halls, classrooms and conference rooms providing a total of 60 educational and entertainment channels. The system's 600 MHz subsplit cable system can be expanded as required.

Cable Distribution systems

Communication system cabling is routed between buildings in steam tunnels, buried concrete encased conduit, direct buried conduit, direct buried cable, and aerially. Twisted-pair and fiber optic cables interconnect campus buildings. Six major cable centers are located on campus at the Cassell Coliseum, Hillcrest, Burruss, Shanks, Owens and Andrews Information Systems Building (AISB) (located at the Virginia Tech Corporate Research Center-(CRC)), and are connected with both twisted pair cables and fiber optic cables. Most of the centers are interconnected using 600 pair telephone cable. Approximately 30 percent of the cable pairs are in use.

The six cable centers are also interconnected by fiber optic cables with 144 multimode fibers and 24 single-mode fibers daisy chained between centers. Approximately 50 percent of the multimode fibers are used for the telephone system and 30 percent are used for Ethernet, leaving 20 percent available. Most of the single-mode fibers are not in use. Future communications needs on campus will require extensive use of fiber and the installation of fiber cable from the network interface of buildings with desktop connections. The existing fiber backbone has substantial capacity, but more may be needed to meet future demand.

The main cable TV headend is located at the CRC Teleport (the video tape playback system is located at the Cassell Coliseum). The TV cable system is routed along with other communication system cables in steam tunnels, buried concrete encased conduits, direct buried conduit, direct buried cable, and aerially. Expansion of the system is possible, especially with the increased use of fiber optic cable.

5.8.2 Proposed Conditions

For the foreseeable future, the University's CBX has adequate overall expansion capacity to support campus programs within areas of the campus currently being served. Problems could arise if there is significant growth in selected areas.

The existing communication cable centers and the cable system may have adequate capacity to accommodate the estimated growth over the next 5-10 year period. Additional fiber cables will be needed between some cable centers and buildings. Fiber will be needed in riser systems of buildings and to the desktop. Outside the core area, in areas such as the Anaerobe Lab, Special Purpose Housing area, and the Plantation Road area, it may be necessary to construct additional cable centers to support digital telephone service, LAN and video services. Additional cable centers will require the extension of duct banks into the peripheral areas of campus (See Figure V-12).

Approximately 5,000 connections are provided on the Ethernet system. Service is expected to grow by 1,000 to 2,000 connections per year until it peaks out at 15,000 connections. Increases in the number of users and connections will require improvements to the system backbone. Part of the increase in usage will occur as residence halls are rewired to provide Ethernet services. Shared media Ethernet connections may be replaced with switched Ethernet and with 100Mbps plus connections to the desktop.

5.9.0 Gas Distribution System

A limited number of core campus buildings are served by natural gas lines, primarily those located in the northeast corner of campus. The local gas provider, United Cities Gas Company, would like to extend service to more campus buildings, typically at no cost to the University.

CHAPTER 6.0

KENTLAND

6.1.0 Existing Conditions

Kentland Farm (the Farm) is part of a rural setting consisting of moderately sloping terrain, a series of stream corridors and flat bottom lands along the New River (the River). The boundaries of the tract are defined on the south and west by a sweeping curve in the River which is paralleled by the Norfolk Southern Railway. To the north and east lies State Route 625 which provides regional access to the site via the community of Longshop.

Topographically, the central portion of the tract gently rises northward from the River yielding conditions which are suitable for crop and pasture land uses. The most heavily wooded area and steepest slopes of the tract are located adjacent to the River on the western edge of the tract. Another area of steep wooded terrain is located on the eastern boundary of the tract (See Figure VI-1).

6.1.1 Historic Resources

The Kentland Farm is the site of nine native American historic sites. These sites are primarily located along the River and have been documented by the Virginia Department of Historic Resources (DHR). Kentland also encompasses 19th century historic structures including a farm house and several barns. These resources have also been documented and are included in a historic district delineated by DHR. The district designation serves to protect the historic structures from the potentially negative impact of farm operations and future development.

6.1.2 Existing Buildings

A majority of the structures at Kentland were constructed between 1840 and 1950 and most are currently utilized to support research and teaching programs. Three existing single-family houses are utilized for offices, meeting spaces and storage space. Most of the barns are utilized for storage.

Currently, there are no suitable facilities for classes, meetings, computer analysis, pesticide storage, weather reporting, laboratory work, or seed refrigeration. The lack of facilities requires that most research equipment and material be stored on the main campus and transported to the site. Supplies used for day-to-day operations are stored in two recently constructed on-site facilities as well as other existing structures.

6.1.3 Infrastructure

In general, the infrastructure requirements of Kentland are adequate for the functions accommodated. Sanitary water disposal is handled by on-site septic systems and potable water is pumped from on-site wells. Irrigation water is pumped from the New River and Toms Creek. Electric service is provided by the Appalachian Power Company via overhead lines which enter the site on the Longshop road. Telephone service is provided by C&P Telephone Company (See Figure VI-2).

The existing roadways, although adequate during most of the year, are less accessible during the winter. Some of the roads are in need of improvement.

6.1.4 Program

The Kentland Farm supports all departments in the College of Agriculture and Life Sciences, as well as cooperative efforts in other colleges. The Farm is being developed and managed to accommodate research, teaching and extension activities, production agriculture, renewable resources, and to create a program that is environmentally sensitive.

Programs currently accommodated on the Farm include: biogenetics; testing of new pesticides and their management; breeding and testing of improved yielding and disease-resistant soybeans corn and small grains; sustainable agriculture and crop/cropping system alternatives; fertilizer and lime management; biofuel production; biological control of pests; grass, hay, pasture and alfalfa testing; vegetable and fruit research; honey bee management and disease research; wildlife management and demonstrations; feed production for livestock research and teaching; pasture management for beef herds; undergraduate and Agriculture Technology classes; and a variety of other activities.

In the planning horizon of this Master Plan, two phases of facilities for the Kentland Farm are listed in the University's Six Year Capital Outlay Plan (1994-2000). The facilities are intended to house sample preparation, data collection, academic classes, extension meetings, offices, and a weather information station.

The first is a general purpose building which includes classroom/conference room; five general use laboratories; a walk-in cold room; refrigerated seed storage; seed treatment lab; plant preparation lab; soil lab/prep room; and support spaces. The second is an equipment repair facility. Programmatically, it includes a mechanical shop, equipment repair areas and a storage area. Other priority program elements include a meeting/conference facility.

6.1.5 Improvements to the Property

When the University acquired Kentland in 1987, the tract was virtually undeveloped for farming. Since then several projects have been completed in support of the College of Agriculture and Life Science's program requirements. These include a 3,600 sf horticulture general purpose building; a 2,590 sf sustainable agriculture feedlot; a 2,816 sf livestock handling facility; and, a 4,320 sf machinery, storage and repair facility.

6.1.6 Program Land Uses

The College of Agriculture has also prepared a land use plan based on soil characteristics, orientation and terrain. The land use pattern that has evolved is logical in that it concentrates crop research areas in the lower areas of the tract adjacent to the river. Crop production land, pomology and

forestry land uses are logically placed on the steeper slopes of the site. The overall pattern generally respects the systems of shallow streams and drainage ways that traverse the tract. In most cases, wooded areas have been maintained adjacent to these water courses to protect water quality, prevent erosion and serve as wildlife corridors (See Figure VI-1).

During the time frame of this Master Plan, the College of Agriculture intends to complete and implement a nutrient management plan and a total conservation plan. Conservation planning to date has included the United States Department of Agriculture (USDA), SCS, Virginia Department of Forestry, Virginia Department of Game and Inland Fisheries, and the Skyline Soil and Water Conservation District.

6.2.0 1994 Master Plan Recommendations

6.2.1 Land Use

The logical pattern of land use developed by the College of Agriculture and Life Sciences is endorsed and supported by the Master Plan. No major land use changes are planned.

It is recommended that some of the proposed meeting and conference facilities be sited in the historic farm house provided it can reasonably accommodate the program without compromising the integrity of this important historic resource. Should that prove to be impossible, it is recommended that these facilities be accommodated in a new structure along with the balance of the general purpose facility program near the farm house (provided it is sensitively sited and architecturally compatible).

6.2.2 Roadway Improvements

It is recommended that the existing logical pattern of farm roads be maintained. Additional roads should be designed to be compatible with existing topography, avoiding steep slopes. In general, it is recommended that the roads parallel the topography.

6.2.3 Location of Proposed Facilities

It is recommended that the proposed general purpose facility (in Phase I) be sensitively sited near the historic manor house. The architectural design of this facility is to be compatible with that the of house and it is to be sited in such a way that views to and from the house are not negatively impacted. It is proposed that the interior of the house be renovated to accommodate a small conference facility and possibly a small number of guest rooms (See Figure VI-1). The proposed repair facility (also in Phase I) is to be sited uphill from the manor house behind existing barn structures.

Structures proposed in Phase II include fertilizer, bulk storage and pesticide facilities. These should be located adjacent to the proposed repair facility and should be screened by existing structures. Also proposed in Phase II are fruit packing and cold storage facilities which should be located adjacent to the existing multipurpose orchard building.

CHAPTER 7.0

IMPLEMENTATION

7.0 IMPLEMENTATION

7.1.0 Master Plan Phasing/Sequencing

Based on the best understanding of University goals and priorities at this writing, a recommended phasing strategy for the implementation of the Master Plan program is provided in this section. The phasing strategy endeavors to identify an efficient and economical sequence for implementing the Master Plan program, taking into consideration infrastructure constraints and associated improvements, parking requirements, and design intent.

The exact sequence in which construction funds will be appropriated by the Commonwealth for specific facilities and infrastructure projects will likely vary in accordance with changing priorities and resources. Pre-planning studies for example have been completed for several facilities, others have been funded for construction, while others are identified only as items in the University's Six-Year Capital Outlay Request. Nevertheless, for planning purposes, proposed facilities have been bracketed into logical groups of projects which are interrelated programmatically, functionally, through proximity, or by design vision. The intent is to identify groups, which, if constructed consecutively, would result in programmatic and infrastructure utilization efficiencies. Moreover, the facility groupings have been identified with the intent of phasing construction so as to create meaningful campus spaces in a relatively short time frame.

The recommended phasing for implementation of the Master Plan program is outlined in the following sections. As noted above, elements in the Master Plan program have been organized into groups based on the anticipated time of construction and the campus precinct or areas in which they are to be located. As infrastructure conditions are critical to the efficient and timely construction of the proposed facilities, improvements associated with each facility are summarized.

7.1.1 Group 1: First Phase Projects (Funded Projects/Projects Related to the Integrated Space Plan)

Projects in this group include those which have been funded and/or approved for design; those related to the implementation of the Integrated Space Plan, the Upper Quad conversion in particular; and, those which will collectively form new campus spaces. Projects intended to form new campus spaces such as those along the Mall are further organized in subgroups. Projects in this group are currently among the highest priority projects for the University.

Student Health & Fitness Center

Funding for the Student Health and Fitness Center had been approved at this writing and the facility was under schematic design. It is likely to be one of the first Master Plan program facilities completed.

Several infrastructure improvements are associated with this facility. A new storm sewer must be constructed from the site to Southgate Drive paralleling Southgate to Duck Pond Drive where it would be discharged toward Stroubles Creek. Also, the capacity must be increased in the sewer line designated to serve the facility and a high pressure gas line must be rerouted.

Sub-group 1: Donaldson-Brown Hotel and Conference Center/Downtown Area

Buildings proposed for the Donaldson-Brown Hotel/downtown area include the University Services Building and the College Avenue parking garage. Both of these facilities were approved by state agencies prior to the 1994-96 biennium planning period as revenue-based facilities.

Programmatically, the University Services Building will allow support office uses to be relocated from Burruss Hall, thereby creating space for academic programs in that building. The College Avenue Garage will address a significant parking shortfall in the Donaldson-Brown Hotel and Conference Center / Squires / downtown area.

Construction of both facilities could require significant infrastructure improvements. Of particular importance, an existing sanitary sewer surcharge problem on Otey Street must be corrected before the University Services Building is occupied. As the Creative Arts Center is to be served by the same surcharging line, construction of these two facilities must be coordinated (See Creative Arts Center discussion below under “The Mall”).

The proposed parking garage must be designed to span an existing storm sewer trunk line which traverses the site. Should that not be possible, the trunk line would need to be relocated to the south.

Sub-group 2: The Mall & Residence Halls

The group of facilities proposed along the Mall, which include the Newman Library expansion, two residence halls, and the Creative Arts Center, will collectively form a new campus space, defining the Mall as an important campus entry and activity center.

Programmatically, the proposed Mall facilities are high priorities for the University. The residence halls, whether sited on the Mall or elsewhere, are critical for the implementation of the University’s Integrated Space Plan, the Upper Quad Conversion in particular. Before the conversion of Upper Quad residence halls can occur, the University must replace the beds that will be displaced.

Also critical for the Upper Quad conversion is the provision of parking for the faculty and staff who will occupy the converted residence halls. To address the associated increase in parking demand, construction of the proposed Creative Arts Center garage would necessarily need to coincide with occupation of the converted residence halls.

Conversion of the Upper Quad from residential to academic uses not only addresses space shortfalls; it also results in residual capacity in critical infrastructure systems such as sanitary sewage. As sewage discharge associated with the proposed academic uses is substantially less than that associated with residential uses, discharge into several critical sewer lines will decrease, thereby providing capacity for several proposed facilities. For example, the conversion of Rasche and Shanks Halls will effectively increase the capacity of the sewer line designated to serve the Creative Arts Center. This is particularly advantageous considering that the designated line has been known to surcharge on Otey Street just east of the Donaldson-Brown Hotel. The Creative Arts Center is not estimated to increase the sewage discharge in the line above present levels. Should present levels be exceeded, it is recommended that the surcharge problem be corrected before constructing additional buildings such as the University Services Building. Similarly, the conversion of Major Williams and Brodie Halls will effectively result in enough additional capacity to accommodate the Library expansion.

Construction of each of the proposed facilities along the Mall is contingent on the completion of the North Campus Chiller Plant (NCCP) capacity upgrade and extensions to the distribution system. An additional upgrade may be necessary for the facilities constructed later in the sequence.

To take full advantage of the efficiencies mentioned above, it is recommended that the facilities along the Mall, and facilities related to the completion of the Mall, be constructed in the following order:

i) Completion of the NCCP Upgrade
The NCCP must be upgraded and the distribution system extended to the extent that it is economical and efficient to do so. (Planned upgrade from 2400 to 5400 tons. A second 1500 ton upgrade is required for the complete build-out planned for the north campus).

ii) Mall Residence Halls
Construct the Mall Residence Halls & Pritchard Quad Housing. The Mall development requires a major sewer line extension to the Drill Field and a possible upgrade of downstream lines.

A replacement dining facility for Shultz could be accommodated in the first floor of the residence halls facing the Mall, together with other meeting office and lounge space. An alternative strategy for accommodating dining in the Upper Quad area would be to maintain part of Shultz Dining Hall as a dining facility after the Upper Quad conversion has been completed. This approach would require some modification of the Integrated Space Plan. As the dining facility was not included in the infrastructure analysis, further study is required to determine its impact on the sanitary sewer system. As noted, the conversion will possibly free up enough capacity to serve the Creative Arts Center and the Library Expansion.

iii) Pritchard Quad Housing

Construction of the Pritchard Quad Housing requires the installation of an additional 300 ton chiller at Owens Hall, the construction and up grade of a new sewer line serving Pritchard, Lee, O'Shaughnessy, Payne, Owens (partial), and the War Memorial (partial) and the rerouting of the storm sewer serving Pritchard Quad.

iv) Convert Upper Quad Residence Halls & Construct the Creative Arts Center Garage

These dormitories are to be converted for academic uses while constructing the Creative Arts Center Garage.

v) Construct West Campus Drive Housing

This project is to be constructed to accommodate remaining beds displaced from the conversion of the Upper Quad. It would require the completion of the proposed Regional Chiller #3 which is planned to accommodate two 750 ton chillers. The estimated loads for the dormitories, however, necessitate that the chillers be upgraded to 800 tons. Improvements to the steam tunnels serving the facility are also necessary and two storm water lines must be relocated and possibly increased in size.

vi) Construct the Library Expansion

It is recommended that the landscape improvements proposed west of the Library bridge be carried out in conjunction with the construction of this building. It would also be economical to design the utilities for the Library expansion to accommodate the future Drill Field Academic Building.

vii) Construct the Creative Arts Center

Construction of this facility is dependent on collection of public funds, thus, the exact time of construction is uncertain.

