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The University vision is to "...be one of the nation's top-20 public universities." In January of 2001, the Board of Trustees adopted the Mission and Vision statements. The Board also endorsed a set of 10-year goals that had been shaped, under the guidance of President Barker, by the Clemson faculty, staff, students, and administrators.

The goals are grouped into five categories. Some of the goals are general and some are very specific.

ACADEMICS, RESEARCH, AND SERVICE

- 1. Excel in teaching, at both the undergraduate and graduate levels.
- 2. Increase research and sponsored programs to exceed \$100 million a year in research support.
- 3. Set the standard in public service for land-grant universities by engaging the whole campus in service and outreach, including a focus on strategic emphasis areas.
- 4. Foster Clemson's academic reputation through strong academic programs, mission-oriented research and academic centers of excellence, relevant public service, and highly regarded faculty and staff.
- 5. Seek and cultivate areas where teaching, research, and service overlap.

CAMPUS LIFE

- 1. Strengthen our sense of community and increase our diversity.
- 2. Recognize and appreciate Clemson's distinctiveness.
- 3. Create greater awareness of international programs and increase activity in this area.
- 4. Increase our focus on collaboration.
- 5. Maintain an environment that is healthy, safe, and attractive.

STUDENT PERFORMANCE

- 1. Attract more students who are ranked in the top 10 percent of their high school classes and who perform exceptionally well on the SAT/ACT.
- 2. Promote high graduation rates through increasing freshman retention, meeting expectations of high achievers and providing support systems for all students.
- 3. Promote excellence in advising.
- 4. Increase the annual number of doctoral graduates to the level of a top-20 public research university.
- 5. Improve the national competitiveness of graduate student admissions and financial aid.

EDUCATIONAL RESOURCES

- 1. Campaign goal surpassed by 40 percent.
- 2. Rededicate our energy and resources to improving the library.
- 3. Increase faculty compensation to a level competitive with top-20 public universities.
- 4. Increase academic expenditures per student to a level competitive with top-20 public universities.
- 5. Manage enrollment to ensure the highest quality classroom experiences.

CLEMSON'S NATIONAL REPUTATION

- 1. Promote high integrity and professional demeanor among all members of the University community.
- 2. Establish a Phi Beta Kappa chapter.
- 3. Have at least two Clemson students win Rhodes Scholarships.
- 4. Send student ensembles to perform at Carnegie Hall.
- 5. Have at least two Clemson faculty win recognition by national academies.
- 6. Publicize both national and international accomplishments of faculty, staff, and students.
- 7. While maintaining full compliance, achieve notable recognition with another national football championship, two championships in Olympic sports, and two Final Four appearances in basketball.

As Clemson's mission is advanced, there will be curricular, pedagogical, staffing, and financial implications that will require creative and forthright actions. Many objectives, to be fully realized, will also require changes in the University's building inventory and site development strategy. The Campus Plan describes the physical resources that exist, the additional facilities that are required to meet current goals, and how the University foresees addressing the projected needs.

"By establishing an approach to decision making based upon clearly articulated principles, you have set the stage for ...a seamless system that blends the overlapping aspirations of the [University's] Plan, the Academic Plan and the Campus Plan into a cohesive unit by intelligently applying your working principles as a measure of what is good within the plan. Constant reference to principle may frustrate the individual bent on action at any cost, it is a process that requires some reflection after all. In a similar way, constant pressure for action may frustrate the individual wishing to seek a higher ideal. Striving for balance requires a modicum of patience, it seems....

In our discussions we were...able to hold fast to the ideals that remain constant while speculating on the opportunities for change that seem inevitable. The plans in front of us offer intelligent choices to gain advantage from a variety of opportunities as they arise, together with a database that provides a rational format for making such choices. The process extends to the planning and development of all university holdings.

J. Jacques, 15 May 2002

PLANNING CONTEXT

A long-range master plan was developed for the Main Campus in 1994, and many of the projects that were identified have been completed. In 2000, the University initiated this new, comprehensive planning effort to address present facility needs on the Main Campus and in its surroundings. This Campus Master Plan focuses on the vision of President Barker and the Board of Trustees that Clemson will become one of the top twenty public universities in the country. Components of that vision include excellence in teaching, increased research support, excellence in outreach, excellence in athletics, excellence in performing arts, thriving Phi Beta Kappa chapter and Rhodes scholarships, and successful private fund-raising.

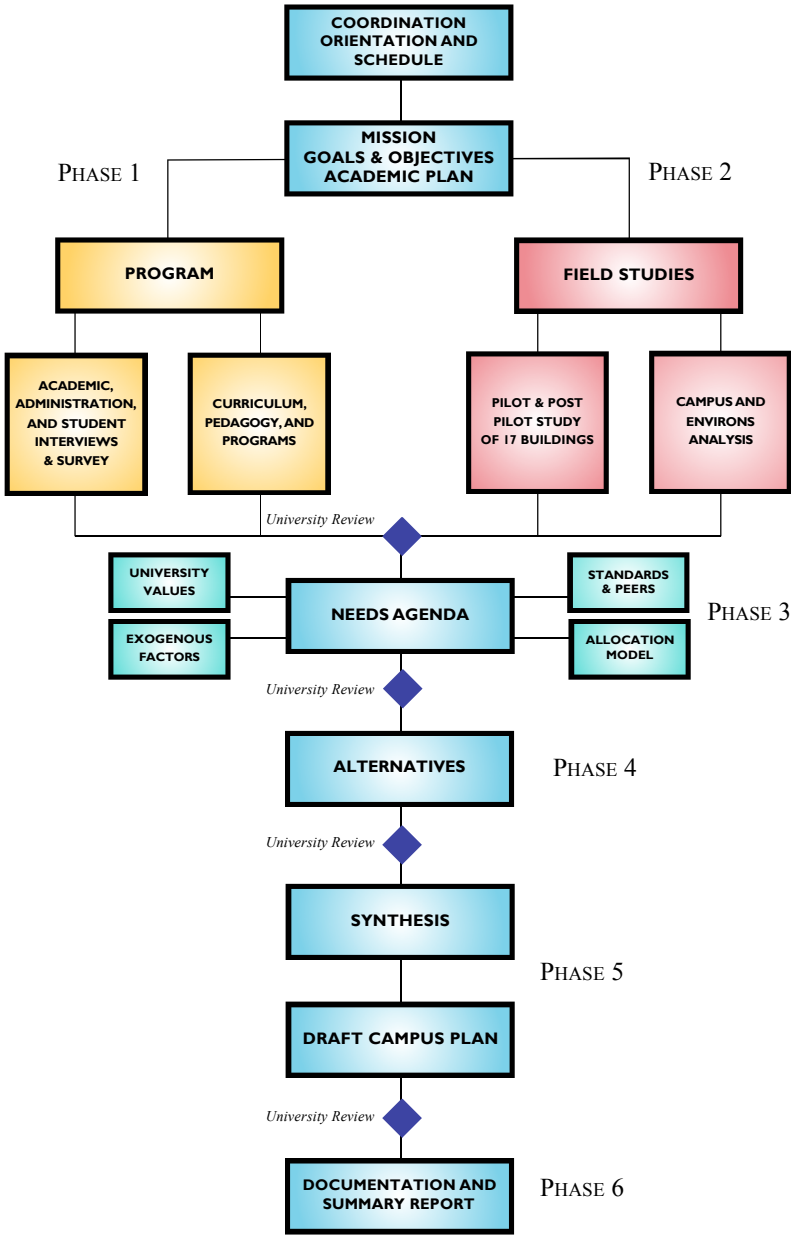
There are three parts to the Campus Plan. One is a study and analysis of the campus and the environs as they exist. Another is a programmatic study and analysis of facility needs in response to the University's academic plan and priorities; and the third is an analysis of buildings in terms of condition, use, and appropriateness of current allocation.

PLANNING PROCESS

The planning process at Clemson was designed to be participatory and collegial. Representatives from each academic and administrative department were involved in an effort to develop a program for the Campus Plan, consisting of a broad list of issues and concerns to be addressed. Additional information was obtained through web-based opinion surveys of students, faculty, and staff, and open forums and presentations to the Clemson community.

The needs as defined were prioritized and quantified, and alternative ways to address those needs were generated. The Campus Plan is a synthesis of the best aspects of the many alternatives. See Diagram 1 for a graphic representation of the planning process.

Diagram 1 CAMPUS PLANNING PROCESS



CAMPUS MASTER PLAN OVERVIEW

The Campus Plan is a framework for decision making that expresses a point of view regarding all aspects of the campus. The Plan identifies sites for new construction, enhanced landscape development, and possible expansion of existing buildings; and describes the continued use or reuse of existing facilities to achieve a functional and attractive physical environment and an appropriate sense of place. The Campus Plan projects are described below. Projects on the central campus are located on Drawing 1. Those west of Lake Hartwell, on the Ravenel site, are located on Drawing 2.

Central Campus

- A The Johnstone development area is the former Johnstone Hall site expanded to include the Harcombe Dining and University Union sites. It will continue to be a mixed-use precinct. New construction will consist of a new dining facility, a new student residence hall, new space for student activities and Student Affairs, a new academic building, and an improved campus open space. The development will be strongly linked, with notable green spaces and pathways, to the adjacent areas of campus, including Cox Plaza to the east, student housing to the south, new playfields to the west, and renovated fraternity housing to the north. Two small student residence halls will be added to this complex (A1).
- B Physical plant service buildings will be relocated to a less prominent site, allowing this central area to be developed for student life and recreation, linking existing athletic fields to the Johnstone site. Two baseball diamonds as well as some additional parking will be provided. The University's Central Energy Facilities will remain in place.
- C South of Cooper Library will be the Center of Centers, located in what now is a large undefined green space in a central campus location. The concept will provide space, constructed in phases, for a variety of multidisciplinary teaching and research centers, such as the University Gallery (art), The Pearce Center (communications), The Rutledge Center (ethics), the Student Development Center (tutorials), Calhoun College (honors), and Clemson College (general education). The Center of Centers is meant to be a core academic resource, enhanced with student-oriented programs, in the center of the campus.

- D A new student services building, a one-stop-shop, will be located near Clemson House, opposite President's Park and north of Highway 91, and near a projected parking deck (P). This facility will house administrative functions that serve students, and that are now primarily located in Sikes Hall.

The new building will offer better space, and will be sized to consolidate administrative groups, some of which are now split between buildings. Concentrating services such as admissions, financial aid, the Registrar's office, and student accounts in a one-stop-shop is desirable as students can then take care of their business with the University in one location. Vacated space will be used to decompress those departments that remain. Sikes will benefit the most as needed space will be gained and more effective, gracious use of the building will be possible.
- E Academic and research is the projected use for the Douthit Hills site along Highway 93. There is a dire need for research space at Clemson, and this site will accommodate the significant amount of space that will be required for future development. Unlike the Ravenel Center, this area is not dissociated from the campus. The development of this sector will also provide an enhanced entrance to the campus.
- F The existing Douthit Hills student residences will be replaced by new apartment-style housing, primarily for graduate students. These units will make more efficient use of the site, taking best advantage of the land features.
- G A new civil/textiles building will be located south of Earle Hall and the Fluor Daniel Engineering Innovation Building. It will house Civil Engineering and the Department of Textiles, Fibers, and Polymer Science and other related departments and centers such as the Center for Advanced Engineering Fibers and Films. This building will be the first of several that will define a new academic quad south of Earle and Fluor Daniel. The landscaped quad will provide building sites for the colleges of Engineering and Science and Architecture, Arts, and the Humanities.
- H The Brooks Center for the Performing Arts could be expanded with a new recital hall seating 250, as well as practice and support space.
- I Additional space for the College of Agriculture, Forestry, and Life Sciences will be provided in the new landscaped agriculture quad, south of Poole Agricultural Center and Lehotsky Hall.