7.1.2 Group 2: Second Phase Projects

Projects included in this category are Capital Outlay and other priority facilities which have not been funded or approved for design.

Special Purpose Housing Area

As part of the strategy to replace housing displaced from the Upper Quad, the Special Purpose Housing Area (SPHA) could be utilized for this purpose. Development in the SPHA, depending on the extent of development, could require a major upgrade to the CNS network and cabling center in the area. It will also require a major storm water detention facility.

Chemistry/Physics Phase II

A pre-planning study had, at the time of writing, been completed for this facility which was listed as a high priority in the 1994-96 biennium. The two adjacent sites identified for the facility each require infrastructure improvements.

Infrastructure improvements necessary for the Davidson Hall site include the construction of a new sanitary sewer line connecting to the Drill Field trunk line, corrective piping work in the Pamplin chiller facility, and further stormwater analysis. Infrastructure improvements necessary for the Hahn Hall site include upgrading of the storm water culvert serving the site which passes under West Campus Drive, and it also requires corrective work to the Pamplin chiller facility.

Multipurpose Livestock Arena

This facility is currently placed in the 1996-98 biennium. Construction will require the completion of a new sanitary sewer line along Plantation Road.

Agriculture and Forestry Research Facility

Listed in the 1996-98 biennium research category, infrastructure improvements associated with this project include the construction of Regional Chiller Plant #2, and possible sanitary and storm sewer upgrades (both require additional study).

Food Processing Pilot Plant

Included in the 1996-98 biennium research category, this facility is not anticipated to have major impacts on the campus infrastructure.

Stanger Street Garage/Cage Lot Expansion

Construction of the Stanger Street Garage or the provision of additional parking in the Cage Lot (shuttle lot) should coincide with the completion of the Engineering Technology Center. At that time, significant surface parking will have been displaced in several locations in the north campus area.

Engineering Technology Center

Included in the 1998-2000 biennium Educational and General category, this facility will consolidate the engineering program and help eliminate the space deficits in the College of Engineering.

Construction of the facility will require the acquisition of privately owned property on Turner Street to the east of Randolph Hall and the demolition of three existing houses. Infrastructure upgrades include the extension of a sanitary sewer to link with the line planned for the New Engineering Building, and connection to the utility corridor established to serve the New Engineering Building (planned for construction in 1995).

7.1.3 Group 3: Projects under Evaluation

Included in this group are those projects which have not been sited in the Master Plan; projects which are programmatically under question; or projects for which no immediate need has been identified.

Cook/Chill Facility

At this writing, the status of the Cook/Chill Facility was uncertain. Its location and small size are not anticipated to have significant impacts on the campus infrastructure.

Faculty Club

This facility is not sited in the Master Plan pending further programmatic refinement by the University.

Undergraduate Classroom Facility

The program requirements for this facility were, at the time of this writing, under review. If constructed, it would most likely be located on the future development site identified in Patton Quad or adjacent to the Library. (See Future Academic Buildings section below for more detail on these sites).

Visitor Center

Funding and programmatic need for this facility were under discussion at this writing.

7.1.4 Future Academic Buildings

Several academic building sites have been identified in the Master Plan to accommodate future growth. The discussion below outlines the necessary infrastructure improvements associated with construction on the identified sites.

Common to all of the future academic sites is the need to complete an additional 1500 ton upgrade to the North Campus Chiller Plant.

B-Lot Academic Building

Construction on this site could potentially conflict with existing sanitary and storm sewer trunk lines which pass beneath the site. Further study of the sanitary sewer would be required to determine the impact this facility would have on the trunk line. It may require the relocation of the line, at which time, it could be increased in size to address existing surcharge problems. The remainder of the utilities, water, CNS, steam and chilled water lines would need to be extended to serve the site, all of which would be complicated by the closed landfill north of Cowgill. Although recent studies indicate that a portion of this site may be in a 100 year flood plain, special grading would make it possible to utilize the site.

Derring Academic Buildings

The new quad proposed north of Derring may be, according to recent preliminary studies, within a 100 year flood plain. Several alternatives exist for developing this important site: 1) provide new storm conduits of a capacity to accommodate the 100 year storm; 2) construct buildings above one level of parking; and, 3) fill the area to create a berm that would channel the 100 year storm down Perry Street.

The site also conflicts with the major trunk sanitary and storm sewer lines. Lines would necessarily need to be relocated or bridged by the buildings. Each of these lines are known to have inadequate capacity under certain conditions, suggesting any relocation should involve an increase in capacity.

Engineering Quad Future Academic

This facility will require a careful siting study to avoid conflict with the new utility corridor being established at this writing to serve the New Engineering Building (area north of the access road). As this building is proposed to span the service access road, it must allow passage of a semi-tractor trailer truck.

Patton Quad Academic Building

This facility could potentially impact the capacity of the Drill Field storm sewer and conflict with an existing water line and two steam tunnels.

Drill Field Academic Building

Located adjacent to the proposed Library expansion, this facility could possibly conflict with existing sanitary and storm sewer lines depending how far to the west it is sited. Combined, the Library and this facility will benefit from the conversion of Brodie and Major Williams, the sanitary sewer discharge of the proposed facilities being equal to the estimated reduction associated with the conversion from residential to academic uses.

7.2.0 Landscape Improvements

The proposed landscape improvements identified in the Master Plan are divided into eight landscape types or categories. The discussion below provides information on the scope and magnitude of improvements associated with each landscape type.

Type I: Landscape Rehabilitation

This landscape category includes 29 acres of land for general refurbishment of major existing campus areas such as the Drill Field and areas in between major campus quadrangles. The scope of work in this category includes: replacement of all litter receptacles with the new campus standard (See Chapter 8); relocation of bicycle parking areas to unobtrusive locations with hedge screening and lighting; removal of aged planting and inappropriate trees; removal of grass from areas to be "naturalized" (to be planted with indigenous material); installation of natural area planting and mulch ground layer; new concrete sidewalks; and, restoration and painting of steel post and chain pedestrian barriers around lawn areas.

Type II: Campus Pedestrian Plaza Areas

This category involves the alteration and redesign of the Library Plaza and the creation of two new plazas to the east and west of Burruss Hall. Work will involve demolition, installation of service routes as necessary, construction of stone seat walls, installation of campus standard site furnishings, installation of concrete brick pavers, installation of new planting. In total these three areas encompass approximate six acres.

Type III: Turner Street Pedestrian Plaza and Service Area

The Master Plan proposes that the parking lot on the south side of Turner Street be removed to make way for a wider landscaped pedestrian pathway linking Cowgill Plaza and McBryde. Parking and a service access lane are to be maintained to serve Burruss and other adjacent buildings. The project includes demolition, installation of new curbing, concrete brick pavers, relocation of light poles, installation of new planting, lawns and site furniture. The proposed project encompasses approximately 2.93 acres.

Type IV: Renovation of Campus Quadrangles

The Master Plan calls for the renovation and rehabilitation of approximately 27 acres of landscape in the ten major campus quadrangles (Williams, Patton, Upper Quad, Ag Quad, Campbell Quad, Eggleston Quad, Ambler-Johnston Quad, Dietrick Quad, Pritchard Quad and Newman Quad). Rehabilitation work will include the removal of selected old shrubs and trees, planting of new trees and shrubs, installation of new concrete sidewalks, installation of the proposed campus standard for benches, litter receptacles and bicycle parking areas.

Type V: Reforestation Areas

Unprogrammed areas of the campus landscape along entry roadways, between campus quadrangles and in agricultural areas are proposed for reforestation with the intent of reducing the total area maintained in turf grass and to improve the overall aesthetic appearance of interstitial areas of the campus. Work includes planting of native trees and shrubs, clearing of grass and other inappropriate plant material, and maintenance of the plant material for the first growing season. A total of 352 acres have been identified in the Master Plan for reforestation, 100 of which are currently maintained as turf grass.

Type VI-A: Restoration of Existing Street Trees

Existing street trees in the campus core surrounding the Drill Field and along Washington Street are to be replanted at 40 feet on center as necessary.

Type VI-B: Planting New Street Trees

Several streets in the campus core including Perry, parts of the Drill Field, Stanger Street, Kent Street, West Campus Drive, the Mall, and Price's Fork Road are to be planted with new trees.

Type VIII: Duck Pond Park Restoration

Approximately 20 acres surrounding the Duck Pond are slated for restoration under the Master Plan. Restoration will include the removal of unhealthy and overgrown trees, shrubs and vines, the pruning of trees, the installation of new trees, shrubs, and campus standard benches and litter receptacles. Improvements will also be made to the banks of the Duck Pond and Stroubles Creek.

7.3.0 Property Acquisition

A long-term strategy for property acquisition is provided as part of the Master Plan to ensure that the University is able to manage important campus edges. Of particular importance are those edges along streets bounded by campus land uses on one side, and residential and commercial land uses on the other. As future residential and commercial uses along such edges may or may not be consistent or compatible with campus activities and aesthetic goals, it is important that the University have some control over these areas. To that end, several property target acquisition areas are identified in the Master Plan (Figure VII-1).

The properties targeted for acquisition are organized in the following priority categories.

Priority 1

The University has a high level of interest in the acquisition of these properties to clarify existing campus boundaries and support future facility needs. The proposed Engineering Technology Center site (Old Turner Street) and a needed expansion of the North Campus Electrical Substation (Blacksburg Substation) will both require the acquisition of land in this category.

Priority 2

The University may have an interest in acquiring properties in this category should they become available due to their adjacency with existing campus boundaries.

Priority 3

Due to their adjacency and existing land use patterns, the University may have an interest in these properties if long-term growth strategies warrant their acquisition.

PART TWO

DESIGN GUIDELINES

CHAPTER 8.0

LANDSCAPE DESIGN GUIDELINES

8.1.0 INTRODUCTION

The following guidelines set forth design principles and standards for the campus landscape. The purpose of the guidelines is to encourage unity in the design of the landscape over time, while simultaneously allowing flexibility for positive innovation. The guidelines do not prescribe specific design solutions. The guidelines are a set of ideas intended to define a direction and positively influence those who design and manage the landscape. The goal is to achieve an integrated campus design in which all of the parts relate to one another, regardless of when they are built. The areas addressed in the landscape guidelines include planting, site structures, exterior furnishings, exterior lighting and exterior sign systems. The emphasis of the guidelines in each of these areas is on design issues and the steps that should be taken to ensure the continuity of desired landscape effects into the future. Issues related to the care and maintenance are not addressed in depth, however, the guidelines are based on the goal of simplifying the long-term maintenance requirements of the campus landscape.

While there has never been a formal landscape plan for the Virginia Tech campus, the landscape is widely considered to be one of the greatest assets of the University During the 19th Century, when newly planted trees were small, the campus landscape was open and indistinguishable from the surrounding agrarian landscape. During the University's early history, individuals including President McBryde and Professor Smyth were strong advocates of campus beautification. Their efforts were largely focused on planting trees and shrubs to bring "shade and dignity to areas once bleak and barren." The informal style adopted by McBryde and Smyth was the romantic style of the great 19th Century American parks, with large lawns and trees informally arranged for aesthetic enjoyment. The landscape was seen as a symbol of civilization, education and culture in the midst of forests and farms. This style has generally been followed by subsequent generations, and typifies much of the campus landscape today. As the campus context has become increasingly developed in the last 40 years, the campus landscape has assumed new meanings. The campus landscape has become a naturalistic, pedestrian oasis in the context of expanding development, roads and parking lots. Rather than being a symbol of the human settlement of nature, it has become a symbol of the rapidly disappearing natural environment and our attachment to it.

8.2.0 CAMPUS LANDSCAPE STRUCTURE

It is the general intent of the Master Plan that the existing structure of the campus landscape be reinforced and built upon. This is particularly true in the urbanized campus core area, which is composed of a green spine of large parklands (the Mall, the Drill Field, and the Duck Pond), a series of quadrangle and plaza spaces, and a network of pedestrian linkage spaces and vehicular streets. The parklands, quadrangles and corridors of the core campus are elements which require enrichment, improved definition and differen-

The core campus landscape requires enrichment and improved definition.

The traditionally rural area surrounding the core campus requires redefinition to control sprawl and create a coherent image.

tiation; they need to become more truly urban in their relationships and refinement. In the less densely developed areas surrounding the core, reforestation is proposed as a means of developing a spatially cohesive setting and regionally appropriate image which also creates a more sustainable relationship between the University and the natural environment of which it is a part. The traditionally rural area surrounding the core campus requires redefinition to become more cohesively ordered and symbolically representative of the purposes of the institution; it should become more truly rural rather than the victim of continued sprawl.

8.2.1 General Recommendations Regarding Campus Landscape Structure

Reinforce the Green Spine of the Core Campus and Extend it Westwardly

- Establish stronger enclosure of the Patton Quadrangle.
- Improve the spatial definition of the Mall by planting formal trees along each roadway .
- Rehabilitate the tree planting around the perimeter of the Drill Field and protect the Drill Field open space as the dominant landmark of the campus.
- Rejuvenate and enrich the planting of the Duck Pond Park and The Grove area, maintaining this area as a naturalistic park for the enjoyment of natural scenery. It is increasingly important to protect and maintain this park area as the campus continues to urbanize. It is also important to improve the Duck Pond and Stroubles Creek bank conditions.
- Extend the qualities of the Duck Pond Park to the west, creating a green corridor extending from Main Street to Route 460.

Reinforce and Extend the Existing Pattern of Residential and Academic Quadrangles

- Establish stronger enclosure of the Patton Quadrangle.
- Improve the perimeter planting and sense of scale of the Pritchard Quadrangle and the space to the southeast of Dietrick Dining Hall.
- Improve tree and shrub plantings in all the campus quadrangles to establish a richer variety and greater seasonal interest, including colorful spring and summer flowers and fall foliage.
- Employ quadrangles as the organizing element for campus expansion north and west of Cowgill, and at the corner of West Campus Drive and Washington Street.

Enhance the orderly strength of all major campus streets by planting large canopy trees along them.

The campus should be remembered for great avenues of trees as much as it is for the Drill Field or its architecture. Perry Street, West Campus Drive, Washington Street, Kent Street and Stanger Street are particularly important in this regard because they serve as an inner edge of campus along which all visitors travel.

Redefine the interstitial landscape areas that serve as the major pedestrian circulation routes of the campus.

These least-attended to areas of the campus should be planted with assemblages of woody native plants to improve their spatial definition, clarity and consistency; to assign them a regionally fitting character; to benefit from ecosystem functions such as erosion control, water quality improvement, air purification and cooling; and to reduce the long-term maintenance requirements of the campus landscape.

Reforestation

The campus landscape should be unified through the reforestation of approximately 350 acres of land of which approximately 100 acres are now maintained in turf grass. Implementation of the reforestation concept requires careful study and fine tuning to ensure that key views of the regional landscape, campus open space, and campus landmarks are preserved.

8.3.0 PLANTING

8.3.1 Basic Principles

There are a number of principles that generally pertain to all areas of the campus, and which should form the basic framework for thinking about the landscape.

Space Definition

The spatial organization of the campus landscape is primarily determined by three major components: buildings, topographic form, and woody plants consisting of trees and shrubs. Paths and roads also play an important organizing function, however, their role is subordinate to the three-dimensional strength of buildings, land, trees and shrubs. The limits, emphasis, and character of all views within and around the campus are defined largely by these elements. Trees and shrubs, therefore, should not be understood merely as superficial decorative objects to be arbitrarily set out on the campus grounds, but rather as elements that define the basic spatial order of the campus which, in turn, significantly affects the quality of campus life.

Trees and shrubs should be used purposefully to achieve desired functions and spatial effects such as limiting or directing views, creating microclimates, creating overhead enclosure for greater intimacy , framing spaces to create compositional closure, or to define and reinforce major spaces and pathways of the campus. These statements are made with the recognition that spatial order and quality is indeed that with which campus design is centrally concerned. The buildings, trees and defining elements assume broader meanings only by virtue of the way they are arranged and the order of the positive spaces they define. While individual buildings or plants may possess characteristics that are attractive in themselves, the emphasis of campus design should be on the larger relationships of formative elements to space.

Scale

The size of trees, shrubs and plant beds should be considered with respect to their scale relationship to campus buildings, roads and spaces. In general, plantings should be simple, rather than overly intricate, and be conceived in broad strokes that are appropriately scaled to the campus. Smaller , garden scale plantings and flower beds are important to the campus; however , they need to be related to the campus through proper hierarchies. For example, the flower beds in front of Burruss Hall work well because they are part of an ensemble of steps, walls and paved terraces that are arranged and sized to fit with the building and the surrounding landscape.

Plant Character and Fitness

The plants selected for use on the campus should possess visual traits that are representative of or similar to the character of plants indigenous to the southwest Virginia region, and that are appropriately long-lived and refined to reflect the enduring quality of the institution. Plants that are highly exotic in their visual aspect should generally not be used on campus even though they may be in fashion from time to time. This includes trees such as the Colorado Blue Spruce, Picea pungens glauca; ornamental grasses such as Giant Miscanthus, Miscanthus sinensis; and horticultural varieties with contorted form or purple foliage. Exceptions to this rule should only be permitted in very special circumstances, and such exceptions should be few . There is great intrinsic beauty in the native flora, and it should be the guiding purpose of the campus planting design to capitalize on it. The design of campus planting should be simple and seek to evoke a mood of tranquility similar to that found in nature. The design should be kept free of distracting elements. Such an approach will yield a campus that is unique, dignified, and practical to maintain.

The natural forms of plants should be retained through proper pruning. This is particularly noteworthy when considering shrubs. Shrubs should be planted in arrangements that allow for their natural shape to be retained through periodic renewal pruning. There are many instances on campus

Trees and shrubs are important in defining the spatial order of the campus.

Plants are not merely decorative, but create positive space.

now in which shrubs have been severely sheared to limit their size because they have not been provided adequate space to grow. The result is an unintentional design of sheared plants that is unattractive, often detracts from campus architecture and is relatively expensive to maintain. Tree pruning should be started early in the life of campus trees to ensure that a proper form is established and the canopy is established sufficiently high to provide clear visibility beneath the trees and to allow adequate light to the grass areas below.

Tree Forms

The dominant form of trees on the campus is rounded as distinct from conical, weeping or upright trees. The rounded forms of the trees create soft continuous lines between land and sky and a general sense of calmness. The round-headed trees also complement the massiveness and severe lines of the campus architecture. The primary round-headed trees include oak, beech, sugar maple, tulip-tree, elm, and planetree. It is recommended that round-headed trees continue to be the primary type of tree used, and that conical, weeping and upright trees be used with restraint and only in circumstances where they remain subordinate to the dominant unity of round-headed trees. For example, hemlock trees (conical) have been used successfully as accents and in groups along the south side of the Drill Field and in the Amphitheater area. The soft outline of hemlocks, larch, Austrian pine, and white pine make them relatively easy to compose with round-headed trees, and their continued use in groups as evergreen accents is encouraged. Spruces, however, present a more rigid form that does not blend as well with round-headed trees. It is suggested that they be used only in groups where the individual forms are less pronounced. The two spruces in front of Burruss Hall are anomalies, that in the long term will increasingly conflict with the beech trees and other round-headed trees that also flank the central tower. Future use of conifers as individual specimens should be discouraged.

Pattern

The general pattern of tree groups on the campus is almost entirely informal and non-geometric. As a rule, this practice should continue. An informal planting pattern has the advantage of being able to accept losses and additions while maintaining compositional wholeness. In several locations, regular rows of trees have been used successfully, and historically "Lover's Lane" was a beautiful elm allé. Likewise, symmetrical patterns of trees and shrubs have been used appropriately in association with buildings and roads such as the honey locust trees at Eggleston Quadrangle, the oaks north of Burruss Hall, the planetrees along the Mall, and the symmetrical plantings that flank the War Memorial. The limited use of formal patterns should continue as a subordinate design approach to the dominant naturalistic approach to the grounds. The proper opportunities to use geometrically arranged plants are along streets, along major axial walkways and in courtyards and plaza spaces regularly defined by architecture.

The design of campus planting should be simple and promote a sense of tranquility found in nature.

Plants should be maintained in their natural form, as shown here at the Library, instead of being sheared.

Round-headed trees should continue to be the dominant tree form on campus.

Conifers should be used in groups rather than as individual specimens.

In the past, shrubs have been used as foundation plantings at campus buildings, often with single plants dotted along the foundation wall mimicking the repetitive pattern of walls and windows. Such patterns should be avoided in the future because the result is a planting design that lacks interest and is often out of scale with large campus buildings. The preferred approach to foundation plantings is to employ large continuous masses of plants that create a unified composition properly scaled to the size of the building. The yew hedge on the north side of Holden Hall is a good example. The Holden Hall hedge would be even more successful if it were lowered to the height of the window sills behind it.

Composition of Species

The most successful group plantings on the campus are those composed of single species or multiple species which share a high degree of visual similarity. Such groups evoke a peacefulness that derives from their visual balance and unity, yet they contain sufficient variety of branching, spacing and silhouette to sustain interest. Good examples include the elms east of Owens and Eggleston and the sugar maples in the Williams Quadrangle. The idea of creating strong groups of single species or multiple species with similar form characteristics should be continued, both in naturalistic and geometric plantings.

Native Plants

To the practical extent possible, tree and shrub plantings should consist of species that are native to the Appalachian Mountain region. This will in most cases enhance the possibility for long term adaptation of plants to the campus environment and create a visual setting that harmonizes with the characteristic beauty of southwest V irginia. The preferred tree and shrub species are specified in the attached Campus T ree and Shrub List. If it is deemed that plants of other origin are preferable to native plants in certain situations, they should only be used if the plants have been demonstrated to be non-invasive. The use of non-invasive, non-native plants may serve educational purposes and visually enrich the campus landscape, however , the fundamental planting strategy should be to employ long-lived native trees and shrubs that are adapted to the local climate and soils. Ultimately, the use of indigenous plants will help create a distinctive, identifiable and imageable campus landscape.

Variety

Campus planting should be sufficiently diverse both in species and age of plants to maintain resilience in the event of unforeseen changes in the environment, such as disease or severe climatic stress that may target plants of a specific type. Simultaneously , however, visual unity should be fostered. Variety within unity can be achieved by planting in groups of similar species and by avoiding clashing forms and colors among the various planting areas on campus. For example, the saplings of columnar Norway maples

The pattern of tree groups on campus should continue to be primarily informal.

Formal arrangements of plants are appropriate along streets and paths, or in association with formal building arrangements, such as these trees in the Eggelston quadrangle.

Plants should be used in broad strokes that are in keeping with the scale of the campus.

Spotty placement of foundation planting should be avoided.

planted on the south side of the Drill Field offer variety but will create a jarring relationship with the round-headed trees that generally surround the Drill Field. Columnar form trees should not be used around the Drill Field and the Norway maples should be removed while they are still young. A better solution would be to use several species of oaks and tulip trees or beech and maples, all of which compose well with the existing round-headed trees surrounding the Drill Field.

In the past there has been a tendency to exclusively plant single species in certain planting conditions. For example, most large flowering shrubs on campus are leatherleaf viburnum. While this practice leads to visual unity and consistency , if taken to an extreme, it can be visually monotonous and possibly renders the plantings more vulnerable to insects or disease. It also ignores the natural range of micro-climates that exists on the campus. A preferred approach for large flowering shrubs would be to employ a variety of viburnum species along with native rhododendrons and shrub dogwoods in circumstances that require large shrubs.

8.3.2 Specific Area Guidelines

The Mall

The planting objectives for the Mall should be to transform this street into a canopied boulevard. It should be a graceful shaded street; the historical and symbolic entrance to the University It should be lined with large stately trees that when mature will possess symbolic value for the Univer - sity as a whole.

The Mall should be planted with four rows of trees of the same species: two rows in the median, plus the existing rows of planetrees that flank the parking lanes. The advantages of using London planetrees to accomplish the planting are that the two outer rows are already in place, the planetree is relatively fast growing, it can withstand the urban limitations of the Mall environment and it can attain sufficient stature to canopy the Mall. Alter natively, American Sycamore or Red Oaks could be used, leaving the existing healthy London planetrees in place. The oaks that are now in the median at the east end of the Mall are all suffering from damage caused by lawn mowers. Future plantings should be protected from mower damage.

The Drill Field

The planting objective for the Drill Field should be to maintain a frame of native deciduous trees on the slopes along the inside of Drill Field Drive, and keep the center of the space as open lawn. The suggestion in the 1983 Master Plan of planting trees in fingers reaching from the perimeter towards the center of the Drill Field should not be followed beyond what has already been started in the southwest quadrant of the lawn. Likewise, the idea of a perimeter path should be dropped. The simplicity of the Drill Field

TABLE VIII-1

CAMPUS TREE AND SHRUB LIST

Preferred woody plants for use on the Virginia Tech Campus. This is not an exhaustive list of all acceptable plants. Other plants that follow the design guidelines may be used.

Canopy Trees

Abies fraseri—Fraser Fir
Acer rubrum— Red maple
Acer saccharum— Sugar maple
Betula lutea— Yellow birch
Betula nigra— River birch
Fagus grandifolia— American beech
Fraxinus americana— White ash
Carya glabra— Pignut hickory
Carya ovata— Shagbark hickory
Carya alba— Mockernut hickory
Carya cordiformis— Bitter-nut hickory
Liriodendron tulipifera— Tuliptree
Liquidamber styraciflua— Sweetgum
Magnolia acuminata—
Cucumber magnolia
Nyssa sylvatica— Black tupelo
Picea rubens-Red Spruce
Pinus strobus— White pine
Pinus echinata— Short-leaf pine
Platanus occidentalis—
American Sycamore
Prunus serotina— Black cherry
Quercus alba— Northern white oak
Quercus bicolor— Swamp white oak
Quercus coccinia— Scarlet oak
Quercus palustris— Pin oak
Quercus prinus— Chestnut oak
Quercus rubra— Northern red oak
Quercus velutina— Black oak
Tilia americana— American basswood
Tsuga canadensis— Eastern hemlock
Tsuga carolinia—Carolina Hemlock

Understory Trees and Shrubs

Amelanchier arborea— Downy serviceberry
Amelanchier canadensis— Shadblow serviceberry
Amelanchier laevis— Allegeny serviceberry
Carpinus caroliniana— American hornbeam
Clethra alnifolia—Summersweet Clethra Acominata
Cercis canadensis— Redbud
Cornus florida— Flowering dogwood
Cornus amomum— Silky dogwood
Cornus racemosa— Gray dogwood
Hamamelis virginiana— Common witch-hazel
Ilex opaca— American holly
Kalmia latifolia— Mountain laurel
Ostrya virginiana— Hop-hornbeam
Oxydendrum arboreum— Sourwood
Prunus pennsylvanica— Chokecherry
Rhododendron calandulace— Flame azalea
Rhododendron catawbiense—Catawba rhododendron
Rhododendron maximum— Rosebay Rhodoendron
Sassafras albidum— Sassafras
Vaccinium corymbosum—Highbush blueberry
Viburnum dentatum— Arrowwood
Viburnum lentago— Nannyberry
Viburnum prunifolium— Blackhaw
Virbunum trilobum—American Cranberrybush
Xanthoriza simplicissima— Yellowroot

space should be retained and the perimeter planting reinforced to become a more complete frame. The wide unplanted opening at Burruss Hall should remain.

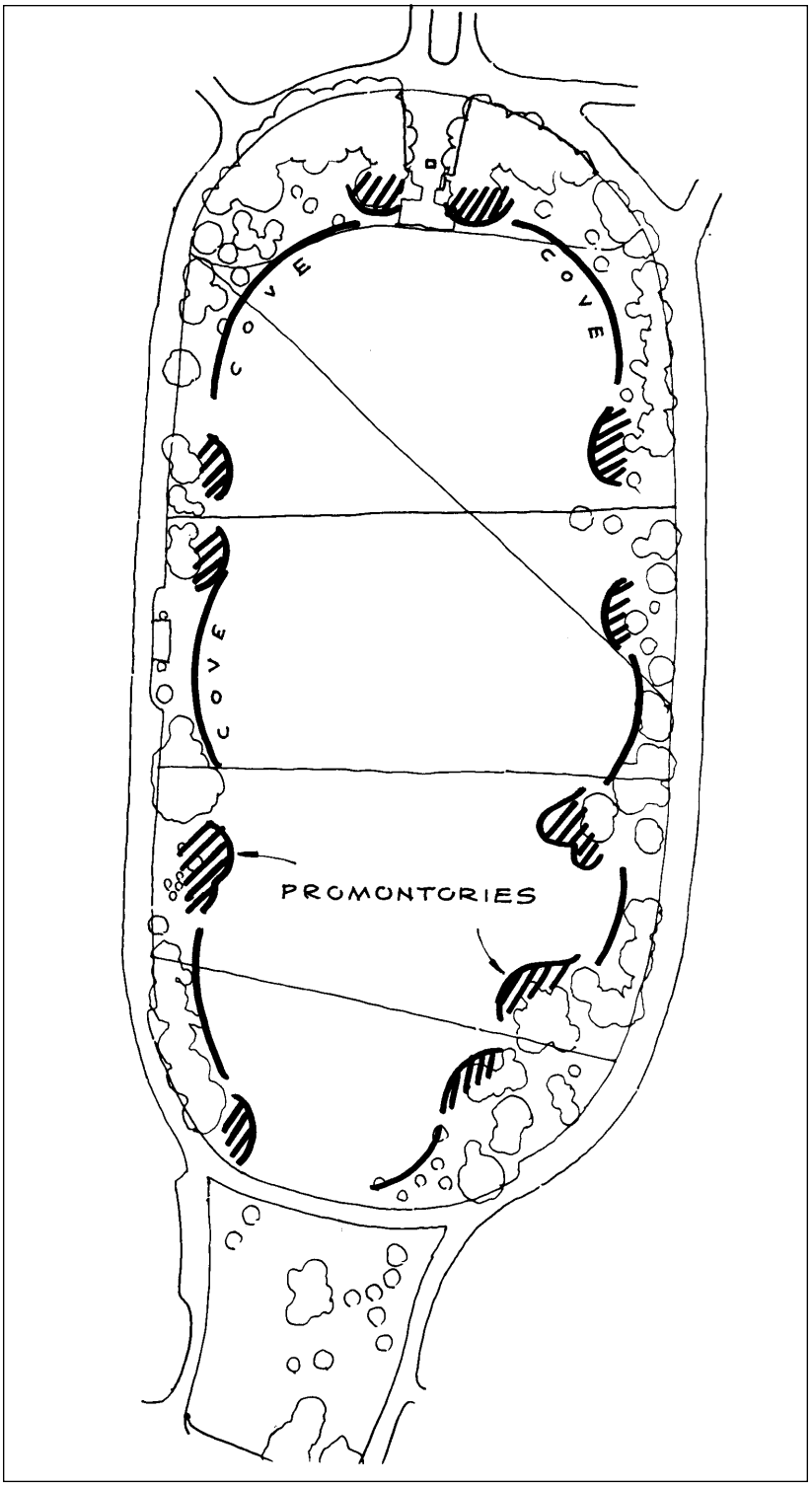
In addition to the large deciduous tree frame, accent masses of conifers should be maintained at their existing locations. The existing conifer groupings should be reinforced, and the groups should generally be arranged in front of the deciduous trees as viewed from the interior of the Drill Field. This will create a pattern in which groups of conifers will form peninsulas or "promontories" projecting slightly into the Drill Field, with deciduous trees forming the "coves." Conifers on the north facing slopes on the south side of the Drill Field should be hemlock and spruce, while the hotter south slopes should be planted with pines.