- J The Campus Plan reserves space for additions to two existing academic buildings–Hunter Chemistry Lab on the west side of campus and the Edwards Hall to the east. A third location for additional space related to existing buildings, also on the east side of campus, is between Long and Vickery halls.
- K The Thornhill Apartments, currently housing 257 students, are in substandard condition. This complex will be replaced over time with new, apartment-style student housing.
- L The physical plant support buildings will be consolidated on this site. Currently some of these functions, including the motor pool, telecommunications, and shops, are on prime land on the Main Campus, where access is restricted and such a use is not appropriate. An alternate location for these support buildings is on the Ravenel site.
- M The Microcreamery is currently in the design phase. This facility will house academic functions related to dairy processing and serve as a student life and outreach node as it will be the new location for ice cream and blue cheese sales as well as a regional farmer’s market place.
- N The Godley-Snell Research Center will be expanded as required. This is a centralized animal research facility, managed by the Office of Research Services and serves those departments involved in animal research.
- O A building in this location can serve a variety of function-specific uses depending on the development of surrounding facilities. The possibilities include: expansion of the Strom Thurmond Institute, University Gallery, further expansion of the Brooks Center, or an additional component of the Center of Centers.
- P Five possible locations for parking decks are shown on the Campus Plan. They are located to serve the east and west sides of the central campus, the development to the north of Highway 93, and the developments along Perimeter Road. These parking decks will increase the total number of spaces by about 1,900 assuming five-level structures. This number is adjusted to reflect the number of spaces lost as land is cleared for the new decks. Adding a parking deck west of the Stadium will provide a net increase of an additional 1,600 spaces.
- Q An addition to the west end of Clemson Memorial Stadium will be constructed. This facility will add “club” and general seating as well as providing for an athletic heritage museum, new locker rooms, and support space.



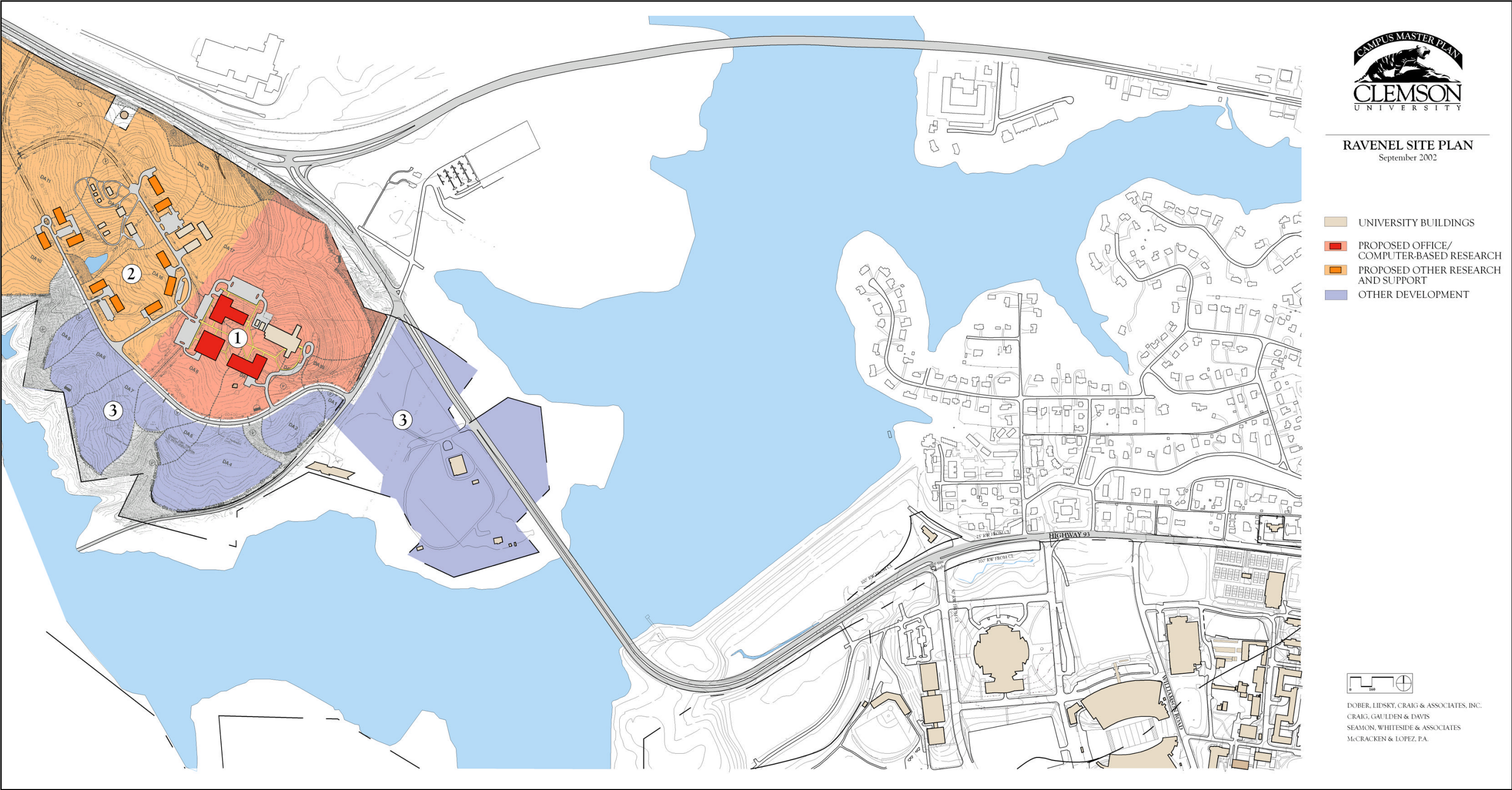
Ravenel Site

Development in this area will respect the existing ponds and drainage areas, shown in dark gray. Roads that exist will be improved and extended, and rerouted as necessary, to serve the new building sites.

- 1 The Ravenel Center will be expanded for clean research. This type of research will be computer- and office-based.
- 2 Research laboratories that are not office-based and University support facilities will be located northwest of the Ravenel Center. The buildings will be utilitarian in design. Typically they will be project-specific for research that may create environmental concerns relating to such issues as noise and dirt. For these reasons, a Main Campus location would not be appropriate. This will also be the location for the library storage facility and other support uses such as housing warehouse and surplus property storage.
- 3 The peninsula projecting into Lake Hartwell will be reserved for other opportunities.
- 4 A heavily planted buffer zone will be created.

The Campus Plan is proposed as a creative set of alternatives for the thoughtful development of the physical environment in line with the careful establishment of the Academic Strategic Plan. Rather than the usual "Master Plan" that fixes development into static phases, the approach to this Plan suggests a more flexible procedure for making well reasoned decisions for planning + design in response to emerging academic priorities. It is, in short, a dynamic plan supported by an underlying database that facilitates sound decision making.

J. Jacques, 30 April 2002



CAMPUS MASTER PLAN PHASING – AREAS OF EMPHASIS

The University has identified the desired Campus Master Plan improvements by areas of emphasis. The implementation time frame is in three five-year increments. In addition, there are improvements for three departments that are in advanced planning and have been funded; and there is a category for other projects that will span beyond the fifteen years.

In each of the five-year time periods there is money budgeted for preservation and renewal of facilities, infrastructure, and landscape. It is anticipated that one of the Center of Centers buildings and a parking deck will be built each five years as well.

Historically, the cost of physical improvements at Clemson has averaged \$80 million in the past three five-year time periods. The projected cost for improvements included in the Campus Master Plan over the next fifteen years is over \$477 million in today's dollars. The total including funded or advanced planning projects and post-fifteen year projects is \$596 million.

The costs are for both renovating existing space and for new construction, depending on the project. As they are project costs, architectural and engineering fees, nonspecialized furniture and equipment, and contingencies are included in addition to the cost of construction.

table 1 PHASING

Funded or Advanced Planning	Project Cost (Million \$)	Private or Self-funded Projects	2020	Project Cost (Million \$)
Biosystems Research Complex	27.0	Center of Centers A12.1	Facility Preservation & Renewal C	30.0
Civil/Textiles	50.0	Honors College2.8	Infrastructure Preservation & Renewal C	5.0
Computer Science	3.6	Martin Inn Bedrooms (80 Beds)4.0	Landscape Preservation & Renewal C	5.0
Advanced Materials Science	18.0	Mandren Center Ballroom (1,200)2.3	Subtotal	\$ 40.0
Total Funded or Advanced Planning	\$ 98.6	Graphic Communications3.7		
		Replacement Student Housing (300 Beds)18.0	Private or Self-funded Projects	
2010	Project Cost (Million \$)	Parking Deck A (675 Spaces)9.5	Parking Deck C (675 Spaces)	9.5
Areas of Emphasis I		Brooks Recital Hall5.0	Center of Centers C	12.1
Facility Preservation & Renewal A	30.0	Gallery5.8	Subtotal Private or Self-funded Projects	\$ 21.6
Infrastructure Preservation & Renewal A	5.0	Turf/PGA/@ Bottoms0		
Landscape Preservation & Renewal A	5.0	Chapel (150)1.0	Total 2020	\$ 61.6
Chemistry	48.1	One-Stop Student Services1.8		
Chemical Engineering	5.3	Subtotal Private or Self-funded Projects	Post 2020	Project Cost (Million \$)
Bioengineering	4.7	\$ 66.0	Physics and Astronomy	11.7
Electrical and computer engineering	27.4		Parks, Recreation, and Tourism Management	3.7
Psychology	3.8	Total 2010	English	4.3
Family and Community Living	0	\$294.6	Total Post 2020	\$ 19.7
Biological Sciences	42.3	2015		
Mechanical Engineering	12.2	Areas of Emphasis		
Animal Research Facility	9.7	Facility Preservation & Renewal B	TOTAL	\$595.5
Subtotal Areas of Emphasis I	\$193.5	Infrastructure Preservation & Renewal B		
		Landscape Preservation & Renewal B		
Areas of Emphasis 2		Computer Science		
Planning and Landscape Architecture	5.0	Relocate Physical Plant		
Construction Science Management	2.4	Subtotal Areas of Emphasis		
School of Architecture	3.0	\$ 52.1		
General Engineering	3.6	Private or Self-funded Projects		
Experimental Statistics	2.7	Harcombe Dining Replacement		
University Classrooms	18.4	Union Replacement		
Subtotal Areas of Emphasis 2	\$ 35.1	Parking Deck B (600 spaces)		
		Center of Centers B		
		Replacement Student Housing (300 Beds)		
		Subtotal Private or Self-funded Projects		
		\$ 68.9		
		Total 2015		
		\$121.0		

Clemson University's mission, goals, objectives, and evolving Academic Plan formed the foundation for the campus planning effort. Within that context, a program for the master plan was developed. This agenda, enlightened by a campus opinion survey and multiple focused meetings and presentations, specified the issues to be addressed by the Campus Plan. From the agenda, the University's facility requirements were determined.

AGENDA FOR PLANNING

The planning process engaged the University's constituent groups in identifying issues and concerns that should be articulated in the Campus Plan. Interviews were conducted and work sessions were held with University administrators, deans, department chairs, faculty, staff, and students – representing each academic and administrative department. The broad list of issues was then prioritized to produce the agenda for planning.

The agenda items relate to improvements for academic departments and programs, improvements to specific facilities, and improvements to the campus and environs in general. From this list, the areas of emphasis and phasing plan were generated.

SURVEY OF FACULTY, STAFF, AND STUDENTS

Opinion surveys were conducted during the fall of 2001. The surveys were web-based and directed to students, faculty, and staff. The purpose was to inform and confirm the agenda for planning; and, by polling opinions of those who might otherwise not be heard, to broaden the base of the Clemson community involved in the campus planning. There were 943 responses to the surveys: 66 percent were students, 7 percent were faculty, and 27 percent were staff.

Survey questions were based on concerns voiced in the preliminary agenda for planning, and were grouped into three parts. The first was to determine the influence of campus facilities or spaces on the participant's decision to either attend or work at Clemson; the second section asked a series of questions relating to campus issues, tailored to each of the three survey groups; and the third section identified campus elements that should be changed and preserved.

The campus core—Bowman Field, Fort Hill, the Outdoor Amphitheater, Carillon Garden, and Library Pond—was the most influential feature in attracting students, faculty, and staff. The second most significant elements were sports and athletic facilities for students, laboratories for faculty, and the Library for staff.

The campus issues section was formatted in a series of questions where the respondents were asked for their levels of agreement. Some sample results are included here. For students, the highest agreement was to the statement, *I feel safe when crossing the streets on campus*. Agreement with two statements regarding bus service, *The buses/shuttles are always on time* and *The bus stops are too far from where I want to go*, ranked high with faculty and staff. The lowest level of agreement for all groups was to the statement *The University provides adequate parking for all*.

In the change section of the surveys, parking prompted the highest percentage of responses for both students (40 percent) and staff (46 percent). In the faculty survey, 21 percent expressed concern over parking, slightly below the largest category, changes to facilities (24 percent). Parking issues related to adding spaces and better maintenance of existing spaces.