Understory trees should be added where opportunities allow in low-traffic, low-use areas where a high branched canopy is not essential. Large deciduous canopy trees most suitable for use around the Drill Field include:

Quercus alba — White Oak
Q. coccinia — Scarlet Oak
Q. velutina — Black Oak
Q. macrocarpa — Bur Oak
Q. borealis — Red Oak
Q. palustris — Pin Oak
Liriodendron tulipifera — Tulip Tree
Acer saccharum — Sugar Maple
Gymnocladus dioicus — Kentucky Coffeetree

All of these trees will make enduring, majestic specimens. Less durable trees such as ash, sycamore, red maple should not be used extensively on the Drill Field if at all. Smaller trees suitable for use around the Drill Field include:

Nyssa sylvatica — Black Tupelo
Amelanchier canadensis — Shadblow Serviceberry
A. laevis — Allegany Serviceberry
A. grandiflora — Apple Serviceberry
A. arborea — Downy Serviceberry
Cornus florida — Dogwood
Hamamelis virginiana — Witch-hazel
Oxydendron arborea — Sourwood
Sassafras albidum — Sassafras
Prunus serotina — Wild Black Cherry
Carpinus caroliniana — American Hornbeam
Ostrya virginiana — Eastern Hop-hornbeam



The planting around the edge of the Drill Field should be composed in a pattern of "coves" and "promontories".

The Mall should be planted with four rows of trees of the same species: two rows in the median, plus the existing rows of plane trees that flank the parking lanes.

The planting objective for the Drill Field should be to maintain a frame of native decidous trees surrounding the lawn.

Shrubs should not be added to the Drill Field landscape except for purposes of consolidating the existing boxwood, Buxus sempervirens, groups that already exist.

A master planting and management plan should be developed for the Drill Field.

The Duck Pond Park

The planting objective for the Duck Pond Park and the area surrounding the President's House should be to maintain parklands and woodlands in their present extent and general composition of species. The parkland area, consisting of tree plantings in lawns should be rejuvenated. Old trees in poor condition should be pruned or removed, and new trees should be planted to establish a replacement generation. The replacement planting should be diverse, to create a parkland with visual richness, and to foster the use of the parkland as an arboretum for educational purposes. Ideally , a long range planting plan should be developed that would establish goals for an arboretum that are consistent with the campus landscape design guidelines. Plant material should be authenticated and formally accessioned so that it has value for teaching and research purposes. While other parts of the campus may also be incorporated into the arboretum, the Duck Pond and The Grove area area should serve as its core. Under no circumstances should the campus become a test area for plant hardiness, morphology studies, or other horticultural research that may require plants to be selected or composed in ways that would violate the landscape design guidelines.

The woodland areas around The Grove and in the Duck Pond Park should be managed as a natural assemblage of native canopy trees and woody and herbaceous understory plants. The primary canopy trees should continue to be oaks. On the northern slopes, eastern hemlock, sugar maple and other shade tolerant forest trees can continue to be encouraged. The use of native rhododendrons should be extended in the northern exposures. The canopy and understory should be managed to encourage native plants, and remove invasive exotic plants as they may arise.

The Quadrangles

The quadrangles are all planted slightly differently, however, they all consist of lawn areas in which trees are planted. Shrubs are used to varying degrees, and are typically located around the perimeter as foundation planting. The planting objective for the quadrangles should be to develop for each quadrangle a characteristic plant assemblage that will foster a distinct identity for the quadrangle and add to the overall variety of the campus landscape. The quadrangles represent a smaller , intimate type of campus space, different from the civic scale campus spaces which include the Mall, the Drill Field and the Duck Pond Park.

Native understory trees should be added around the Drill Field.

The Duck Pond Park should be maintained as a naturalistic park and serve as the core of a campus arboretum. The bank condtions along Strouble's Creek and the Duck Pond should continue to be a focus of improvement efforts.

Tree planting in the quadrangles is essential to provide overhead spatial containment, the sensory interest that biomorphic forms offer in a dominantly architectural setting, and the environmental benefits of wind protection, shade, cooling, and improved air quality. Trees with high branching canopies that form a space beneath them should be preferred over trees that are densely branched at a low level and are more object-like. This will prevent the quadrangle plantings from becoming too massive and preserve an openness which is desired for visibility and to allow sunlight to reach the lawns. Elms are the best example of canopy trees that create a space beneath them. Other trees that are suitable for this purpose include white oak, red oak, black oak, bur oak, scarlet oak, sugar maple (improves with age), red maple, honey locust, and tulip trees. Lindens, horsechestnut, European beech, Ginko and most of the conifers are examples of trees that branch low to the ground and do not typically create spaces below their canopies, or do so only in old age. The idea of using one or two dominant characteristic tree types for each courtyard should continue, and the pattern of locating trees around the edges of the quadrangles in rows or informal groups should continue. In quadrangles where there is significant topographic change, informal groupings of trees should be favored. The only quadrangles whose terrain, shape and size support a formal planting are Eggleston Quad and the Newman Quad. In these quadrangles, single rows of trees framing the four sides of the space are a successful approach. The trees should be planted on the inside of the perimeter sidewalk.

Shrub layer and understory trees should continue to be planted around the perimeter areas. Openness at the centers of the quadrangles should be retained. In general, shrubs should not be planted in small groups or complicated configurations, but rather in broad strokes and simple patterns. For example, the yews along the north wall of Miles Hall would be much more successful as a single continuous hedge along the sidewalk rather than in their present configuration. The shrubs in the agricultural quadrangle are a good example of an informal arrangement of proper scale, and illustrate how shrubs can be successfully used inside of the perimeter walkway rather than simply confined to the area between the sidewalk and the building.

The selection of shrubs and understory trees for each quadrangle should be based on developing a characteristic theme for each and should seek to provide visual interest for more than one season of the year. For example, one courtyard may develop a viburnum theme, another may be devoted to deciduous azaleas and dogwood trees, and another to large leaf rhododendrons or hollies. The shrub and small tree themes should be selected with an understanding of the soils and microclimate of each quadrangle, and may , where possible, create a logical association with the canopy trees. In each case, the planting theme should be simple; a single strong idea carried out with excellence rather than a complexity of ideas from which nothing emerges with clarity . As each quadrangle is framed by large buildings with singular architectural expressions, so too the plantings should adopt a practical simplicity to avoid being trivial by comparison.

Canopy trees are essential in all quadrangles to provide spatial containment, sensory interest and environmental benefits.

The Newman quadrangle requires larger trees than the existing Cork Trees (Phellodendron amurense) to be in proper scale with the buildings.

Intricate and fussy shrub plantings like this should be avoided.

A simple straight hedge with small flowering trees behind it is an excellent way to handle plantings at the edges of large residence halls and academic buildings. University of Illinois, Urbana Champaign

The quadrangles are excellent areas to develop herbaceous ground layer plantings including spring flowering bulbs. These should also be conceived in simple patterns that relate properly to the scale of campus buildings, walks and other plantings. The tendency toward residential scale gardening with fussy combinations of plants should be avoided. The simple patterns and composition of natural landscapes should serve to guide the spirit of campus plantings.

General observations and planting recommendations regarding the campus quadrangles are as follows:

- Patton: The use of ash should be discontinued in favor of native oaks. Informal placement of trees is recommended. A complete rejuvenation of shrub plantings should be undertaken.

- Williams: The sugar maple theme should be retained and new trees should be high-branched specimens. English ivy could be tested as a ground cover in heavily shaded areas where turf is not possible.

- Agriculture: Maintain existing conditions. If juniper masses decline as shade increases, consider replacement with rhododendrons.

- Campbell: Retain the American beech theme with informal layout. Re-evaluate shrub planting and rejuvenate and enrich shrub layer.

- Ambler-Johnson: Retain the red maple theme with informal layout. Rejuvenate and enrich shrub plantings.

- Dietrick-Cassell: Strengthen east and west edge planting by adding trees along the walks. Large canopy trees such as oaks and tulip trees should be used to be in scale with the massive dormitory buildings. The pine and birch plantings should be retained and reinforced.

- Pritchard: The existing informal tree planting should be evaluated regularly to monitor its success. Replacements should be made as required to maintain the frame effect that is sought. Strong wooded trees such as sugar maple, or oaks should be planted instead of ash. Shrub plantings at the building edges should rejuvenated.

- Eggleston: The elms should be protected, and honey locust replacements should continue as the elms are lost. The trees should be kept in formal rows along the perimeter walks. A double row

could be planted where sufficient space exists between the walk and buildings. This quadrangle does not require a shrub planting except along the east side where sidewalks are close to windows, and an intervening layer of shrubs would enhance separation. The hedges should be rejuvenated and supplemented. Small flowering trees along the edges near doors or portals would be welcome.

- Newman: The theme of formally arranged trees should continue on all four sides of the quad, however, consideration should be given to changing the dominant tree species from Amur corktrees to a tree of larger stature with better shade producing foliage. At the building lines the yew plantings should be replaced with hedges backed with flowering trees, or simply beds with flowering trees. Prior to 1994 storm damage the hawthornes at Newman were a good example of the use of small trees in the quad.

- Upper Quad: The south side of Lane Hall should be generally maintained in its present configuration of informal trees and hedges. The hedges should not be sheared, but should receive periodic renewal pruning. To the north of Lane Hall, landscape areas made available as a result of the Upper Quad Conversion and the subsequent removal of the existing tennis courts, should be studied in greater detail to determine appropriate landscape treatments and furnishings. In general, it is recommended that the area consist of lawns and informally planted trees.

Core Area Linkage Spaces

The planting treatment of linkage spaces should be designed to make these areas more consistent and unified so that the pedestrian experience of moving through the campus is more coherent. It is recommended that turf grass be reduced and that ground cover and naturalistic shrub and wooded areas be developed similar to those already planted between Dietrick Hall and Slusher Hall. Grass should be retained in areas where it is valuable for informal use, and along the edges of paths where slopes permit easy mowing. In steeply sloping areas, or small areas that are impractical to maintain as turf, assemblages of native plants should be planted to replace the grass. The long term goal of these areas should be to reduce their maintenance requirements to only periodic pruning and thinning. The specific plants for each area should be determined by soils, exposure, use and space available at the location. The planting and management plans for various areas may also allow for the long-term succession of initial plantings to quite different ones. It may be accepted, for example, that oak seedlings be allowed to colonize a short-leaf pine planting; or indeed the plan may specify that acorns be planted at a given stage of the life cycle of a planting. A mass shrub planting of gray dogwood or fragrant sumac used for bank stabiliza-

Linkage spaces like these suffer from a lack of consistency. These areas should be transformed from grass and spotty shrub plantings into naturalistic tree, shrub and ground cover plantings.

On the left, a good example of a naturalistic planting of shrubs and trees at the Owens Hall Service Area.

tion may be purposefully and gradually replaced by a tree planting after the shrubs begin to naturally decline. The management process should be flexible and opportunistic.

It is recommended that initial plantings be dense enough to establish shade to limit grass and weed growth. This will typically be denser than the desired long term density. Relatively small size plants should be used to enhance acclimation, and limit the cost of dense plantings. Species such as sassafras, sweetgum, red maple, black cherry and chokecherry are suggested as suitable trees for creating a canopy fairly rapidly in the proposed naturalized areas.

Examples of linkage spaces proposed for naturalizing are the corridor between Campbell Hall and War Memorial Hall, extending up to and around the north side of the Dietrick Hall service yard; the embankment on the northeast end of Payne Hall; the embankment south of the Owens Hall service yards and the mounded area immediately west of Burke Johnson Student Center

Campus Streets

The planting objective for the streets of the core campus area should be to define the campus streets as continuous spatial corridors and to create a uniform appearance. This will help to control the variation of landscape and building conditions that currently exist along most streets. Uniform rows of trees are recommended to minimize the differences in building setbacks, alignment, materials and style.

As a general rule, campus streets should be planted with deciduous canopy trees that will provide foliage at a height from fifteen to forty or sixty feet above the ground, while allowing open vision below the branches. The trees should be on both sides of the street and the species should be the same along a given street. Changes in species should be coordinated with logical changes in street alignment or at intersections. Arbitrary changes in species or mixing a variety of species on a given street should be avoided in the interest of maximizing visual continuity. Exceptions to this can be entertained if the mixed species have very similar size, form and texture characteristics.

Campus Forest Areas

The proposed campus forest areas consist of existing wooded areas and open areas proposed for reforestation. There are four long-term objectives for the forest areas. The first is to maintain stands of large native trees with associated understory and ground layer plants that will provide a regionally fitting visual theme for beautifying and unifying the University owned area surrounding the core campus. The second is to provide the environmental benefits of cooling, enhanced storm water management, erosion control

The Wingra Woods at the University of Wisconsin-Madison Arboretum is a maple-beech forest planted in the 1930's. The proposed new forest areas at Virginia Tech should draw inspiration from models like this.

and water quality protection, increased species diversity and reduced water consumption and energy expenditure for grounds maintenance. The third is to provide areas for research, education, and passive recreation in close proximity to the campus. And, the fourth is to provide an example of environmental responsibility that will serve to heighten public awareness of the relationship between human society and the natural environment. All of these objectives are supportive of the University president's commitment to the 1990 Talloires Declaration for a sustainable future.

In balancing these objectives, it should be recognized that in areas of high visual sensitivity along roadways, the aesthetic quality of the forest should be given priority. Research activities that may result in "unattractive" landscapes or the dominance of invasive exotic species over extended periods of time should be located in areas with limited public exposure. The forest areas along roadways should be designed and managed to enhance and unify the campus image over the long-term with a minimum of short-term unattractiveness during periods of canopy establishment. The detailed planning of reforestation initiatives should also include, as an overarching design parameter, the maintenance of campus safety and security, and the preservation of significant views.

The forest areas should not be designed as strict restorations of the forest communities that naturally occur or occurred in the region during previous times. Rather, the forest areas should be designed to simulate the general structure and ecosystem functions of naturally occurring forest communities of the region, with a composition of species that may not necessarily replicate the original forests of the area. The designs and the management methods for each forest area should respond to the existing vegetation soils, hydrology, exposure, size, shape and context of each site.

The methods for establishing new forests should be adapted to the site conditions and budget available for each site. The preferred method of forest establishment in areas of high public visibility is to plant canopy trees at densities and proportions of species similar to their final desired configuration, and to allow and encourage invasion by understory species as the forest canopy develops.

Examples of the canopy trees that would be included in the initial canopy plantings are listed below. The list will require refinement based on more detailed studies that would address issues of plant availability in required sizes, species transplant characteristics, and the matching of tree types to field conditions.