The campus landscape was highest on the list of those elements that all groups would like to see preserved. This was followed closely by a desire to preserve Clemson's symbolic buildings. For more detail regarding the surveys see the summary document, "Survey of Campus Environment and Facilities."

FACILITY REQUIREMENTS

The facility requirements result, in large part, from needs associated with reaching the twenty-seven goals noted earlier in this report. For instance, there will be an increase in the number of faculty, the number of graduate students, and the amount of research space. The quality of student life will need to be improved to attract and retain the best students. Almost all of Clemson's goals have facility implications. The result will be significant increases in the quantity and quality of space on campus.

There are forty specific improvements in the Campus Master Plan. Some are for general preservation and renewal of facilities, infrastructure, and landscape. Some are for new buildings or additions to existing buildings. The building improvements range in scale from a new chapel to a new \$50 million-building for Civil Engineering and the Department of Textiles, Fibers, and Polymer Science. Other departments or programs that need significant amounts of new space are Biological Sciences, Biosystems Engineering, Chemistry, Electrical and Computer Engineering, Materials Science, Mechanical Engineering, and Physics and Astronomy. The list of improvements or departments that require improvements follows.

FACILITY REQUIREMENTS	
Advanced Material Science	Graphic Communications
Animal Research Facility	Harcombe Dining Replacement
Bioengineering	Honors College
Biological Sciences	Infrastructure Preservation & Renewal
Biosystems Research Complex	Landscape Preservation & Renewal
Brooks Recital Hall	Madren Center Ballroom
Center of Centers	Martin Inn Bedrooms (80 Beds)
Chapel	Mechanical Engineering
Chemical Engineering	Parking
Chemistry	Physical Plant Relocation
Civil/Textiles	One-Stop Student Services
Computer Science	Parks, Recreation, and Tourism Management
Construction Science Management	Physics and Astronomy
Electrical and Computer Engineering	Planning and Landscape Architecture
English	Psychology
Experimental Statistics	Replacement Student Housing (600 Beds)
Facility Preservation & Renewal	School of Architecture
Family and Community Living	Turf/PGA @ Bottoms
Gallery	University Classrooms
General Engineering	Union Replacement

CAMPUS AND ENVIRONS ANALYSIS

The planning process significantly informs and determines the planning product. A consequential step in articulating the comprehensive Campus Plan for Clemson University was a careful site analysis. The drawings on the pages that follow are a record of this analysis; and have been used throughout the planning process to guide collegial discussions with faculty, students, staff, and trustees. The analysis has also helped to clarify the planning assumptions and conclusions as the Campus Plan was developed.

Each analysis drawing distills a particular type of information, overlaid on a map of the campus and its environs. The study area covers the broad, regional context and then focuses on the Main Campus. The combination of these overlays describes the Clemson campus as of the winter and spring of 2001.

Drawing 3: Context/Environs

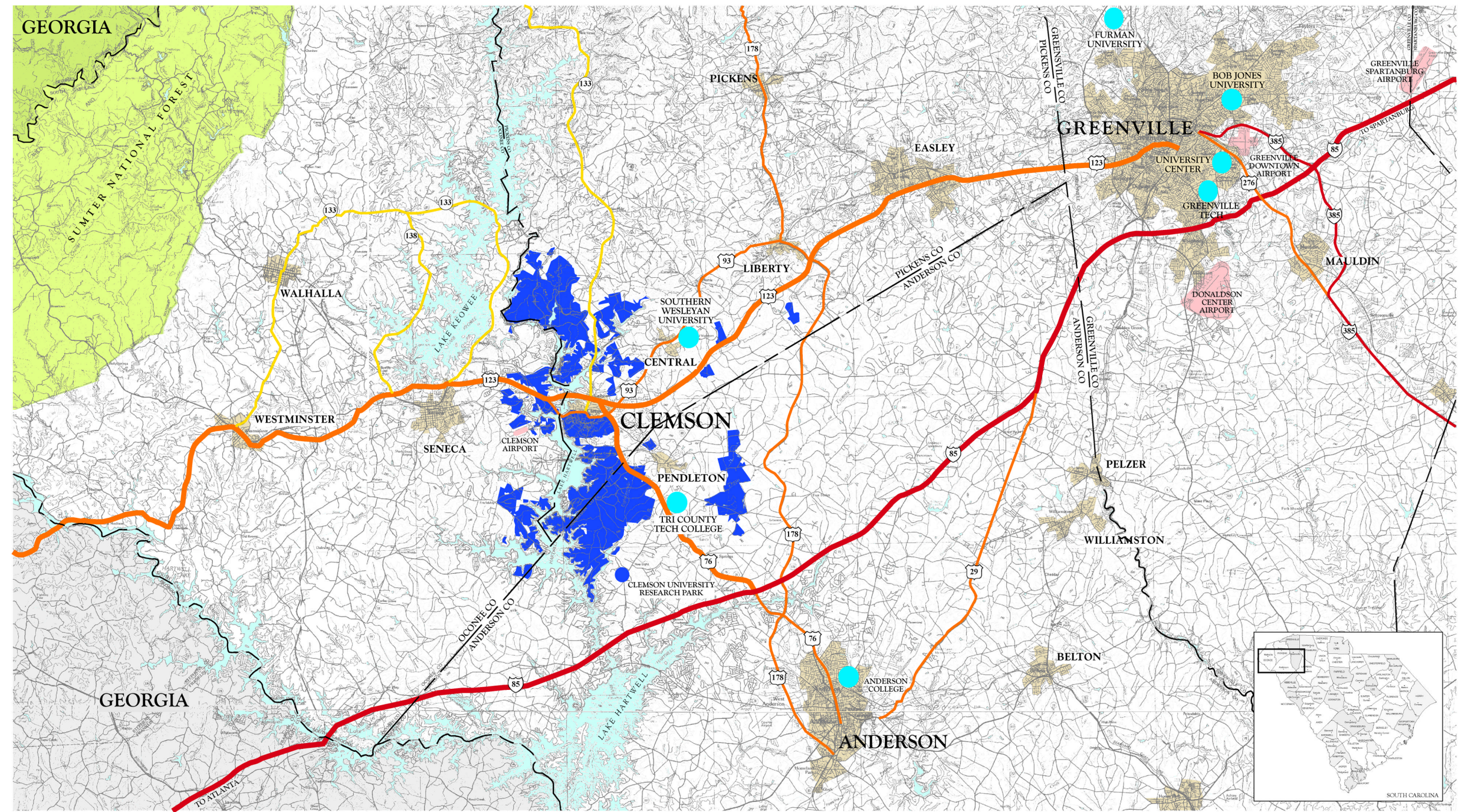
Clemson University is nestled in the foothills of the Blue Ridge Mountains, near the Sumter National Forest, in the northwest corner of South Carolina. See the rectangle superimposed on the inset map of the state. The Main Campus and the University Research Park, to the south, are indicated in dark blue. Other Clemson property is a lighter blue. The combined University land holdings are extensive, straddling three counties—Anderson, Pickens, and Oconee—and surrounding a good portion of Lake Hartwell's north-south leg.

The University is west of Greenville, connected by interstate highway 123, shown in red, or by interstate 76 via interstate 85, shown in orange. Arterial roads are yellow. Several airports, indicated in pink, are in the vicinity. The Greenville Spartanburg International Airport, which is east of Greenville, is the one most commonly used. Of course off the map, to the southwest, is Atlanta and its Hartsfield-Atlanta International Airport. Cities and towns are beige, the largest of which is Greenville.

There are six other colleges and universities in this sector of South Carolina, shown by the bright blue dots. In the immediate area are Southern Wesleyan University, Tri County Tech, and Anderson College; and Furman University, Bob Jones University, and Greenville Technical College are in the metropolitan Greenville area. The University Center of Greenville, also in Greenville, is a consortium that includes Clemson as well as six other universities that are within commuting distance of Greenville County.



AERIAL PHOTOGRAPH OF CLEMSON UNIVERSITY



CONTEXT/ENVIRONS
April 2001

- CLEMSON UNIVERSITY
- COLLEGE/UNIVERSITY
- AIRPORT
- BUILT-UP AREA
- NATIONAL FOREST
- INTERSTATE HIGHWAY
- FEDERAL HIGHWAY
- ARTERIAL ROAD



DOBER, LIDSKY, CRAIG & ASSOCIATES, INC.
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SEAMON, WHITESIDE & ASSOCIATES
McCRACKEN & LOPEZ, P.A.



STATUE OF THOMAS GREEN CLEMSON



CALHOUN LAW OFFICE



CALHOUN MANSION (FORT HILL)

Drawing 4: University Property

This drawing shows Clemson University property, but at a larger scale than the previous, Context/Environs map. There are three categories of land holdings—the Main Campus (dark blue), Land Use Property (light blue), and Foundation Property (lilac).

The 1,445-acre Main Campus includes the original bequest of Thomas Clemson along with property acquired from the state and intended for academic use or for uses that directly support the academic and student life programs. Superimposed on the Main Campus is a dashed orange line that indicates the extent of the original 814-acre Clemson land gift that has been augmented over the years. The pie-shaped dark blue and white striped area is land that is leased and used to support the armory to the northwest.

Land Use Property is land that has been conveyed to Clemson by the federal government for the purpose of supporting research activities. The Ravenel Center, northwest of the Main Campus, is on Land Use Property. Research conducted by Civil Engineering, Forest Resources, and Mechanical Engineering occurs in this location. The light blue and dark blue striped area is Y-Beach, used by the Y.M.C.A. and the National Council of Examiners for Engineering and Surveying through agreements with the University.

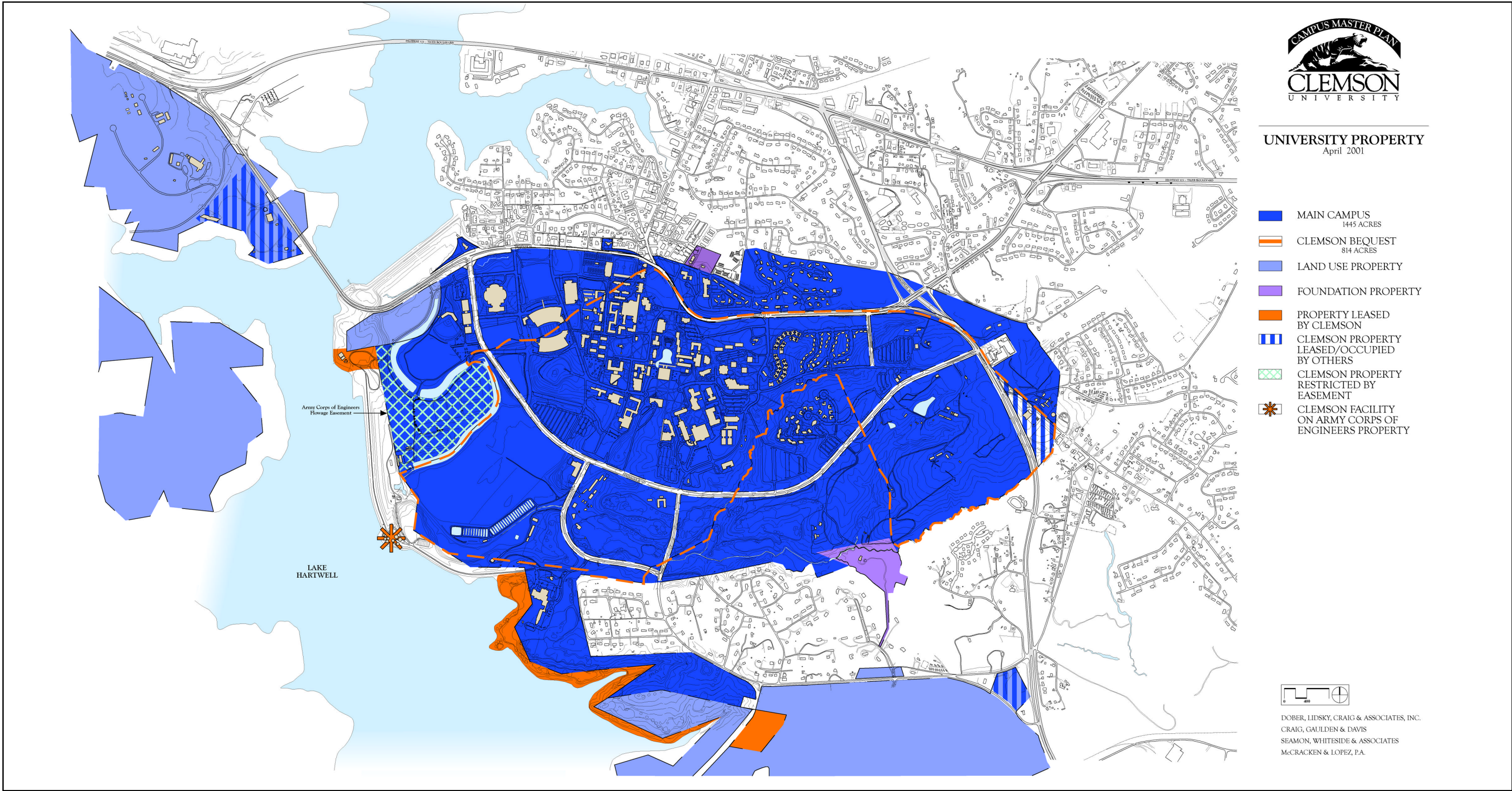
Land Use Property contiguous to the Main Campus is at the northwest corner and to the south. The north area is used for playfields, and the south for the golf course

The Clemson University Foundation is an independent, nonprofit organization that was formed to manage assets and maintain appropriate donor records for the benefit of Clemson University. The Foundation receives, manages, and distributes all gifts to the University. Gifts of real estate constitute Foundation Property.

There are two Foundation Property locations shown on the map. The one north of the Main Campus is the Shirley Center for Philanthropy and the location of the Development, Governmental Affairs, and Institutional Advancement offices. Adjacent to it is a residential property. The other, to the south, is also residential.

The land that Clemson leases from others is colored orange. The areas on Lake Hartwell are leased from the Army Corps of Engineers, and used by Clemson for a boathouse, the Madren Center, and to extend the golf course. The orange asterisk indicates Clemson's water treatment plant also on Army Corps of Engineers land.

Most of the facilities that support Clemson's academic and student life activities are located on the 1,400-acre Main Campus and consist of between 3,000,000 and 4,000,000 gross square feet of space. The campus is surrounded by 17,000 acres of University farms and woodlands devoted to research. In addition, over 12,000 acres of Clemson land are distributed through the state. The University also owns land in Italy and on the Caribbean island of Dominica.





ENVIRONMENTAL CONSTRUCTION WITHIN THE BOTANICAL GARDEN



CLEMSON SOCCER FIELD

Drawing 5: Land Use

The various uses of University land are depicted on Drawing 5. The Core Campus is colored purple and is at the center of the Main Campus. The north edge of the Main Campus is formed by athletic fields (yellow green), campus open space (light green), and significant stands of trees (dark green). There is an historic district on campus that overlaps Highway 93 in one section, which is outlined with a dashed orange line.

Historic landmarks are orange and those on the National Register of Historic Places are marked with a black pinwheel. Landmarks that are on the Register include the Calhoun Mansion or Fort Hill and Calhoun's Law Office, the Sheep Barn, and Hanover House. Woodland Cemetery and the Ransom Hunt Cabin are historic landmarks as well. The Bottoms, Calhoun's field laboratory, is also in this category. It is the last remnant of his plantation and one of the last bottomland areas in this vicinity. The tree line along Highway 93, President's Park is also historic.

University buildings are colored tan, and those that are architecturally or historically significant are outlined with a pink circle. A series of major campus open spaces extends from Bowman Field south to Perimeter Road. A tree stand area surrounds Woodland Cemetery, and others intertwine through the campus residential district, colored pale yellow. Parking reservoirs are gray, marked with the letter P, and street rights-of-way are gray with dashed black lines.

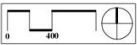
On the south edge of the Main Campus, across Perimeter Road, are athletic fields; the Calhoun Field Laboratory, a research facility (aqua); and community facilities (light blue). Included in this classification are the Walker Golf Course, the Madren Center, the Botanical Garden, and Schoenike Arboretum. The Ravenel Center is a second research facility, and the other community facility is the Y.M.C.A. on Y-Beach.

Commercial use is indicated in dark yellow and occurs north of Highway 93, along College Avenue, and Highway 123 or Tiger Boulevard. There are large residential areas north, east, and south of the Main Campus.



LAND USE
April 2001

- UNIVERSITY BUILDINGS
- COMMERCIAL
- RESIDENTIAL
- CORE CAMPUS
- HISTORIC DISTRICTS
- HISTORIC LANDMARKS
- HISTORIC REGISTER
- CAMPUS OPEN SPACE
- ATHLETIC
- PARKING RESERVOIRS
- COMMUNITY FACILITIES
- RESEARCH FACILITIES
- SIGNIFICANT TREE STANDS
- STREET RIGHT OF WAY



DOBER, LIDSKY, CRAIG & ASSOCIATES, INC.
CRAIG, GAULDEN & DAVIS
SEAMON, WHITESIDE & ASSOCIATES
McCRACKEN & LOPEZ, P.A.



COOPER LIBRARY



STROM THURMOND INSTITUTE



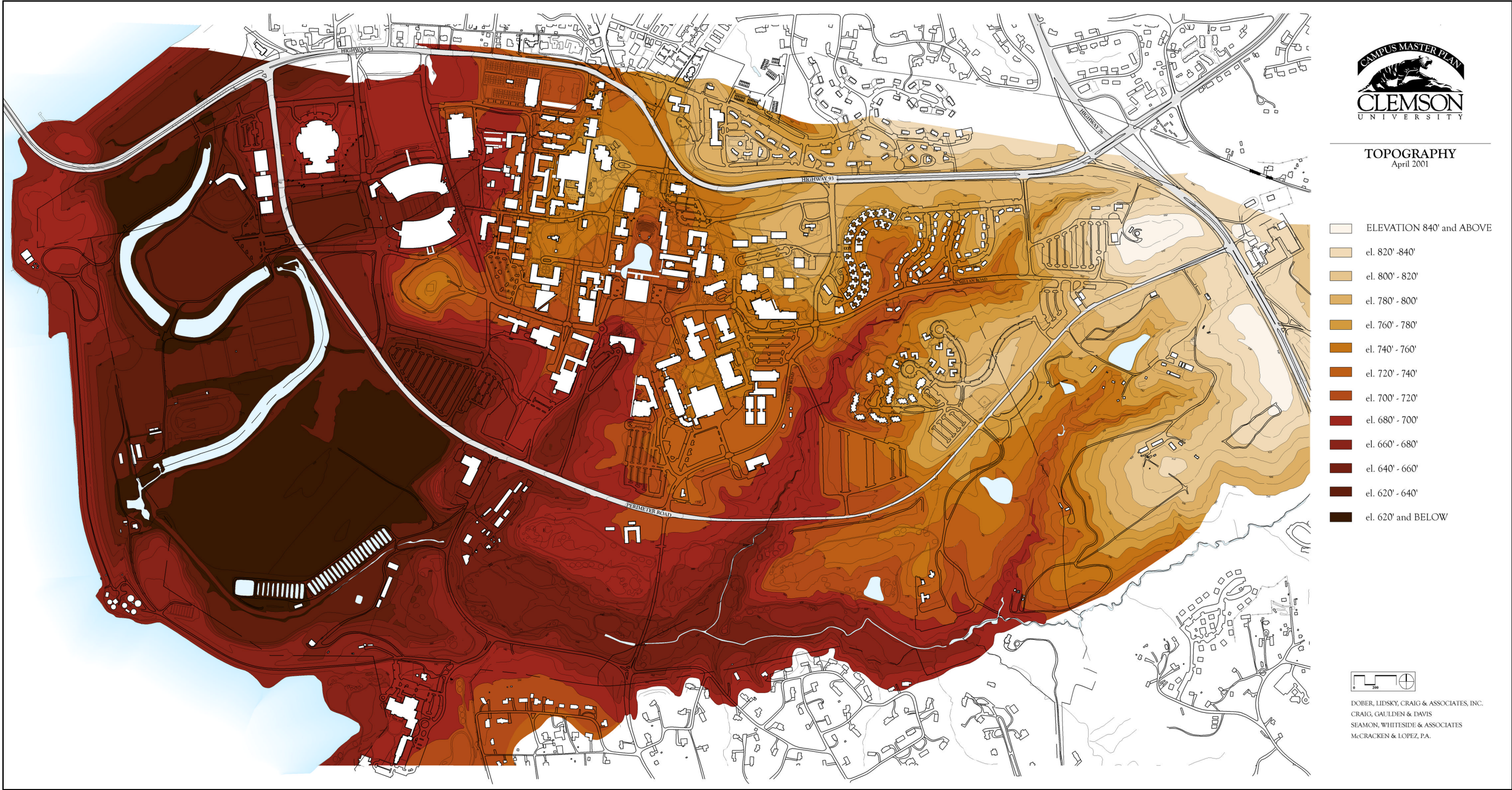
BOWMAN FIELD

Drawing 6: Topography

Drawing 6 is at a larger scale than the three previous drawings, and shows the Main Campus in more detail. Illustrated here is the range of topographic elevations that characterize the campus. Darker colors indicate lower elevations and lighter tones indicate higher elevations. Each color represents a twenty-foot change in grade. There is a difference of over 220 feet from the highest to the lowest levels.

The area where there is the greatest concentration of University buildings, between Highway 93 and Perimeter Road, is relatively flat except for a swale on axis with Cooper Library and the Thurmond Institute. This landform continues, in a more moderate configuration, north of the Library, through the Outdoor Theater and Carillon Garden, to Bowman Field. The elevations drop to the west except for the hillock, which is Woodland Cemetery; and rise to the east except along the creek through the residential sector of campus. South of Perimeter Road the land continues to slope down toward the edge of the lake.

There are many subtleties in topography that contribute to the overall interest of the Main Campus. Bowman Field is a significant example. On both sides the land slopes up—to the Alumni Center on the north side, across Highway 93, and to historic Tillman Hall on the south side. The field and buildings are thereby accentuated by the unique contour of the land in this area.





THE HENDRIX STUDENT CENTER



REFLECTING POOL IN FRONT OF THE COOPER LIBRARY

Drawing 7A: Predominant Use Main Campus

The University buildings are color-coded by predominant use on this drawing of the Main Campus. There are eleven distinct use categories.

Cooper Library and the Thurmond Institute are colored purple indicating library use. These two facilities are on the strong north-south spine formed by the natural land configuration seen on the topography map. Academic buildings, colored red, and Sikes and Martin halls, administrative buildings colored blue, reinforce this alignment. On the west side, this mix of buildings continues north to form the west edge of Bowman Field.

The circle superimposed on the map represents a five to seven-minute walking distance from Cooper Library, its center. The diameter is, therefore, the distance that can be walked during the ten to fifteen minutes between scheduled classes. The other academic buildings are within this zone. Research facilities are orange and are located on the Main Campus periphery.

Administrative buildings are on the north side of the Core Campus except for the Shirley Center for Philanthropy and Alumni Center. These buildings are north of Highway 93, as are Gentry Hall and the Print Shop.

Student residences are yellow and form the next ring of buildings. Further east are clusters of apartments—the Calhoun Courts, Thornhill Village, and the Lightsey Bridge Apartments - supported with recreation and laundry facilities, colored green to indicate student life use. Clemson House and Douthit Hills duplex housing is north of Highway 93. There is a dining facility in Clemson House as well as other student life support, and a ballroom and meeting rooms indicated by the yellow green special color.

The large student life building to the west is the University Union that houses Harcombe Dining Hall, with its range of dining venues, and other student activities functions. The group of three facilities to the east consists of the Schilleter Dining Hall, Hendrix Student Center, and Redfern Health Center. The Fernow Street Café, located between Riggs and Freeman, is another food service option.

Athletic facilities, colored light brown, are concentrated in the northwest sector. This is the area of campus where outdoor play fields have been developed.

Buildings that are classified as special use on the Core Campus are Fort Hill, Calhoun's Law Office, and the Campbell Museum of Natural History. The President's Home and the historic sheep barn are to the east.

The Madren Center and Club House associated with the golf course are public access facilities, colored dark purple. Other examples of this use type are the Campbell Geology Museum, Campbell Carriage House Café, the Hayden Conference Center, and Hanover House.

Clemson University Foundation residential properties are colored aqua. Physical plant and campus support facilities are gray. There are two major support facility complexes. One is in the heart of campus, west of Johnstone Hall, and the other is south of Perimeter Road.