Acer saccharum — Sugar Maple
Acer rubrum — Red Maple
Betula lenta — Sweet Birch
Carya sp — Hickory

Fagus grandifolia — American Beech
Fraxinus americana — White Ash
Liriodendron tulipifera — Tuliptree
Nyssa sylvatica — Black Tupelo
Prunus serotina — Black Cherry
Pinus rigida — Pitch Pine
Pinus strobus — White Pine
Pinus echinata — Short-leaf Pine
Quercus alba — White Oak
Q. coccinea — Scarlet Oak
Q. prinus — Chestnut Oak
Q. borealis — Northern Red Oak
Q. velutina — Black Oak
Tilia americana — Basswood
Tsuga canadensis — Hemlock

In the interest of minimizing the period for canopy establishment and increasing their immediate visual effect, trees should be planted at the largest sizes practical. Weed and grass competition should be reduced in the immediate area around the planted trees until such time that the new planting can successfully compete. Existing grass and forbes should be allowed to grow without mowing in the remainder of the project area, until they are ultimately shaded out and colonized by woody plants. The grass should be removed if rodent control becomes necessary to protect young trees from girdling. To maintain a neat edge along roadways, a narrow strip of lawn, free of trees, may be maintained during the establishment years, and later be phased out or maintained as a grass shoulder .

Other methods of planting may be employed in situations where less immediate visual effects are acceptable, or where soil conditions, exposure or the project budget will not allow planting large canopy trees at ultimate densities. These methods include: planting desired canopy trees at lower densities in loose savanna configurations that will, over time, naturally close or can be supplemented with future planting; planting desired canopy trees at higher than ultimate densities (probably with smaller size planting stock for cost reasons) to increase the rate of canopy establishment and the opportunity for development of an understory layer; and planting fast-growing pioneer tree and shrub species at medium to high densities to rapidly establish a canopy followed by inter-planting with longer lived shade tolerant canopy species. Variations of these methods are also feasible. The planting of fast growing temporary shelter belts and hedgerows may also be desirable to provide protection for the new forests during the first several decades of their establishment. In proposed forest areas along the edges of large parking areas it would be desirable to include a large proportion of conifers for visual and wind screening. For example, the Prices Fork Road edge between West Campus Drive and Stanger Street should be planted in this way to supplement the street trees that are already there.

All major crosswalks in the core campus area should be paved in masonry pavers.

A good example of a pedestrian walk with a smooth, continuous alignment.

8.4.0 SITE STRUCTURES

8.4.1 Pavements and Curbing

Street and Parking Lot Paving

The pavement material for vehicular streets and parking lots should continue to be asphalt concrete. At crosswalks, the pavement should be concrete unit pavers similar to those installed at College Avenue and Draper Road. All major crosswalks within the campus core, particularly those on Drill Field Drive should be treated in this manner

All paint markings on parking lot and road pavements should be white, not yellow, except where required by VDOT standards.

Pedestrian Pavements

The pavement material for pedestrian walks should continue to be broom finished cement concrete. Score joints typically should perpendicular to the tangent or arc length of the walk. The alignment of walks shall follow smooth continuous curves and tangents, free of kinks and misaligned curve-tangent intersections.

The preferred pavement material for pedestrian plazas and terraces immediately adjacent to buildings is cut stone, or a unit paver of brick or concrete. The use of concrete on plazas and terraces is also acceptable. The design of the plaza surface should be treated as an integral part of the surrounding architecture. The pavement should meet adjacent buildings walls, steps in a planned way; as an interior floor would deliberately meet the walls of a building. Drainage inlets should be compatible with the adjacent architectural detailing.

Curbing

Street curbing shall be cast-in-place, or precast concrete. The practice of painting the curbing yellow should be discontinued.

Walls

Site walls should be designed to be a direct extension of the architecture they are most immediately associated with. Materials and finishes shall match those of the adjacent architecture. Seat height walls located in association with building entrances and other natural gathering places are encouraged. The seat walls should have smooth cut stone or precast caps to encourage sitting, rather than rough Hokie stone or brick.

The cheek walls that contain steps should be designed to be nearly flush with surrounding lawns or plant beds, rather than projecting above the adjacent grade level.

Low walls should be capped with smooth limestone or precast concrete, suitable for sitting.

The overlook at the Agriculture Quadrangle offers an excellent opportunity to develop a pavilion to enhance campus place making.

Bus Shelters

The transparent shelters presently used on the campus should be adopted as the campus standard.

Pavilions and Trellises

Several opportunities exist on campus to add trellis or small pavilion structures to enrich the campus landscape. One opportunity is in the Agriculture Quadrangle on top of the existing concrete slab that overlooks the lawn. Another is at the top of the steps between Brodie Hall and Major Williams Hall. In each case the structure should be designed to be compatible in style and materials with the surrounding architecture. For example, the rustic wood pavilion at the Duck Pond, as appropriate as it is in that setting, would be out of place within the built campus, where stone, metal or more finished wood construction would be appropriate.

Pavilions should be designed as enjoyable places to sit and as gateways along paths that frame views or mark a transition from one place to another. The pavilion at the Duck Pond, for example, is inviting and attractive because of its design and siting.

8.5.0 FURNISHINGS

8.5.1 Benches

It is proposed that the horizontal slat, Scarborough bench, manufactured by Landscape Forms, Inc. of Kalamazoo, Michigan, or equal, be adapted as the standard campus bench. The color should be the standard campus brown to match all other metal furnishings. The existing precast concrete bench should continue to be used, and in some contexts may be employed instead of the Scarborough type. The traditional precast garden benches should also remain in their existing locations, but be discontinued in future applications.

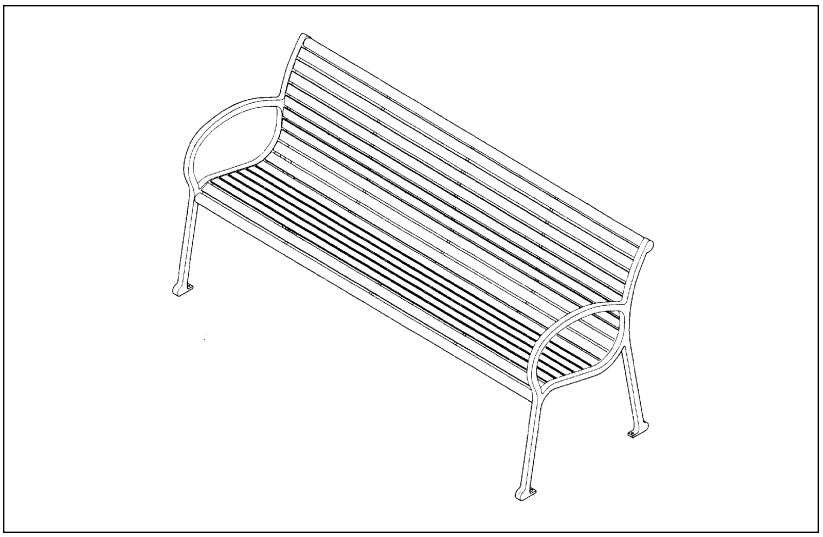
8.5.2 Tables

The existing precast concrete picnic tables now used on the campus should be replaced. A metal table and set unit similar to those used at the Burke Johnston Student Center or the Squires Student Center should be used as replacements.

8.5.3 Litter Receptacles

The use of precast concrete and metal drums for litter receptacles should be discontinued. New metal receptacles, constructed of durable vertical metal straps with a inner removable liner should be employed throughout the core campus area. The receptacles should be standard campus brown to conform to the light poles, benches and other metal furnishings. The Victor Stanely Company manufactures a receptacle of this type.

The existing precast concrete bench should continue to be used in situations where architectural strength is required.



The preferred bench for most situations is the Landscape Forms Scarborough Bench.

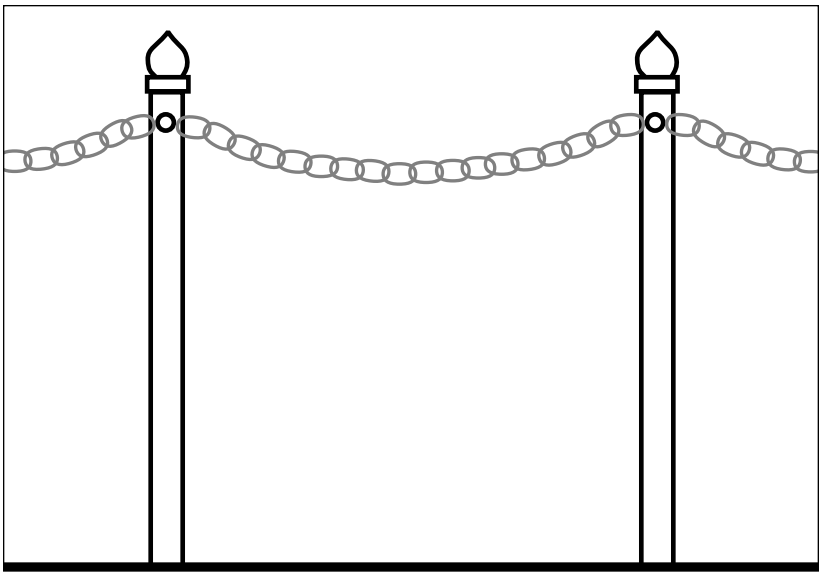
Metal tables and seats similar to those at the Squires Student Center should be used to replace the concrete picnic tables on campus.

New metal litter receptacles should be employed throughout the core campus.

Bicycle parking lots should not be located in visualy prominent locations.

Bicycle parking lots should be located against the edge of buildings and enclosed with low hedges or masses. University of Illinois, Urbana Champaign.

Bicycle racks should have a simple functional design.



A cap should be designed to properly finish the top of bollard pipes.

8.5.4 Newspaper Machines

Newspaper dispensing machines should be organized in groups and anchored into permanent locations to avoid the random placement that now sometimes occurs. The receptacles should be located for easy access, convenient use and visibility but should not be obtrusive or intrude into areas of visual importance. Backing the machines with a hedge or low wall can perhaps also help to unify and organize them.

8.5.5 Bicycle Lots and Racks

Bicycle parking lots should be located in convenient proximity to desired destinations, however, they should be located toward the edges of campus spaces and movement corridors rather than directly in prominent view. A good place for bicycle parking is against the edges of buildings, between the sidewalk and the building. Having a tree canopy over the lot is desirable to shade it and to make the lot less visible. Low hedges should be installed to contain and partly screen the lots. The lots should be planned for expansion.

The bicycle racks now used should be phased out of use in favor of a new type that is more functional in terms of meeting contemporary tie-up needs. The new rack should allow for locking of the frame and front wheel. Proper racks will encourage use and discourage the practice of using light poles and other campus furnishings for bicycle tie-ups. A rack such as the “Bike Slot” by Bike Security Racks Company of Rumney New Hampshire should be considered. The rack should have a simple functional design that does not draw unnecessary attention to itself such as the “ribbon” or hoop-shaped racks that are currently popular in the market.

8.5.6 Chain Bollards

The existing system of bollards and chains used to control pedestrian movement and protect the campus landscape should be continued. The design of the bollards, however, should be improved. A cap should be designed to properly finish the top. In locations where bollards are closely associated with buildings, a larger diameter pipe should be used for more substantial effect. The existing, thinner pipe should continue to be used in more open landscape areas. The bollards and chains should be painted standard campus brown to be consistent with other campus furnishings. Bollards and chains should be used in areas that are adequately lighted so they can be seen at night.

8.6.0 LIGHTING

The present system of standard light poles and fixtures should continue to be applied in new areas of the campus. The layout of fixtures should continue to follow the regular patterns of walks, roads and buildings so that the main lines of the campus structure are revealed by the layout of lights. New building-mounted lights should be low glare fixtures and employ lamps with good color rendition, particularly at building entrances. Bollards, well lights

The standard system of signs should continue to be used in the core campus.

The present system of lite poles and fixtures should continue to be applied to new areas of the core campus.

and fixtures embedded in walls or steps should not be used. These types of lights are prone to failure in exterior applications and require a high level of maintenance. Pole-mounted or wall-mounted fixtures consistent with the standard campus fixture should be used. W all-mounted fixtures may adopt the style of the architecture on which they are mounted rather than follow the campus standard pole-mounted fixture.

8.7.0 EMERGENCY CALL BOXES

The existing emergency call boxes should be integrated as part of a free standing pedestal element or possibly as a building mounted element provided that they are architecturally integrated. The installations should be designed to support the primary function of the call boxes (i.e. it should be consistent and easily recognizable). In general, the boxes should be located in all academic and residential areas as well as highly traveled remote areas of the campus.

8.8.0 CAMPUS SIGNS

The standard system of exterior campus signs should continue to be applied. it is recommended that all sign posts and the reverse sides of all regulatory signs be painted the standard campus brown. Building identification signs should follow the present standard design, however , the index of building occupants should be removed from all exterior signs. This information is unnecessary on the outside of buildings and, in the interest of keeping signs to a minimum and the messages simple, only the building name, and street address if necessary , should be on the sign. No signs should be attached to buildings unless they are specifically part of the building design, such as a building name carved in stone over the doorway .

8.9.0 ART

The use of elements of sculpture, relief and ornament in the development of the campus landscape is encouraged. Any such work of art, be it free standing sculpture, a fountain or an ornamental pattern in a plaza pavement, should always be carefully integrated with the landscape immediately surrounding it. The art and its setting should be developed together so that the art is a harmonious part of the landscape rather than a foreign or free element in the landscape.

Works of art that are considered to be permanent should be classic in their design. Stylistic works that will quickly be dated should be avoided. This rule applies to both abstract and representational art. The campus is the physical manifestation of social and educational purposes that span many generations. Campus art should be a fitting reflection of this enduring aspect of the university. Its beauty should be classic and timeless.

It is recommended that a campus art review board be established to evaluate and control the design and placement of art on the campus.

Campus art should be well integrated with its setting.

Whether it is abstract or representational, campus art should be classical and reflect the enduring qualities of the university. Harvey Mudd College, Claremont, CA.

CHAPTER 9.0

ARCHITECTURAL DESIGN GUIDELINES

First Academic Building, circa 1878

Old Preston and Olin Building, 1860

YMCA, 1899

Price Hall, 1907

The Forge Shop, 1895

9.1.0 INTRODUCTION

The Design Guidelines are a companion to the Master Plan and are meant to assist architects in understanding the design and planning characteristics which make the Virginia Tech Campus a special place. The purpose of these guidelines is to ensure consistently high design quality as the campus develops. Rather than restricting the freedom of individual designers, the Guidelines seek to enlist their help in extending and enhancing the underlying strengths of the campus. Identification of areas where planning, landscaping, and architectural design problems exist helps designers focus on the opportunities for remediation as well as the addition of new grace notes. Designers are encouraged to find the proper balance between individual expression and overall contextual conformity.

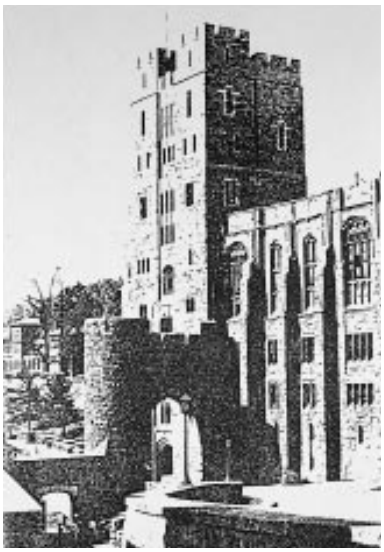
9.2.0 CAMPUS OVERVIEW - A HISTORICAL PERSPECTIVE

The planning and architectural design of the Virginia Tech Campus reflect the changing character of the institution over time. Future buildings will likewise be a reflection of Virginia Tech's character, its culture, architectural legacy, and contemporary technology. The brief history below is intended to help designers understand the planning and architecture of the campus in a historical context.