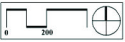


SIKES HALL



PREDOMINANT USE
April 2001

- ACADEMIC
- ADMINISTRATIVE
- STUDENT RESIDENCE
- STUDENT LIFE
- ATHLETIC
- LIBRARY
- SPECIAL
- RESEARCH FACILITY
- PUBLIC ACCESS FACILITY
- PHYSICAL PLANT/
CAMPUS SUPPORT
- CU FOUNDATION/
RESIDENTIAL



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THE PRACTICE FIELDS ON THE NORTHWEST SIDE OF CAMPUS



STEPS TO THE AMPHITHEATER



FOOT BRIDGE ON CAMPUS GREEN

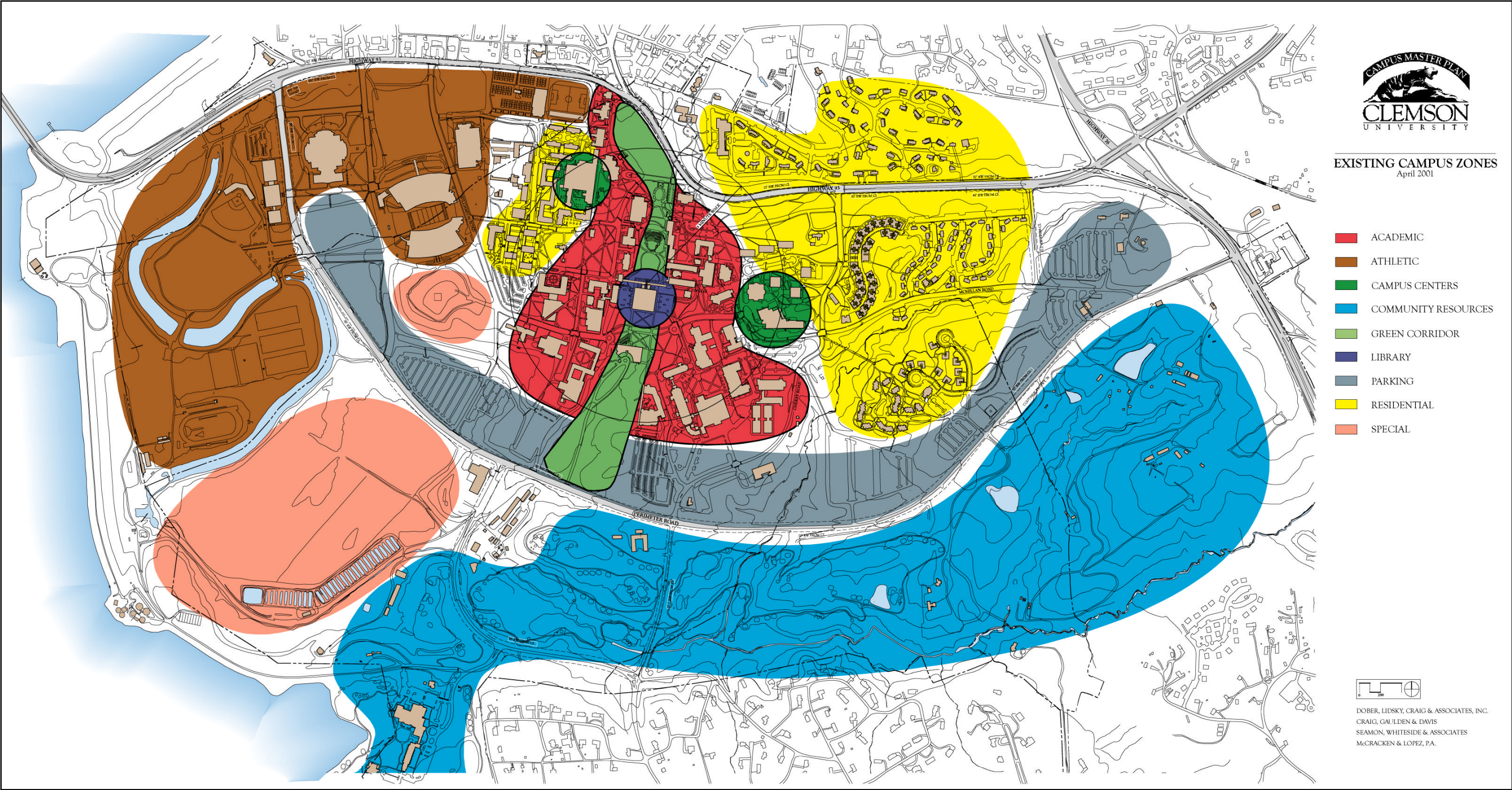


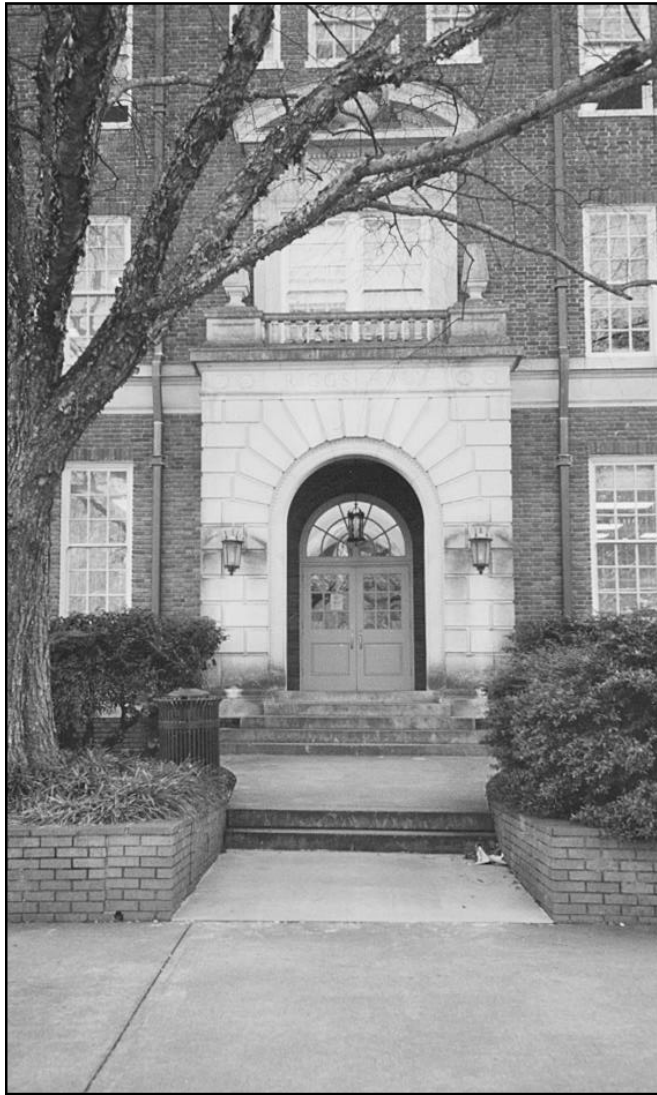
THE MEMORIAL STADIUM FOOTBALL FIELD

Drawing 8: Existing Campus Zones

Another way to analyze the campus is by zones. On this map, the Main Campus is graphically categorized into nine zones. The red academic zone follows the academic building pattern on the Predominant Use map. Similarly, the residential (yellow) and campus center (green) zones follow those building uses.

The north-south spine is indicated as the green corridor zone, interrupted by the purple library zone. The brown athletic zone is to the northwest. The blue gray swath, north of Perimeter Road, is a parking zone that serves all other zones on the Main Campus. Woodland Cemetery and the Calhoun Field Laboratory are special zones colored pink. The blue green community resources zone follows Perimeter road to the south.





ENTRANCE TO RIGGS HALL



THE COURTYARD OUTSIDE THE UNIVERSITY UNION BUILDING



ENTRANCE TO THE POOLE AGRICULTURAL CENTER

Drawing 9: Budget Center Use

The University administrative units are grouped into Budget Centers. This organization provides a structure for allocating funds as well as space. There are nineteen Budget Centers. Their locations are shown graphically on this drawing.

When there is more than one Budget Center in a building, it is colored with those colors that are applicable. A narrow stripe of the appropriate color is shown when the Budget Center occupies less than 20 percent of the assignable space in the building. The three largest Budget Centers are Student Affairs, the College of Engineering and Science, and the College of Agriculture, Forestry, and Life Science.



CORRIDOR INSIDE FLUOR DANIEL ENGINEERING
INNOVATION BUILDING





TURNAROUND IN FRONT OF TILLMAN HALL

Drawing 10: Vehicular Circulation

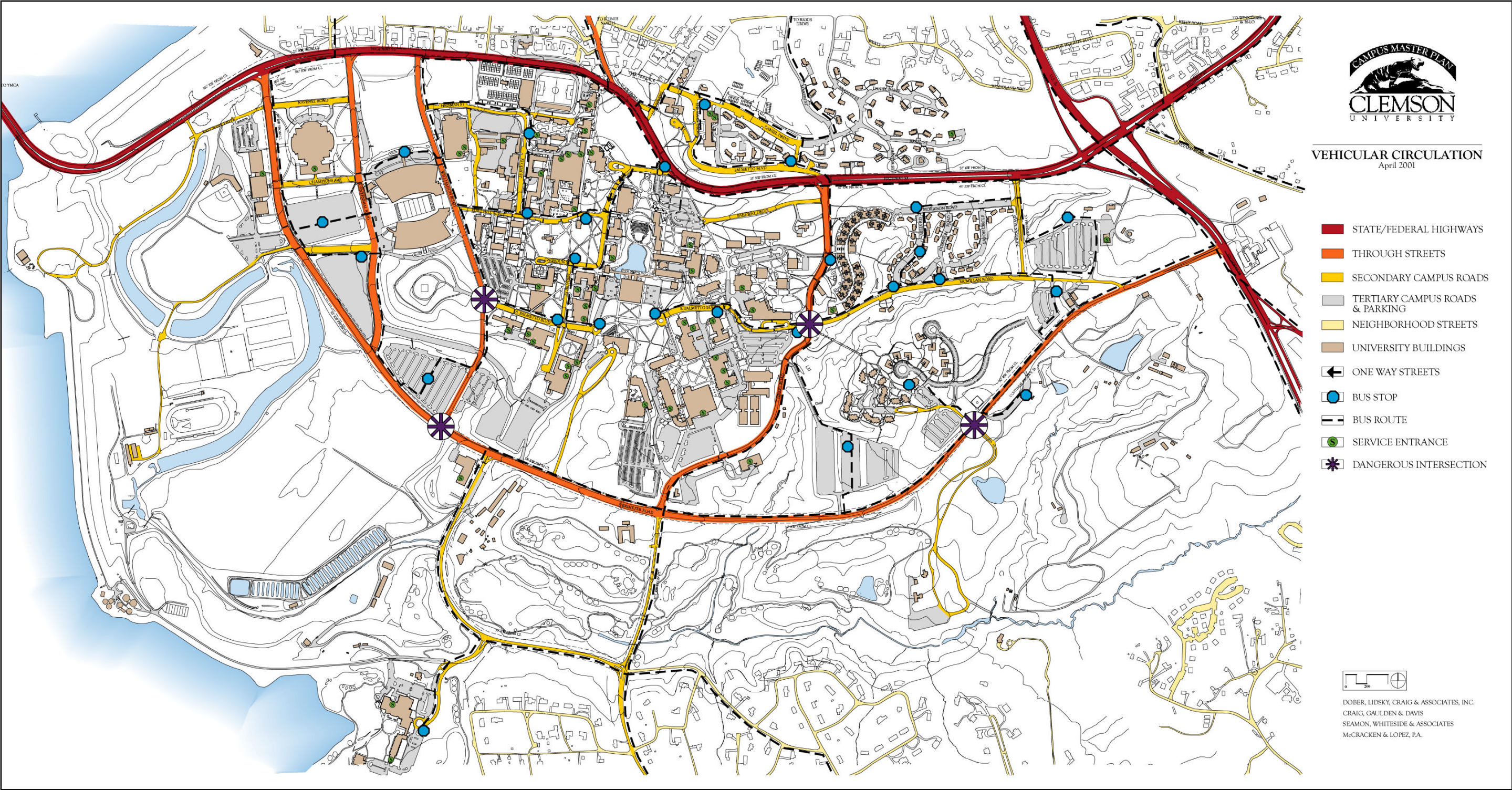
The roadway system in and around the Main Campus is mapped on this drawing. State highways 93 and 76 are red, through streets are orange, and neighborhood streets are pale yellow. Paved campus roads are dark yellow.

Highway 93 runs east and west, north of most of the campus. It intersects Highway 76, a north-south route, at the eastern edge of campus. Perimeter Road is important to the campus circulation pattern as it connects highways 93 and 76, and connects directly with Highway 93 via three through streets: Centennial Boulevard and Williamson Road on the west side of campus, and Cherry Road on the east.

Four hazardous intersections have been noted, and are marked with a blue star. Poor site lines due to topography are an issue at the corners of Perimeter and Williamson roads, Perimeter and Lightsey Bridge, and South Palmetto and Williamson. The fourth is at the junction of Cherry Road, South Palmetto Boulevard, and McMillan Road. The problems at that intersection are compounded by the large amount of traffic generated by the Hendrix Student Center and an adjacent, major parking lot.

The paved campus roads form two networks that serve the campus and its parking lots. One is on each side of the open space from Carillon Garden to the Thurmond Institute, preserving the open space that is defined. Building service access is marked by a green dot with the letter S superimposed. A section of the street west of Brackett is one-way and marked with a black arrow.

The Clemson Area Transit campus bus route is indicated by the heavy, black dotted line. Bus stops are blue octagons outlined in black. The bus system is operated as a joint venture with the city of Clemson and serves the Main Campus and surrounding student residential neighborhoods as well as the city in general.





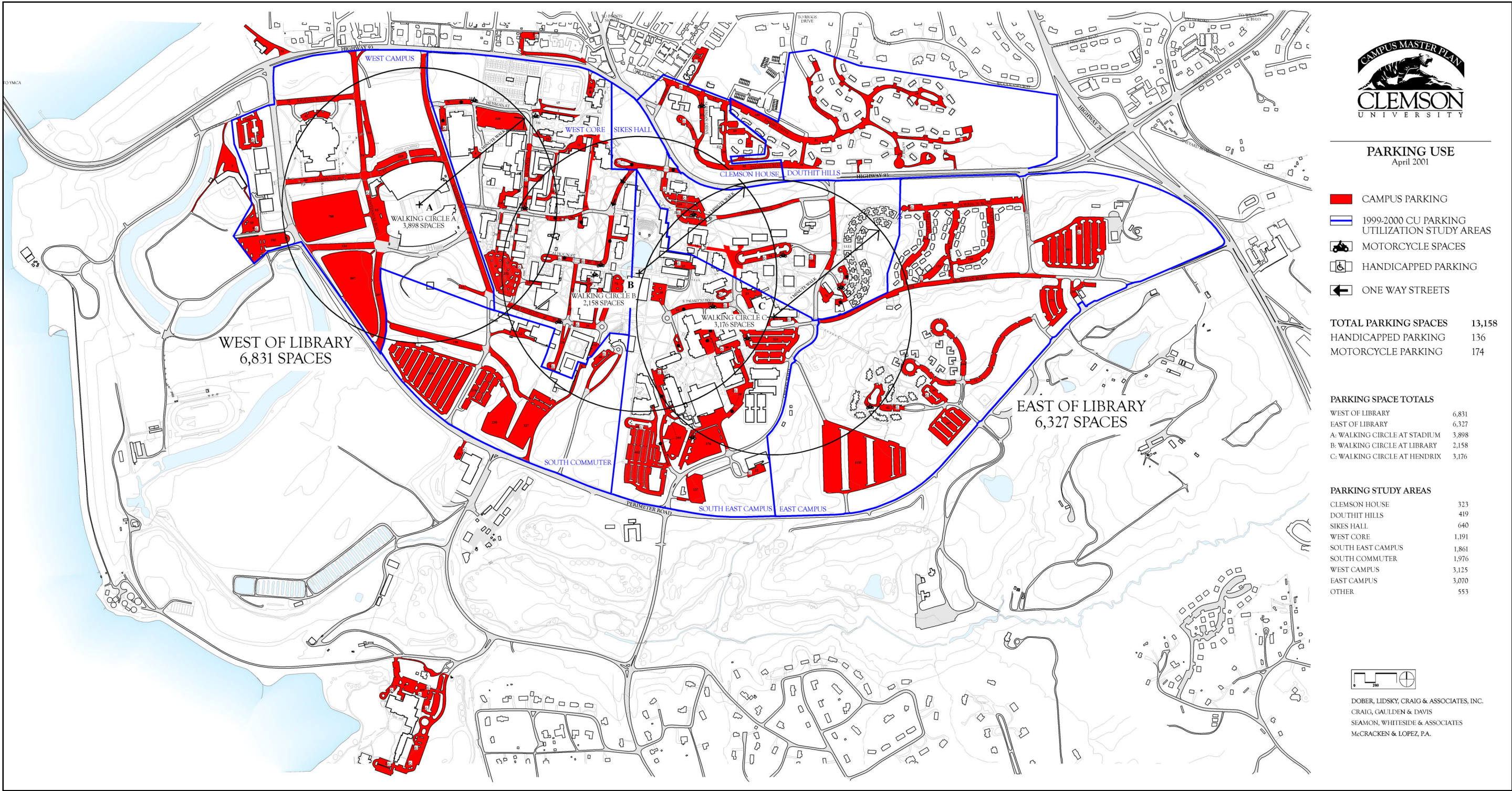
PARKING FOR MEMORIAL STADIUM

Drawing 11: Parking Use

Parking, another layer of vehicular information, is analyzed on this map. Parking lots and streets where parking occurs are colored red. Other roads are gray. Motorcycle spaces and parking for those with disabilities are indicated by symbol.

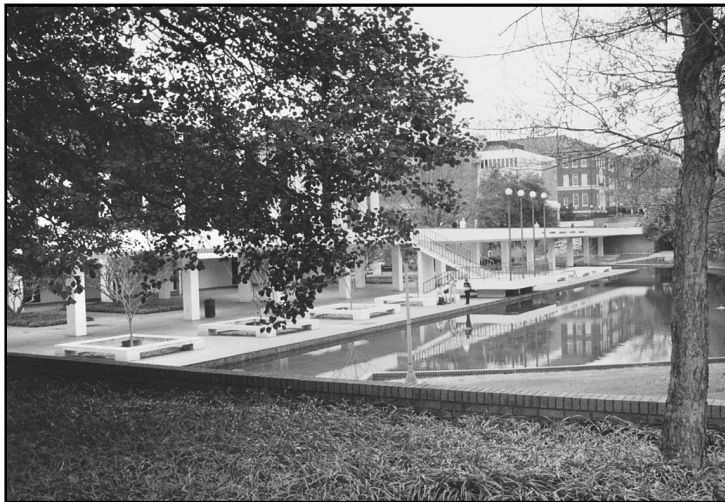
In 1999-2000 Clemson University conducted a parking utilization study. The study areas are outlined in blue. This map updates the information provided in the original study. There are 13,158 parking places on campus, 136 of which are reserved for people with disabilities. The distribution of spaces is almost equally divided – 52 percent are west of the Library and 48 percent are to the east. There are 83 spaces per 100 students at Clemson. This is well above the average of 55 parking spaces per 100 students, from the DLC+A database comparing eighty institutions. In addition, there are 174 parking spaces for motorcycles.

Three walking circles are shown on the map. Again, the radius is a five to seven-minute walk. The centers are at the Clemson Memorial Stadium (Circle A), Cooper Library (Circle B), and the Hendrix Student Center (Circle C). Within these three circles there are 9,232 spaces: 42 percent in Circle A, 23 percent in Circle B, and 35 percent in Circle C.





COVERED WALKWAY AT THE
BROOKS CENTER FOR THE PERFORMING ARTS



ELEVATED WALKWAY IN FRONT OF COOPER LIBRARY

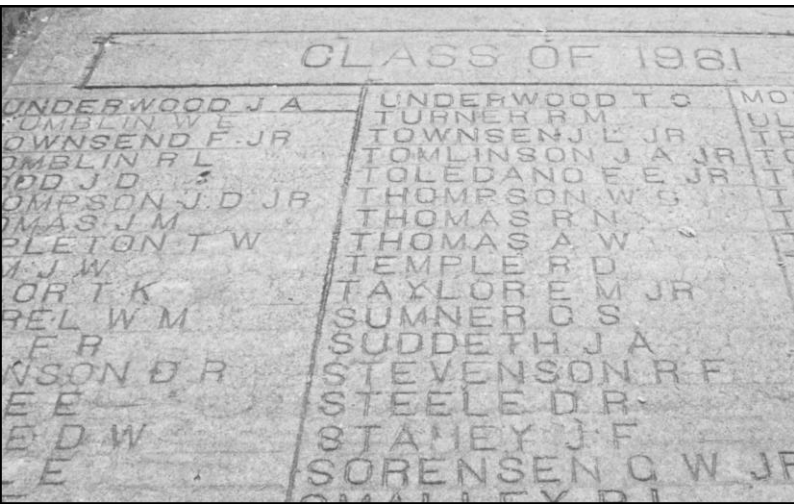


WALKWAY IN FRONT OF COPE HALL

Drawing 12: Pedestrian Circulation

Paved surfaces that are used exclusively for pedestrian walkways and outdoor gathering places are shown in solid red on this map. Where both pedestrians and vehicles use the surface, it is a red and white striped pattern. The series of pink dots indicates unpaved, informal walkways that have been etched into the landscape to provide more direct or convenient routes. The dashed orange line indicates an arcade or covered walkway. Handicapped accessible entries to buildings are marked by symbol.

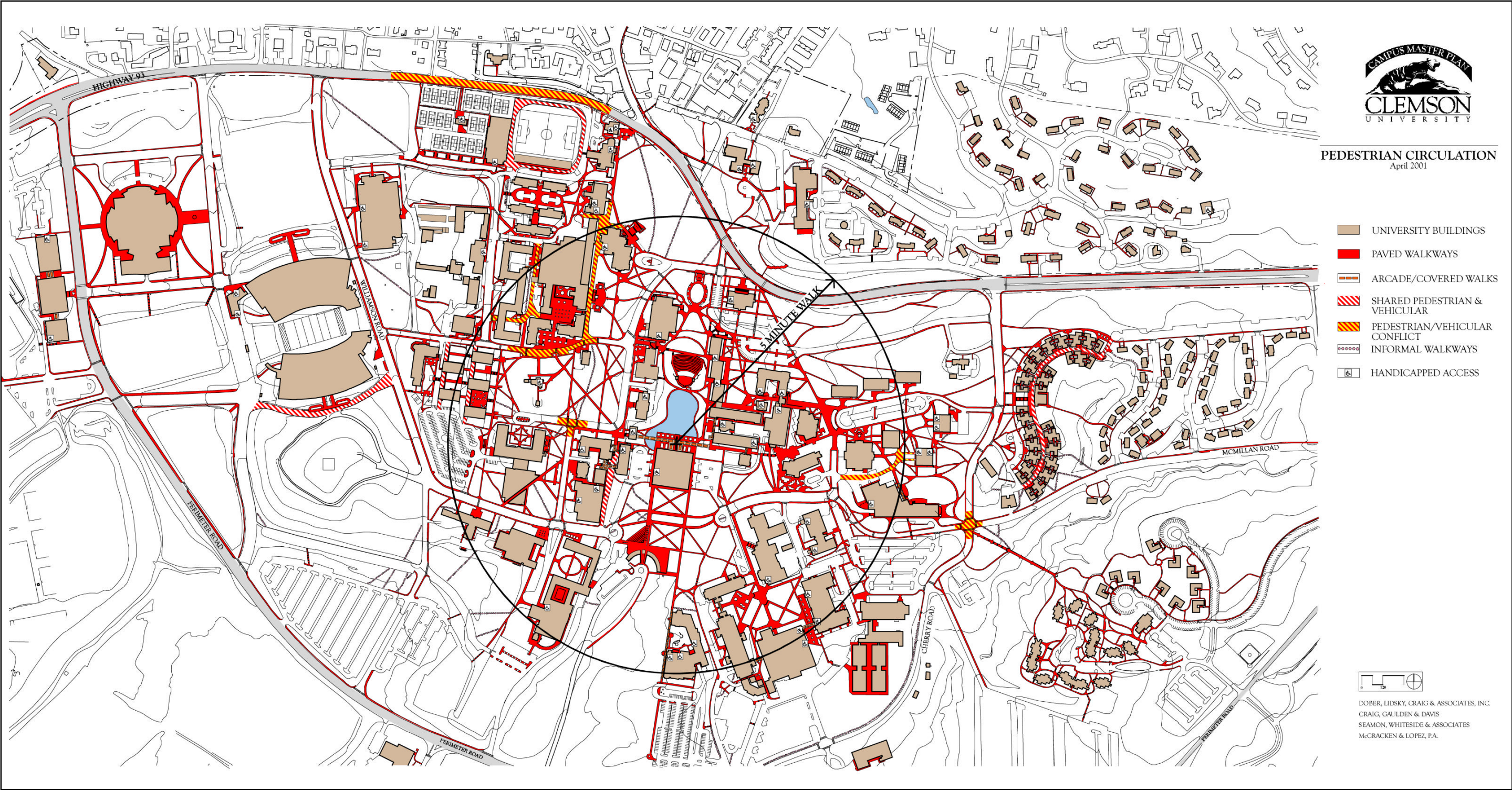
As on the previous drawings, a circle has been superimposed representing a five to seven-minute walking distance, from its center, based on a walking rate of three miles per hour; or the distance that can be walked during the fifteen minutes between scheduled classes. The circle is drawn about the Library, the paradigmatic geographic center of academic activity. Although the athletic, student apartment, and duplex housing sectors are outside the circle, most academic buildings and student residence halls are within it. For an institution with an enrollment of over 17,000 students, the campus is remarkably compact.