9.2.1 Early Campus Buildings

The earliest campus buildings, built between 1872 and 1905 for the Virginia Agricultural and Mechanical College, were simple, austere structures. Whether Greek Revival, Georgian, or Victorian, they shared a simplicity of massing, materials and fenestration. This simplicity reflected the practical character of the educational mission of Virginia Tech. For example, some buildings included foundries for training in the mechanical arts.

Lane Hall, 1888



West Point, 1919

Burruss Hall, 1936

Virginia Tech's architecture has traditionally reflected its changing institutional character. New development should continue this tradition.

The Administration Building
"The Rock House", circa 1905

The "Old Library" in Winter, 1905

World War Memorial Hall, 1926

Patton, 1929

9.2.2 Collegiate Gothic Buildings

Collegiate Gothic buildings began appearing on campus early in the twentieth century and continued until the mid 1960's. During this period, the Drill Field was sculpted and defined by a ring of Collegiate Gothic quadrangles built of Hokie Stone (locally quarried dolomitic limestone). This approach to campus planning and architectural design was extremely popular at the time as is evidenced by the similarity between buildings at West Point and Virginia Tech.

Collegiate Gothic buildings at Virginia Tech reflect the same austere quality of the earlier campus structures. While carved stone is used in architectural weatherings such as copings, scuppers, sills, jambs and watercourses, purely ornamental elements are infrequent. Architectural ornament allows buildings to be individualized and gain personality without sacrificing architectural continuity.

Massing

While massing and plan shape are typically simple, many Collegiate Gothic buildings gain individual identity through their roof-forms, roof-lines and silhouettes. Towers, dormers and chimneys allow buildings to have their own signature against the sky. Minor offsets in plan give character to these elements without sacrificing the functionality of the plan.

Newman Library, 1955

Signs are an important component of an ornamental program

Topical ornamental motifs add personality and character. They engage people and humanize buildings.

Heraldic bas relief

Ornament

Heraldic shields appear in a number of locations with some variations. Where more whimsical ornamental devices occur , they add a delightful note. At times they are topical in nature. Names carved into buildings add to the ornamental vocabulary. The particular style of their graphics can create an intriguing aesthetic dialogue across history and architectural styles.

Facades

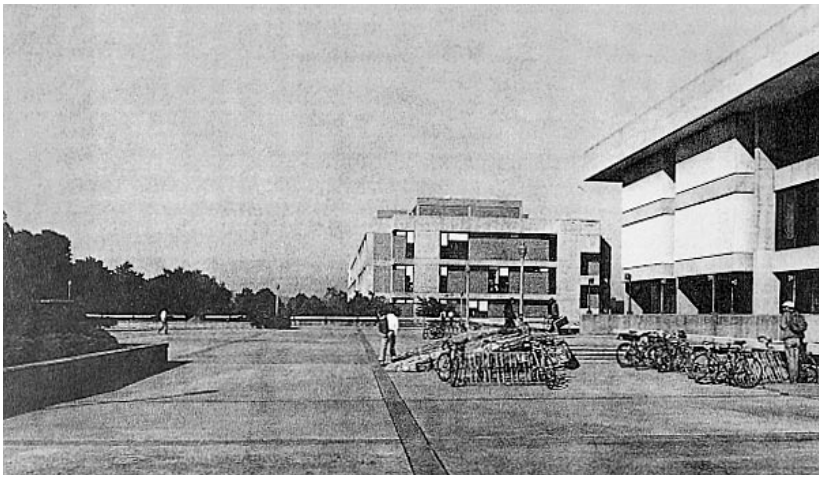
The facades of the Collegiate Gothic buildings are clearly ordered and regular . Simple rhythms of windows and buttresses and division into base, middle and top are the rule. Larger elements such as bays and great windows add accent and punctuation. In addition, they may depict an interior function by their prominence. Doorways and passageways are well articulated. Generally windows are vertical in proportion and inset several inches. Where grouped together into a horizontal assembly, the verticality is reestablished by intermittent stone jambs. Vertically proportioned panes of glass reinforce this effect. The carved stone surrounding these important elements is finely dressed and detailed (See sketch on page 128).

Gargoyle

Gargoyle

Agriculture quad, cowgoyle

Hillcrest Hall, 1940. Overall massing, fenestration and limestone trim of Hillcrest unifies it with the Collegiate Gothic buildings on campus.



Cowgill Plaza prior to the construction of the G. Burke Johnston Student Center. When membership in the Corps of Cadets became optional, the buildings also "broke ranks" and dropped out of formation, no longer defining quadrangles.

Column base transitions into a thoughtful detail which weathers well and allows a graceful visual transition from the vertical column to the ground plane.

Passageways are finished, exterior vestibules.

Interior Passages / Portals

The interiors of passages through buildings which connect campus quadrangles have integrated seating ledges and wood beamed ceilings. The use of Hokie Stone with finely dressed limestone trim is typical of the Collegiate Gothic buildings. However, brick buildings such as Hillcrest illustrate the importance of overall massing, fenestration, and limestone trim, as defining stylistic elements which can provide unity with hokie stone Collegiate Gothic buildings.

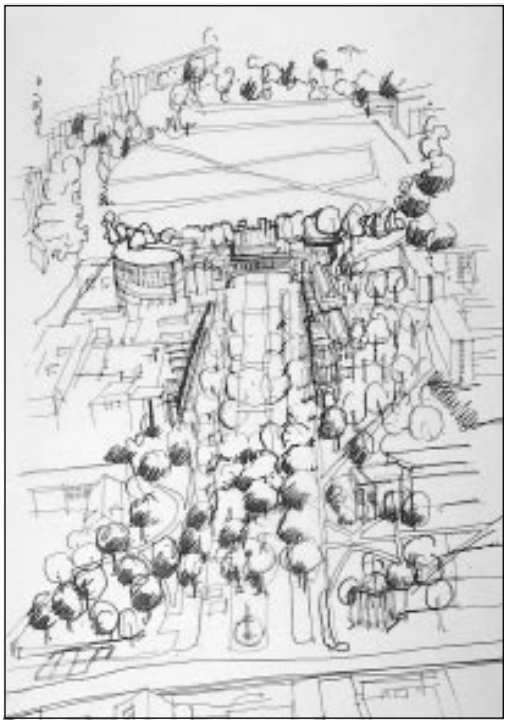
9.2.3 Non-Collegiate Gothic Architecture and Planning

In the mid-1930's, brick buildings in the Georgian style were constructed along College Avenue near the older part of the campus. While different in style from the Collegiate Gothic, they are compatible with them. Means for shedding water and wall opening details are aesthetically and functionally refined. This mutually high level of resolution helps make buildings of both the Georgian and Collegiate Gothic styles compatible.

In 1964, membership in the Corps of Cadets became voluntary and, coincidentally, the traditional Collegiate Gothic style was replaced by a more "voluntary" planning and design approach. Buildings became more object-like in design and siting and the practice of defining campus quadrangles fell out of favor. Facades were less traditionally ordered. Their entries were not as clearly marked, and fenestration patterns were more abstract. Ornament and fine detail were no longer widely employed. Hokie stone was generally replaced by architectural concrete. The new McBryde Hall, although built with a significant amount of hokie stone, illustrates that stylistic and planning continuity derive from more than the use of similar materials. The lack of windows or doors, which provide a sense of scale, and the absence of the shaping of exterior space make this building non-contextual.

Original McBryde Hall, completed in 1917 defined exterior space. It had windows and elements which provided a sense of scale.

The Mall as it appeared in 1983 and generally today.



The Mall as envisioned formally, functionally, and symbolically reuniting the town and campus by "infilling" new facilities along its edges.

Extension Building (Sandy Hall), 1924

Residential quad completed in the early 1960's

Alumni Hall, 1935

New wing of Newman Library completed in 1981

In the early 1980's, a renewed interest in preservation and enhancement of the institution's architectural and planning traditions arose. The 1983 Master Plan manifests this change in attitude. The result has been the preservation, rather than the continued demolition of Collegiate Gothic structures. Concurrently, the strategy of siting buildings to define campus open spaces was reestablished as an important planning principle. A new concern for energy conservation combined with these ideas to create atria joining old, recycled buildings with modern technologically sophisticated mates. Although detailing and ornament are not as finely developed as in the older Collegiate Gothic buildings, there has been great success in recapturing the spirit of the older structures and spaces.

The 1994 Master Plan continues the "Infill" approach of the 1983 plan and suggests areas, such as the Mall, where it can be further applied. The Design Guidelines seek to ensure that the buildings constructed as part of this effort reinforce this planning strategy.

The above overview of the campus is no substitute for designers studying the campus personally . Enough time ought to be spent on campus to observe and understand the special character and spirit of the place. In addition, earlier Master Plans, especially the 1983 Master Plan, and books such as Tech Triumph are valuable tools for a greater understanding of the campus.

The Court D'Honneur and redefined Mall, follow and extend the Collegiate Gothic campus planning tradition.

Proposed Library Bridge helps define the Court D'Honneur and provides an axial terminus in scale with the length of the Mall.

Eggleston Quad, 1937 – Traditional definition of outdoor space on the Virginia Tech Campus.

9.3.0 GENERAL ARCHITECTURAL DESIGN RECOMMENDATIONS

The architectural expression of future campus buildings is a natural extension of the Master Plan. The general observations and recommendations below are therefore intended to ensure that individual buildings reinforce planning principles as well as result in attractive and durable buildings.

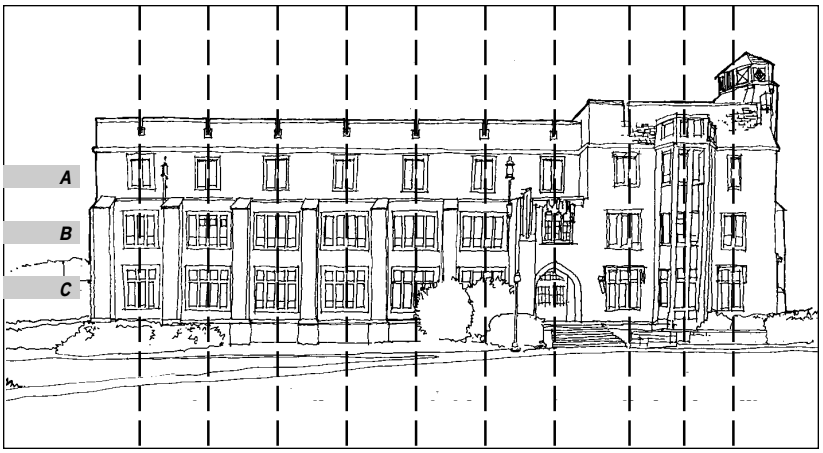
9.3.1 Definition of Exterior Spaces

New structures are to be placed to help define outdoor campus spaces. Their locations and massing, as illustrated in the Master Plan, express this intention. While specific program requirements will necessitate adjustments to these parameters, the space-making intentions of the Master Plan are to be honored. A precinct plan, developed during the concept design phase of each project, will help maintain a focus on campus master planning issues such as spatial definition, circulation, building entries, and ground level uses.

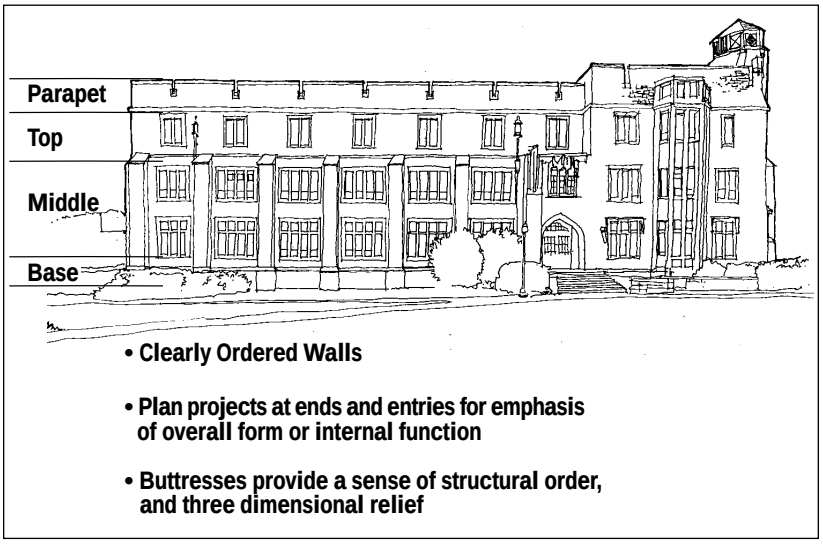
The location of entries, arcades, and ground level internal activities can do much to animate campus spaces. The plan illustrates key locations for entries and portals (See Figure III-4). Where possible, these functions should be incorporated into the building's design. Spaces should be activated with the addition or relocation of entry points. Designers are to consider how views into or from a building will create a connection between the new building and outdoor areas. A window frame can be thought of as a frame for a vignette of campus life, or as a frame for a view of a building's internal life.

View through entry portal

Portals frame views of important spaces and emphasize connections within the campus.



Holden Hall has simple massing and simple, regular fenestration with vertical hierarchy.



Holden Hall, 1940

Roofline features, Holden Hall

Cast stone and patterned brick are economical means for producing contemporary roof line ornament. Republic Place, Washington, D.C.

Sloped roofs, dormers, chimneys and pediments can be composed into strong visual compositions, creating memorable architecture.

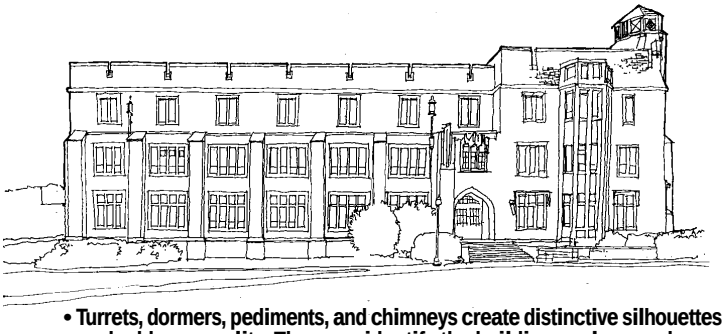
9.3.2 Massing

While many of the buildings on campus are simple in their overall massing, there is wide use of smaller scale individual elements such as bay projections and porches. These elements are used to suggest special internal functions, draw attention to important areas like entrances, and provide visual and compositional balance. These elements help to provide the visual and psychological cues necessary for an understandable architecture. Their inclusion in new designs is encouraged. Simple massing allows constrained budgets to be focused on higher quality materials and careful detailing. The traditional buildings on campus exemplify how richness can be achieved through the use of durable materials and fine detail within the context of simple massing.

Roof forms, roof lines and silhouette

Sloped roofs, parapets, and dormers are all extant on the campus. When successful, they are integral elements of the design and provide individual character to a particular building. Sloped roofs provide the opportunity for individualizing a building that is simple in plan and elevation. Executed in slate or standing seam metal, sloped roofs are attractive in appearance and durable. Asphalt shingles, which have a shorter life span, and a less formal appearance, are rarely appropriate for campus use. If traditional forms of construction such as these are to be used, they should be carefully reviewed. The choice of color, size, and pattern of roof tiles are important design decisions. Standing seam metal roofs allow for a similar range of options including material, color, patterning, and method of seaming. Other details, such as snow clips, ridge and valley flashing, and vents are all essential elements and should be consciously evaluated.