DETAIL OF WALKWAY

Central campus buildings are well linked except for the athletic facilities to the west. These facilities, because of their location and scale, are not as well connected, suggesting a reliance on bus service or the automobile for access. There are several shared pedestrian and vehicular surfaces, but usually vehicular use infringes only minimally on the pedestrian. However, the section east of McCabe, Harcombe Dining, Johnstone Annex, and Godfrey is heavily trafficked by both pedestrians and vehicles. In the case of the shared pedestrian path and service road between Rhodes and Riggs, west of Cook and Freeman, pedestrian use occurs because this is the most direct north south route and there are no sidewalks.

A significant arcade on campus is the one that connects elements of the Brooks Center for the Performing Arts. This canopy enhances a rather long walk and defines the view across the green space to the west. Examples of covered walkways are the ones behind Cook, Rhodes, and Riggs that provide convenient connections between those engineering facilities. The bridge connection north of the Library is also an important pedestrian walkway.





BRACKETT HALL NORTHWEST OF AMPHITHEATER



MARTIN HALL EAST OF THE AMPHITHEATER



SIRRINE HALL



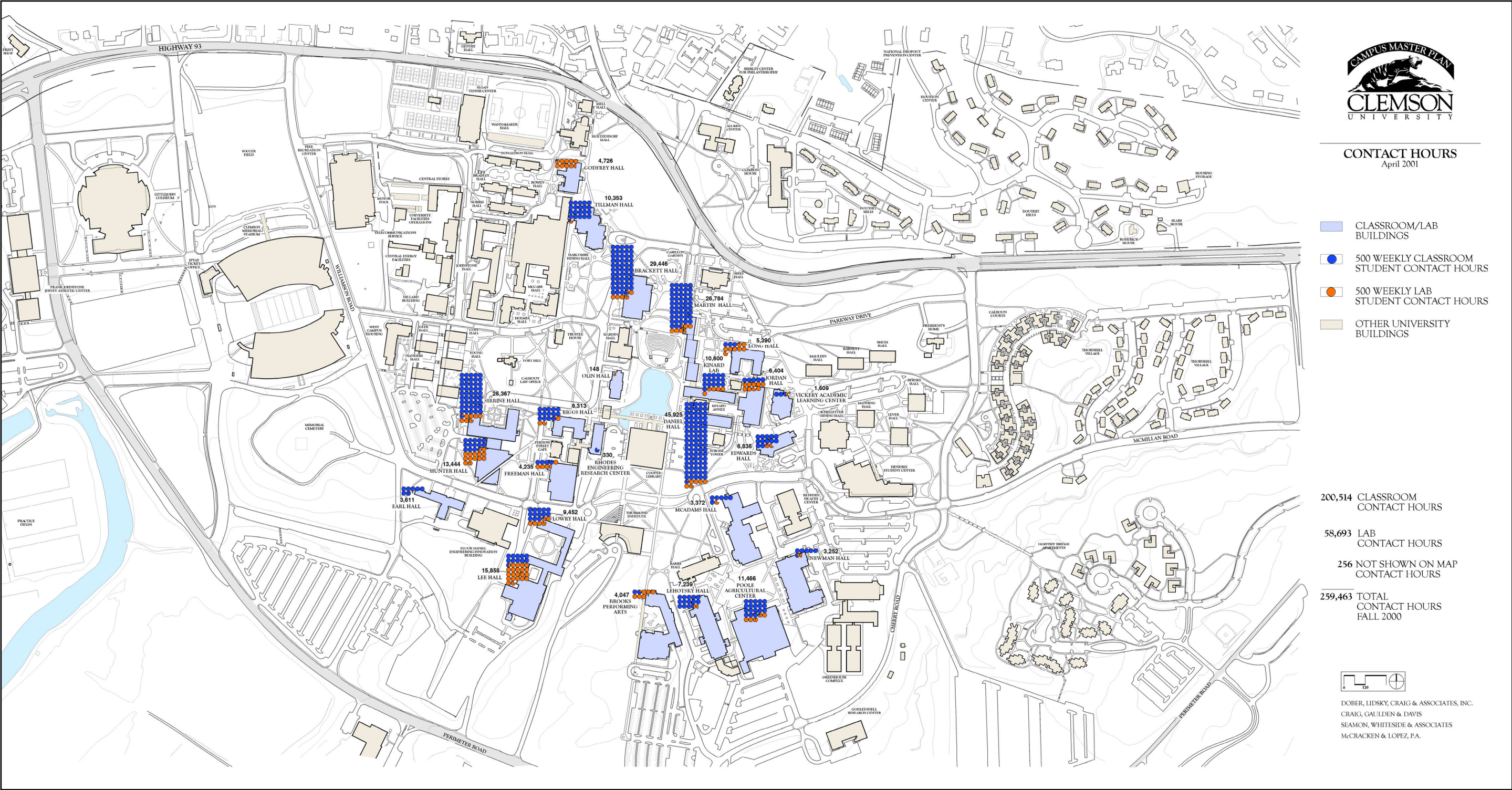
DANIEL HALL NORTHEAST OF THE COOPER LIBRARY

Drawing 13: Contact Hours

This analysis shows where the students were throughout the academic week during the fall of 2000. All twenty-four facilities where teaching occurred are colored blue on this map. The density of classroom use is depicted by dark blue dots, and laboratory use is depicted by orange dots. The basis of usage is contact hours – the number of students enrolled in each class multiplied by the number of hours per week it was scheduled.

Of the total 259,463 weekly contact hours (number of students x number of scheduled class hours) that term, 200,514 occurred in classrooms, 58,693 in laboratories, and 256 were off the Main Campus. Each dot represents 500 contact hours, and the total number is tallied for each building. The most heavily used academic building was Daniel Hall where 18 percent of the contact hours occurred.

The contact hours on the Main Campus are concentrated in three sectors. The largest, accounting for 57 percent of the contact hours, is south of Bowman Field, extending along the east side of the north-south spine to the Library. The science complex west of the north-south spine is another concentration with 32 percent of the contact hours. The smallest nucleus, 11 percent, is east of the campus green, south of the Library. More importantly, and significantly, half the University's contact hours were in four buildings: Brackett, Martin, Daniel, and Sirrine.





JOHNSTONE HALL (FRESHMAN HOUSING)



STRODE TOWER



WANNAMAKER AND DONALDSON HALL (FRATERNITY HOUSING)



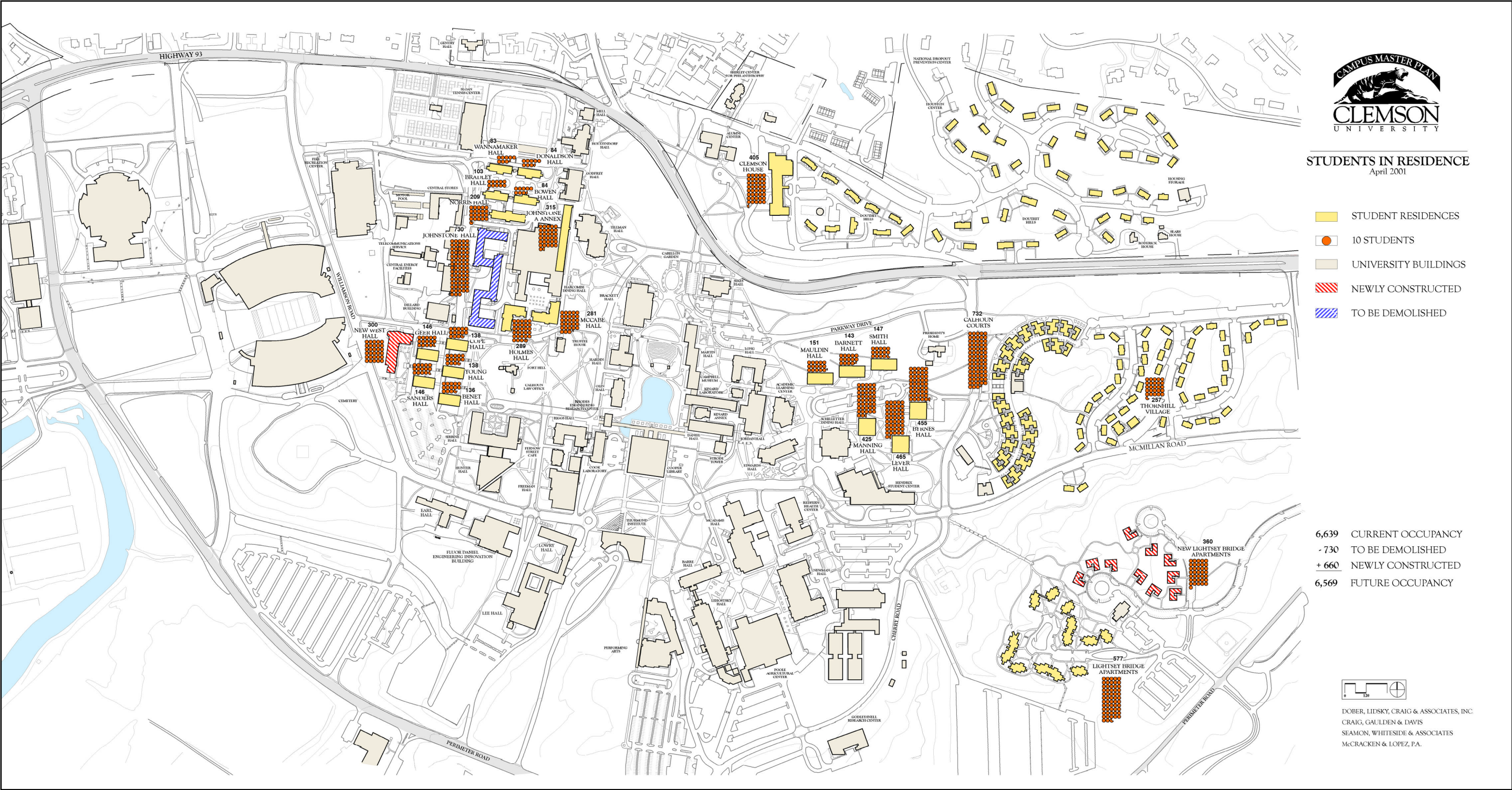
CLEMSON HOUSE

Drawing 14: Students in Residence

This map shows where students live on campus. Student residences are colored yellow, and the density as of the fall of 2000, except for the Douthit duplex housing north of Highway 93, is indicated by orange dots. Each dot is the equivalent of 10 students. New West Hall and the New Lightsey Bridge Apartments have recently been constructed and are indicated by the red and white stripe pattern. Johnstone hall was scheduled to be demolished at the time of the analysis, and is colored with blue and white stripes.

There is a residence hall precinct to the west of the central campus and another to the east. Clemson House stands alone, north of Highway 93. Further to the east are the apartment clusters.

During the fall of 2000, 6,639 students lived on campus, either in residence halls or in one of the three apartment clusters. With demolition of Johnstone Hall and the addition of the west campus residence hall and Lightsey Bridge housing, 6,569 students will live on campus – 42 percent of the 15,825 full-time equivalent student enrollment or 47 percent of the undergraduate population. Of the students living on campus, about 70 percent will live in residence halls and 30 percent in apartments.