Payne Hall, 1993



- **Turrets, dormers, pediments, and chimneys create distinctive silhouettes and add personality. They can identify the building, a place and an interior function.**
- **Ornament provides further enhancement of critical architectural elements**
- **Special windows, ornamental features, stairs, ramps, and walls announce and enhance entries.**
- **Bay projections can suggest internal functions and help create a larger order to the facade.**

- **Finished stone trim enhances weathering, and emphasizes key elevation orders, elements, and rhythms**

Traditional parapet detail in carved stone

Traditionally ordered wall

Contemporary parapet details can be accomplished with cast ornament

Where parapets occur on the campus, they are most successful when trimmed in stone. A full range of design and detailing possibilities may be considered for copings. The specific slope of a roof, whether it is hipped or gable-ended, and the incorporation of both functional and ornamental details, such as scuppers and gargoyles, add character and individuality to a building, These traditional details also improve the weathering of a building and its appearance over time. Where copings are used and simplified to express their modernity, a consideration of their traditional function is beneficial. Dormers provide a lively accent along the tops of several existing buildings on campus. They provide a sense of the life within a building not unlike bay projections. Whether co-planar with the wall below, or set within a sloping roof, they must be well detailed. These details include side elevations, roofs and intersections with the main roof.

9.3.3 Facades

The traditional buildings on the campus have simply ordered and well articulated facades. Clearly delineated bases, middles and tops are the rule. In many cases, facades are symmetrical with the central and end bays pulled forward and emphasized with towers, pediments, or raised parapets. Bays and giant order windows help organize the facades an d, in some cases, indicate special interior spaces. Doors with carved surrounds, stairways, and wing walls clearly mark entries and often project several feet beyond the main facade. Windows are regularly placed both vertically and horizontally . Their sizes sometime vary from floor to floor to create a sense of hierarchy and order. They are generally vertically proportioned singly or through intermittent mullions, when arranged into horizontal groups. Their finished stone surrounds (heads, jambs and sills) give a finely crafted quality to the buildings and allow for metal or wood window frames to meet the otherwise rough, crack-faced hokie stone. This finer finishing of materials at openings in the facade reveals an intelligent understanding and sensitivity to the reality of construction and the nature of materials.

Traditional carved stone figurative ornament. Reflecting the craft of its time, it embellishes a functional rain shedding cap along a buttress.

Contemporary laser cut steel figurative ornament is economical and reflective of contemporary technology. The donkeys and elephants embellish anchorage points for canopy cables. The subject matter reflects the particular interests of the building's occupants in Washington, D.C.

Traditional stone detailing organizes the effects of weathering to enhance architectural expression.

Ornament gains intensity at points of greater importance; especially entrances.

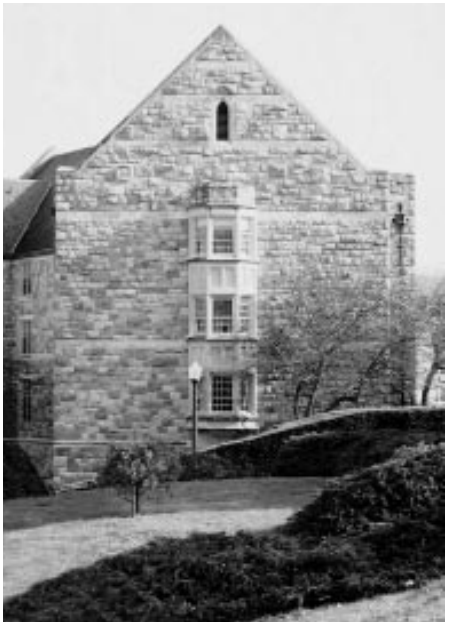
9.3.4 Architectural Details

Architectural details play an important role in the development of campus architecture. Buttresses, water courses, belt (string) courses, and copings help order these facades both horizontally and vertically . These elements increase the play of light and shadow on the facades. Many also enhance the buildings' weathering capabilities. In fact, the term 'weathering' is a traditional name for elements such as sills, copings and other water -shedding architectural details. These architectural elements have evolved over centuries and are profoundly sophisticated. They shed water effectively due to their geometry. They also create shadow lines, highlights, and ridges, which help visually organize the facade. Their functional purpose may also direct the inevitable and unavoidable residue of the weathering process into patterns which attractively reinforce the architectural order of the facade. Ironically, this type of low-tech traditional response to the natural environment is often a better technological solution than a 'high-tech' reliance on chemically exotic caulking. Caulk joints that are part of an assembly which has no geometric method for shedding water have no effective alternative should the sealant fail.

9.3.5 Ornament

Ornament arranged into a coherent, topical and idiosyncratic program can enhance and elevate a building's design. It can speak to people on a symbolic and emotional level and help provide the Vitruvian "delight" so often missing. Architectural ornament exists on the campus but not in great quantity. Where it exists, it provides the type of individuality and expressiveness which make a campus memorable and unique. Heraldic shields, plant and animal imagery, and graphic designs can be integrated into an ornamental program in any traditional or contemporary building. The creative use of unadorned construction elements can also produce a type of abstract ornament. Employing new methods for the production of ornament can suggest the eloquent advancement of technology. The use of scientific knowledge to invent methods – technologies – whereby ornament becomes feasible within the constraints of contemporary resources comes close to defining the very mission of Virginia Tech. This invention is therefore an important and meaningful aspect of campus architecture. The existing ornamental programs on campus provide a basis upon which to start. However, future programs should be more ambitious in fulfilling Virginia Tech's aspirations.

Hillcrest Hall is compatible with the Collegiate Gothic core campus as a result of its massing, roof forms, silhouette, fenestration and detailing. Its brick represents an acceptable variation and ties it to the other brick buildings on campus.



Traditional Virginia Tech Collegiate Gothic building.

Masonry detailing

Contemporary hokie stone wall with openings trimmed in finished limestone

Hokie stone

Masonry bonding patterns and lighting fixtures provide detailing and ornamental opportunities at a corporate headquarters. Shady Grove, Maryland.

9.3.6 Masonry

Hokie stone, brick and architectural concrete are the dominant building materials on campus. Their use generally follows a clear pattern. The Drill Field and its surrounding quadrangles are hokie stone. The buildings surrounding the inner Collegiate Gothic core along the Mall, College Avenue, and the west side of West Campus Drive are brick. Architectural poured-in-place and pre-cast concrete mixed with brick occur along the north edge of campus and in parts of south campus. This pattern of materials helps give each precinct its own character. Continuing this pattern of material-use can make sense to the extent it reinforces the planning structure of the campus, and informs the campus scale.

Where areas of different material-use interface, an evaluation must be made as to which materials or what blend of materials ought to be employed. Johnston Student Center and Hancock Hall illustrate the use of hokie stone buildings in an area of material-use interface. The insertion of these stone buildings effectively bridges between the two areas, creating a quadrangle and transforming Cowgill into a positive accent.

Hokie stone should continue the tradition of having split-faced units in a random ashlar pattern with flush mortar joints. Smooth limestone is used most appropriately for trim and ornament. Brickwork requires careful attention to unit size, texture and color. In addition, bonding pattern, mortar color, and joint striking, are important considerations. The incorporation of stone trim, accents, and ornamental elements in brick masonry campus buildings is encouraged.

Poured-in-place concrete, pre-cast concrete, and cast stone can be aesthetically acceptable and cost-effective substitutes for limestone. They can be formed with textures and patterns which reflect their own particular character or which resemble traditional carved stone elements. In the case of the Bookstore, the poured-in-place concrete parapet is compatible with the nearby limestone trimmed-parapets. Its board forming provides a means to attractively organize weathering patterns and marks a particular architectural period – Brutalist.

Contemporary example of architectural detailing achieved with cast stone. George Washington University, Loudoun County, Virginia.

The entry and doors above are not compatible with Virginia Tech's architectural tradition in style or quality.

Traditional buildings on campus celebrate their entries. The doors themselves have strength and character.

Traditional ganged windows.

Bay emphasizes entry

Profiled aluminum extrusions allow economical and maintainable modern windows of a traditional nature. George Washington University, Loudoun County, Virginia.

9.3.7 Roofing

Roofing materials need to be of equally high quality. Sloped roofs, as previously stated, should be slate, high quality artificial slate, or tern-coated stainless steel. Flat roofs need to be evaluated for their visual appearance to the degree they are visible from above or can be utilized as terraces. In these cases, roofing pavers and ballast stone need to be reviewed for their aesthetic appearance. Careful consideration needs to be given to organizing and screening rooftop mechanical equipment.

9.3.8 Doors

Doors and door hardware are important as they are constant points of contact between people and buildings. They denote much about the character and durability of a building. They also provide an opportunity to personalize a building and welcome users in a gracious manner. Wood, metal, and glass can all be used acceptably on the Virginia Tech Campus. Combinations may occur where inner and outer doors form a vestibule. Attention should be given to visibility through doors for safety and convenience.

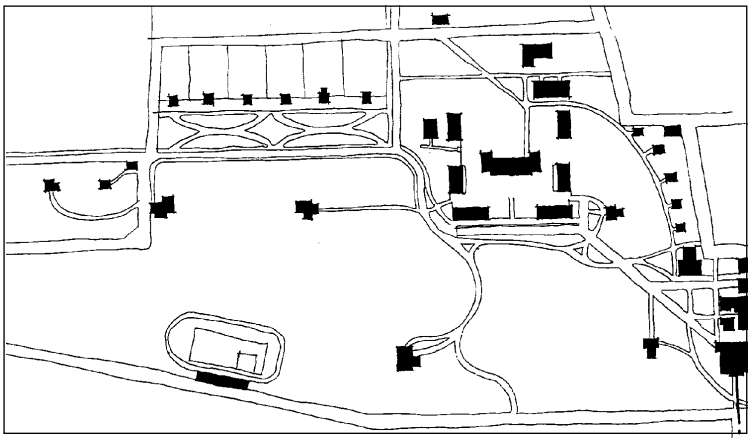
9.3.9 Windows

Windows should be of high quality wood or metal. Profiles and mullions should respond to the small scale and delicate quality of the traditional casements. Window glass should appear as clear as possible within good energy management requirements.

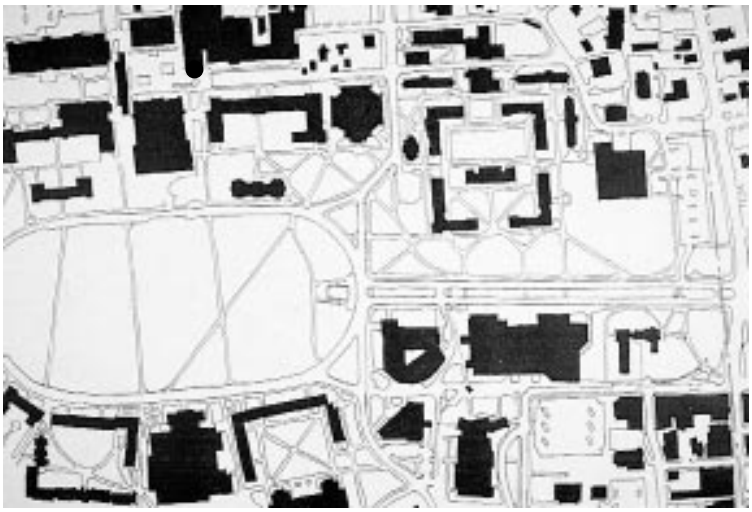
9.3.10 Color

The coloration of the campus is dominated by the color of the hokie stone. Red brick, grey roofs, and light limestone and concrete complete a muted palette. While landscape materials provide colorful accents, more is needed. Window trim, which in the past was painted light grey to match the weathered hokie stone, provides an opportunity to add colorful architectural accents (There is an ongoing program to paint grey window trim dark brown – matching other exterior metal such as lamp posts). Red, blue, and green, when mixed with sufficient grey or black, can provide contrast in value and hue with the stone and brick. In fact, the trim color will bring out colors in the basic materials which are not otherwise noticeable. Black can also be considered as a possible trim color where sharp contrast is desired. This stronger approach to trim, and even door color, is more true to the traditional architectural styles on campus.

Plans of the Mall area over time



Past



Present

Future

Virginia Tech was historically integral to the heart of Blacksburg and the focus of Main Street (Preston and Olin Building).

1994-This focus is currently lacking.

Reestablishing this focus with a strong, memorable structure will improve the urban design of Blacksburg and mark the historical and ceremonial entry to Virginia Tech.

9.4.0 MALL COMMENTARY: AN ILLUSTRATION OF THE DESIGN GUIDELINES

A key element of the 1994 Master Plan is further development of the Mall. In its current condition, this area has little spatial definition, represents a rupture in the ring of quadrangles surrounding the Drill Field, and fails to connect the campus to the town of Blacksburg along Main Street. It also fails to fully establish the formal, ceremonial gateway to campus orig inally promised by this planning strategy. The 1994 Master Plan envisions four actions to improve the Mall: 1) construction of a Creative Arts Center; 2) construction of buildings along the north edge of the Mall; 3) construction of a pergola along the north facade of the Squires Student Center; and, 4) construction of a Library addition spanning the Mall. Each of these actions is described below .

9.4.1 Creative Arts Center

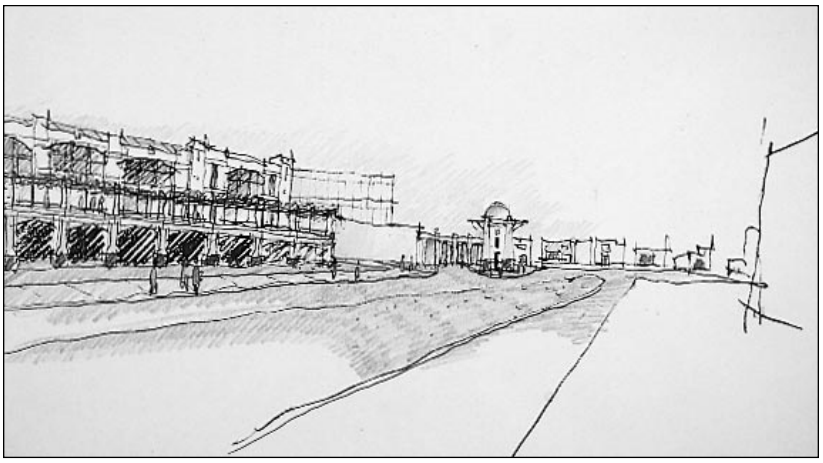
The Master Plan envisions locating a Creative Arts Center on the Mall which will include a performing arts theatre, art studios, an art museum and a parking garage. As part of an effort to reestablish Virginia Tech's historic architectural presence in downtown Blacksburg, it is proposed that the art museum incorporate a tower landmark element on the corner of the Mall and Main Street. The tower element will serve to mark a critical point of entry into the campus in a manner recalling the original axial relationship between Main Street and the Preston and Olin Building on the Virginia Tech campus (The Preston and Olin Building was demolished in the 1930s to allow for the extension of Main Street to the north).

Building Dimensions

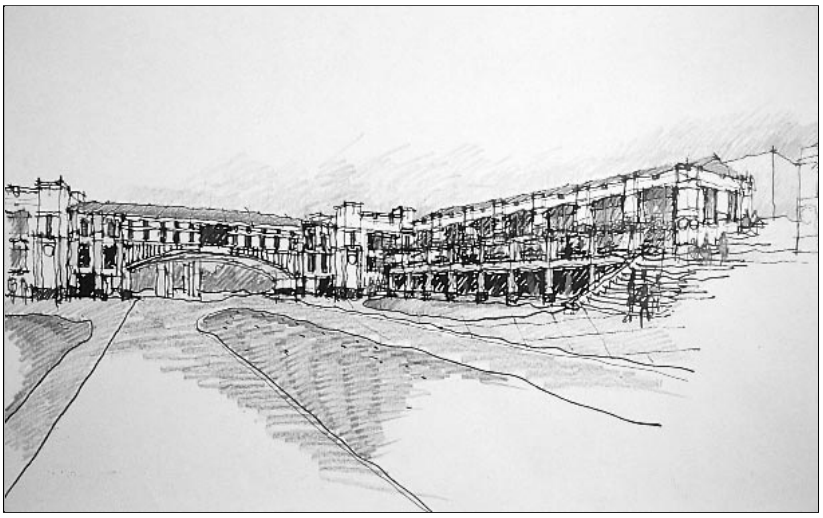
To effectively establish a focal point on Main Street, the proposed tower element of the art museum should be 40'–50' in diameter and about 50' in height. It should be monumental in scale and illuminated at night as an icon of the University As part of an Arts building, it will also suggest the broader academic sweep of today's Virginia Tech.

Materials and Expression

A mixture of hokie stone and brick on the tower element could be an appropriate palette of materials at this interface between 'town and gown'. As a statement of Virginia Tech's educational mission in engineering and the sciences, it would also be appropriate for the tower element to integrate an expression of technology .



View of the proposed 'Rampart' buildings and the Creative Arts Center tower element.



The proposed 'Rampart' buildings allow for dining or other public functions to be adjacent to a ground floor arcade. A similar arcade is proposed for the Squires Student Center.

Lover's Lane could be redefined along the north face of the 'Rampart' buildings and the south edge of the Upper Quad.

A tower element such as that on Holden Hall could define the east end of the Rampart buildings.

9.4.2 Mall Buildings (north side)

The creation of a mixed-use, linear building opposite the Squires Student Center and at the base of the Upper Quad is proposed to improve the spatial definition of the Mall. A stair on axis with the entrance to Lane Hall is envisioned as a way to reinforce the cross axial relationship between Lane Hall and Squires. The base of this four or five story building could accommodate food services or other public functions which provide life to Mall. The upper levels, set back to create a south facing terrace, could accommodate many uses ranging from dormitory to classroom to faculty offices. The northern face of the building would be three or four stories high due to grade changes, and could be used to help redefine historic Lovers' Lane.

Materials and Expression

The base of this building should be hokie stone with limestone trim. The upper stories may be a mix of hokie stone, brick, and limestone trim to foster a transition between the predominant brick of this precinct and the hokie stone of the Drill Field. If one material dominates, brick could be used to keep the Drill Field's clarity and definition. An active cornice line, dormers and towers are encouraged. A sloping slate roof is also acceptable. A major tower at the east end could help create an accent along the Mall, generate a special room internally , and place a marker where the historic diagonal path to the Upper Quad crosses the Mall.

9.4.3 Squires Pergola

The construction of a pergola along the length of Squires could provide this building with a unified and formal facade and reinforce the character of a ceremonial gateway drive. It could be utilized to screen existing discordant uses such as the loading docks on either end of Squires, perhaps with gates, and provide a more rhythmic fenestration, and massing to the facade. It could also function as a shading device and provide seating for informal conversations and outdoor dining. As a front porch to the building, it could create a more inviting image for the building.

Materials and Expression

The columns of the pergola, if built of hokie stone, should match the stone arcade of the new buildings proposed for the north side of the Mall. Likewise, the current brick exterior of Squires would reflect the upper brick portions of the building proposed for the north side of the Mall. At approximately 16' in height, these columns could incorporate commemorative inscriptions and ornament providing opportunities for recognizing graduating classes, groups, and/or individuals. The cross members should be of properly proportioned durable wood, metal, or fine precast concrete. They should provide reasonable shade, support for vines, and visual weight.

View of the Mall looking east toward Main Street.

View of the Proposed Reading Room looking east.

Alumni Gate, built 1914, removed 1936.

Window tracery frames campus views.

9.4.4 Library

The construction of a gateway arch spanning the Mall from the northern end of the Library to a new academic/library wing on the south side of the Mall is proposed. This structure would delineate a ceremonial entry to the inner Collegiate Gothic core of the Virginia Tech Campus and serve as a bridge connecting the mid-level of the Library to the higher topographic elevations of the Upper Quad. The span of the bridge is envisioned as a great reading room providing a "window" to the Mall, Drill Field, and the War Memorial in the distance. Further, it could provide a covered drop-off and pick-up area below , and would locate a 24-hour activity at the very heart of the campus.

In conjunction with the War Memorial, the Library Bridge would help architecturally express Virginia Tech's mission to foster a commitment to service (the Memorial) and the rigorous academic preparation which contributes value to that service (the Library). The Library Bridge would provide a vista to the Mall from the east framing views of the Memorial and the Virginia landscape beyond. This spatial gateway and frame would be reminiscent of the passageways connecting the quadrangles and the Drill Field. As a grand gateway , the Library Bridge would define the Mall as a ceremonial entry to the campus. It would also frame a Court D' Honneur defined by the existing library, the proposed north wing of the library, and the War Memorial. At 32 feet in height, the War Memorial could more effectively command this newly defined space which is approximately 320 feet wide in the east/west direction. The Mall, at 1,200 feet in length, is an overwhelming expanse relative to the height of the War Memorial. The Library Bridge would provide a terminus more in scale with this length.

The architectural design of this key building is critical and will require careful study . The following recommendations provide a starting point.

Building Dimensions

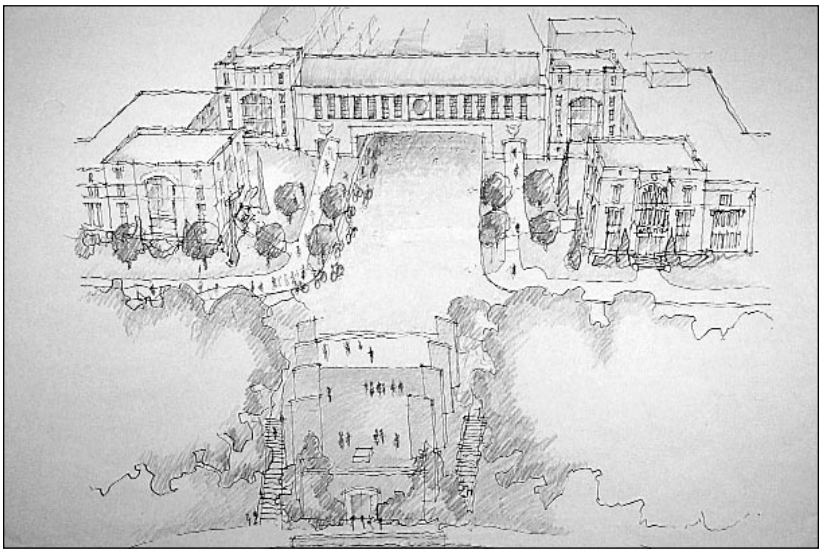
The bridge should span the Mall from curb to curb, about 98 feet. It should be no more than 60 feet wide, have a clearance in the center of 22 feet, and 14 feet at its spring points.

Interior Reading Room

The mass of the bridge should be directly related to the size of the interior reading room. This room should have a minimum ceiling height of 14 feet at its edges, and perhaps a barrel-vaulted shape in its East/West section; adding another 8 feet in height to the space. It is important that this room have a compelling and memorable character that enhances its symbolic location and stirring views. The campus once had a 'great hall' in the old library. This room can replace that lost asset.

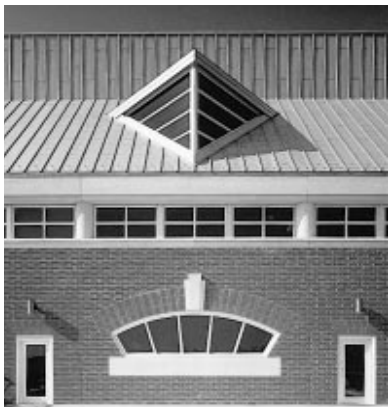
Reading Room in old library (destroyed by fire).

Traditional Virginia Tech ornament and detail.



View of Court D'Honneur with proposed Reading Room/Bridge.

Modern ornament achieved by sand blasting. Office Building, Pennsylvania Avenue, Washington, D.C.



Reinterpretation of traditional architectural elements ties past to present. George Washington University, Loudoun County, Virginia.

Contemporary ornament and detail achieved with cast stone on an office building. Pennsylvania Avenue, Washington, D.C.

Materials

The exterior of the Library Bridge should be predominantly hokie stone with limestone trim. The underside of the span must be developed with the same care as the other campus passageways. Coffering in plaster, tile finish, or wood detail should all be considered. The roof should be a standing seam metal of grey color.

Details

The exterior should incorporate refined architectural details and an ornamental program.

Design Expression

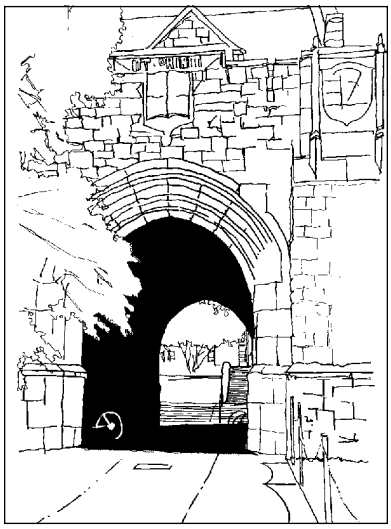
The greatest challenge may be in expressing the modernity of the structure. This may be accomplished through the careful revelation of concrete or steel structural systems. Perhaps the side walls of the Library Bridge are beams, with the top and bottom of the central window expressed as compression and tension connections respectively. A savvy and sophisticated merging of program, technology, and aesthetics is required. These three characteristics parallel the Vitruvian ideals of 'commodity, firmness, and delight'.

9.5.0 THE DESIGN CHALLENGE

The above description of the Mall development is meant to illustrate the broad latitude afforded designers within this Master Plan's vision for Virginia Tech. The value of an individual's freedom and creativity is a foundation of our society. Writing for the Washington Post, E. J. Dionne, Jr., described how this spirit of individual freedom is exemplified in American cultural heroes such as Humphrey Bogart:

"Bogart's enduring strength lies in the fact that he resolved the essential tension in the American character between a passionate individualism and a powerful but unsentimental devotion to community. Bogart could give himself to others, even to abstract ideals, while remaining his own man, a risk taker. He could say, as Sam Spade put it, 'I don't mind a reasonable amount of trouble.'

We also value individual sacrifice and commitment to the common good. Virginia Tech's founding, as a Land Grant College, is a manifestation of both these values. The purpose of the Design Guidelines is to help individual designers express their creativity within the framework of serving the common good.



Traditional Virginia Tech archway

9.6.0 GENERAL RECOMMENDATIONS SUMMARY

9.6.1 Design Character

- Buildings should extend and enhance the underlying planning and architectural strengths of the campus.
- New buildings should balance individual expression with contextual sensitivity.
- New buildings should reflect the character of Virginia Tech as an institution with a rich past, vibrant present, and promising future.
- Program, site, and budget parameters should all be addressed in an integrated fashion.

9.6.2 Planning

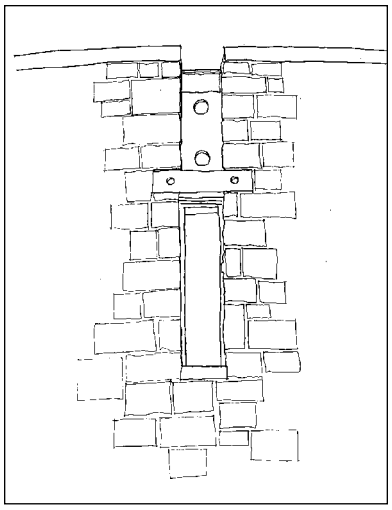
- Buildings should be sited to reinforce and enhance the spatial structure of the campus and its circulation patterns.
- Building entries should be clear and coordinated with circulation patterns and landscaping elements.
- Ground level uses should consider the harmony of interior and exterior activities.

9.6.3 Massing

- Massing should be simple.
- Buildings should be tall enough to define adjoining spaces. This will require a minimum 3-story or 45 feet high building.
- Bays, porches, towers, and other minor adjustments to massing are encouraged.

9.6.4 Roof Forms, Roof Lines and Silhouette

- Well developed and articulated roof lines are encouraged.
- Sloped roofs and flat roofs are both acceptable.
- Sloped roofs should be of high quality self finished metal or slate.
- Flat roofs should have carefully selected aggregate or pavers if visible. Visible roofscapes must be as carefully designed as any other exterior sur - face of the building.
- It will be necessary for designers to explain all aspects of their design selection including material, color, patterning, and other details.



Contemporary architectural detail executed in cast stone.

- Parapets should be well articulated and trimmed with cut stone. Profiles, scuppers, and other ornamental devices are acceptable and encouraged.

- Dormers and pediments are also acceptable and encouraged as are cupolas, chimneys, and other traditional roofing embellishments. Their intersection with the main roof must be well detailed and will receive careful scrutiny. These elements should not be viewed purely as ornamental elements without functional attributes.

9.6.5 Facades

- Facades should be simple and well ordered.

- General fenestration patterns should be regular . Some vertical hierarchy is appropriate. Window surrounds should be cut stone. Window openings should be subdivided to create a vertical proportion where they form horizontal groupings.

- The use of bays, giant order elements, or special accents to provide a large overall order is acceptable and encouraged.

- Special detailing ornament and materials at significant locations are acceptable and encouraged.

- Window frames and glass should be set back approximately 6". Sills and heads should be detailed to shed water and alleviate the possibility of unattractive weathering patterns.

9.6.6 Architectural Details

- Buttresses, coping, string courses, and other traditional architectural details are acceptable and encouraged.

- The joining of dissimilar materials must be resolved carefully and will be rigorously reviewed.

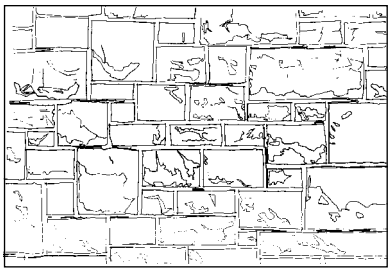
- Where possible, caulk joints should be placed in less visible locations such as inside corners or reveals.

9.6.7 Ornament

- The campus currently has minimal ornament reflective of its lengthy history. Future buildings should have well developed ornamental programs appropriate to a University with such a broad contemporary mission.

- Heraldry, plant, animal, and geometric motifs are all acceptable and encouraged in a coordinated program.

- Building identification integrated into building facades are key elements of an ornamental program.



Traditional Virginia Tech random stone masonry.

- The use of new technologies to economically produce ornamental elements is acceptable and encouraged.

- The creative use of masonry patterning is also acceptable as an ornamental strategy.

9.6.8 Masonry

- Material selection should be made to reinforce existing campus patterns.

- Hokie stone with split face random units and natural color mortar should be used in buildings within the quadrangles surrounding the Drill Field. The drill marks these stones contain should also be retained as a design element. Cut limestone trim should be utilized. Outside this inner core, a mix of hokie stone and reddish brick, or brick with limestone trim may be considered.

- Masonry design must comprehensively consider unit size, texture, color , hording pattern, mortar, and striking. These design choices will be rigor - ously reviewed.

- Precast concrete, poured-in-place concrete, and cast stone may be proposed as alternatives to limestone trim.

9.6.9 Roofing

- See 9.6.4

9.6.10 Exterior Doors

- Wood, metal, and glass doors are all acceptable.

- Doors should have a quality and character appropriate to the overall facade.

- Vision panels, reveals, and carving are appropriate and encouraged.

9.6.11 Color

- Color choices for brick must be coordinated with the existing campus and reinforce the overall campus design.

- Paint colors on campus are currently subdued. More contrast and hue are encouraged.

- Colors should help "bring out" the various tones in the hokie stone and plant materials on campus.

- Deep red, blue, and green, with grey may be considered. Black and dark brown are also acceptable.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