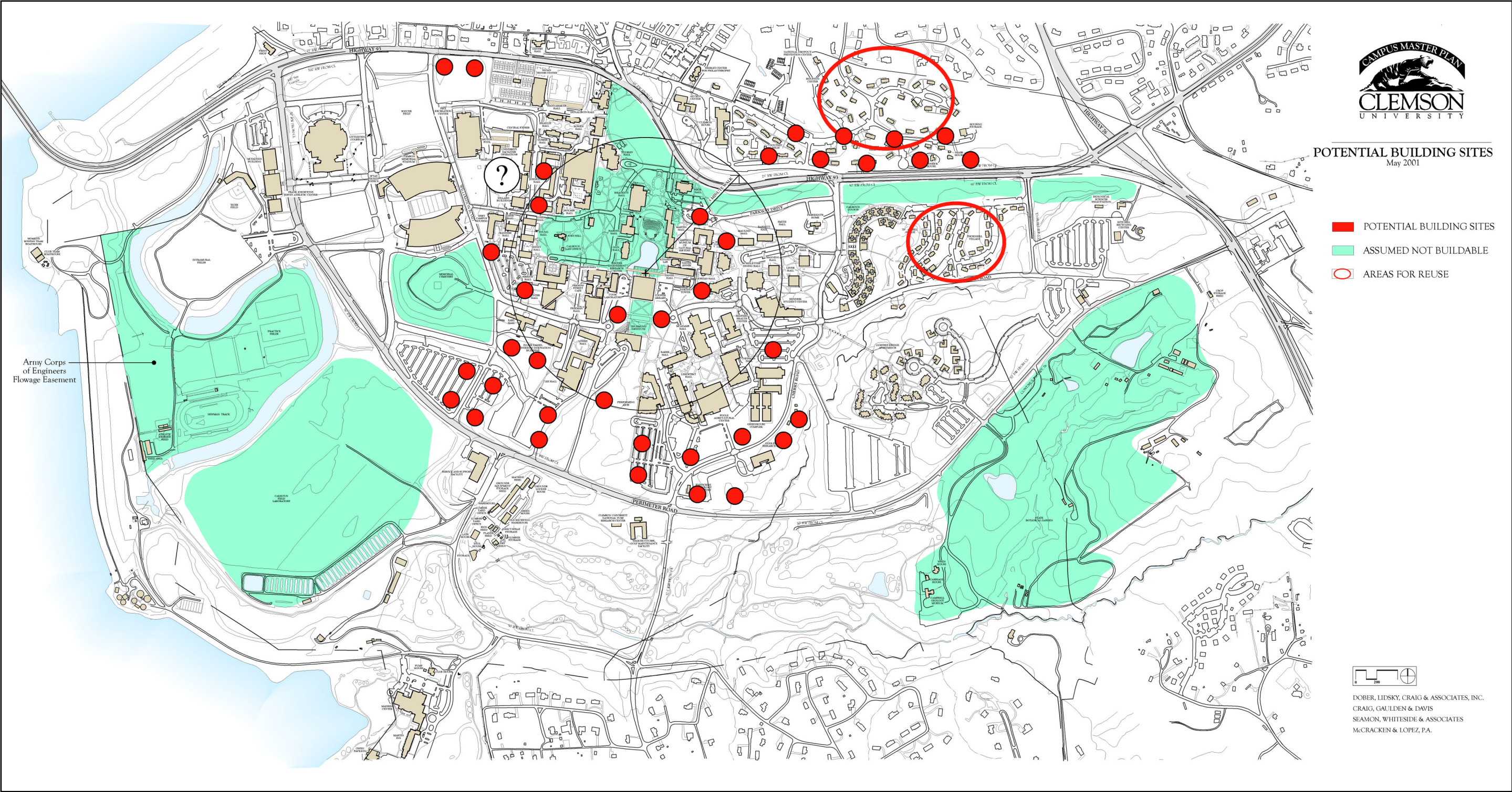
DOUTHIT HILLS

Drawing 15: Potential Building Sites

Possible sites for future buildings on the Main Campus are identified on this drawing. The sites are marked by red dots. The open red circles indicate general areas where new construction might occur, and would require demolition of the existing Thornhill Village apartments south of Highway 93 or the Douthit duplex housing to the north. The five to seven-minute walk, centered on Cooper Library, is superimposed to put into perspective the relative distances to the various sites.

Those areas that are assumed to be sacrosanct, and therefore not building sites, are colored green. On the Main Campus, these areas are the open spaces associated with the historic district on the Core Campus, the open space on the north-south spine between the Library and Thurmond Institute, Woodland Cemetery, and the Calhoun Field Laboratory. The area to the east is the Schoenike Arboretum and the Botanical Garden as well as sites of the Campbell Geology Museum, Campbell Carriage House Café, the Hayden Conference Center, and Hanover House.

Most of the potential sites are based on continuing the current pattern of academic buildings and assume that proximity to these existing buildings is important. The sites along and north of Highway 93 provide an opportunity for a new academic and research gateway into the campus.

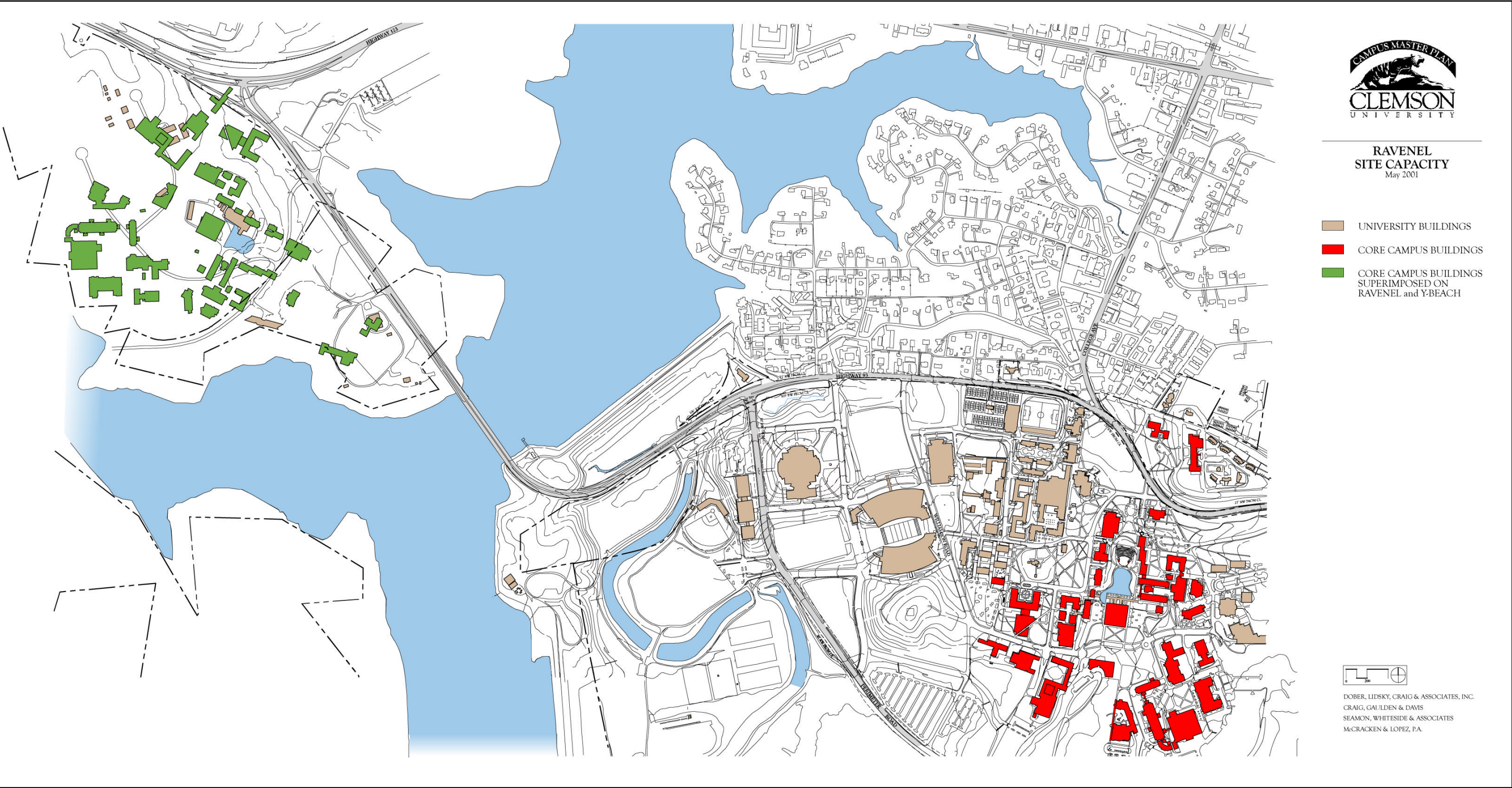




RAVENEL CENTER

Drawing 16: Ravenel Site Capacity

On this map the Core Campus buildings, indicated in red and shown in context to the right, are superimposed on the Ravenel Center and Y-Beach. This juxtaposition shows the scale of this sector graphically, and suggests there is a potential for denser development.





LIGHTSEY BRIDGE

CONCLUSIONS

The Main Campus is essentially a pedestrian campus except that parking is allowed along Core Campus roads. Both vehicular and pedestrian circulation could be improved by eliminating this parking and expanding the lots on the periphery as replacement parking is required.

The general development pattern on the Main Campus is rational and workable in that the various uses are clustered together. In any space reallocation plans, however, departments should be kept together and Budget Centers should be consolidated.

There are a variety of sites for new buildings on the Main Campus. Some are more appropriate for new development than others. When a new facility is planned, the building site must be carefully selected to fit within the broad campus design parameters. Designating open space and other space that should not be built upon is essential to preserving the integrity of the Clemson campus.

PROGRAMMATIC ANALYSIS

Two studies relating to programmatic analysis were concluded during the 2002 campus master planning effort. One is the Space Utilization Study, which summarizes the existing space use on campus and the methodology for predicting future space needs. The other study is a survey of sixteen significant University buildings, which examined building condition and ways to evaluate future changes in allocation or configuration.

SPACE UTILIZATION STUDY

2002

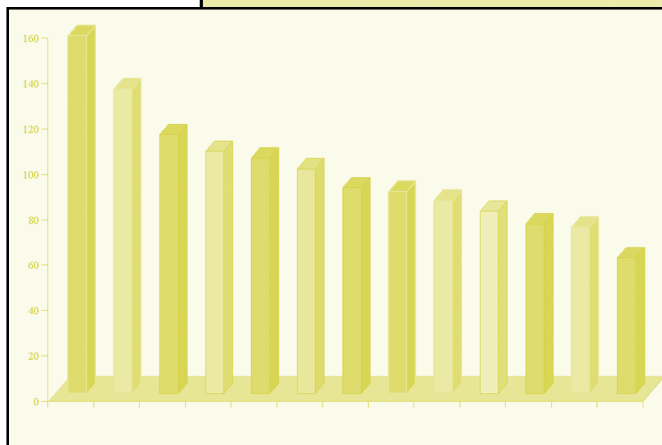
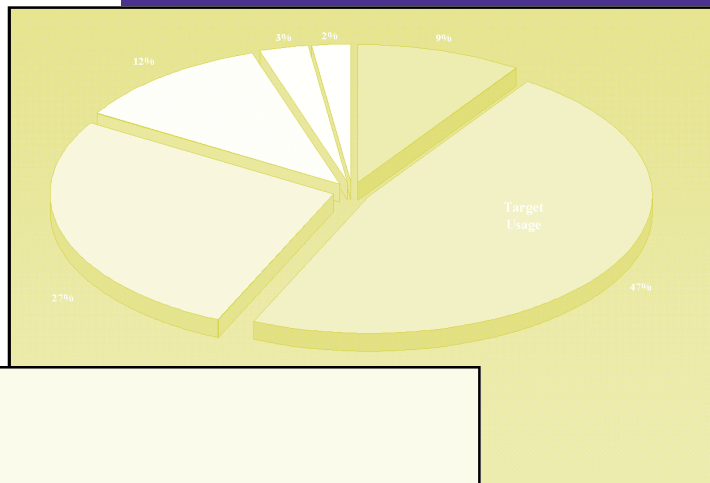


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 Diagram 2: Survey Building Locations27

APPENDIX

 Table A: Classrooms — Time Utilization Analysis45

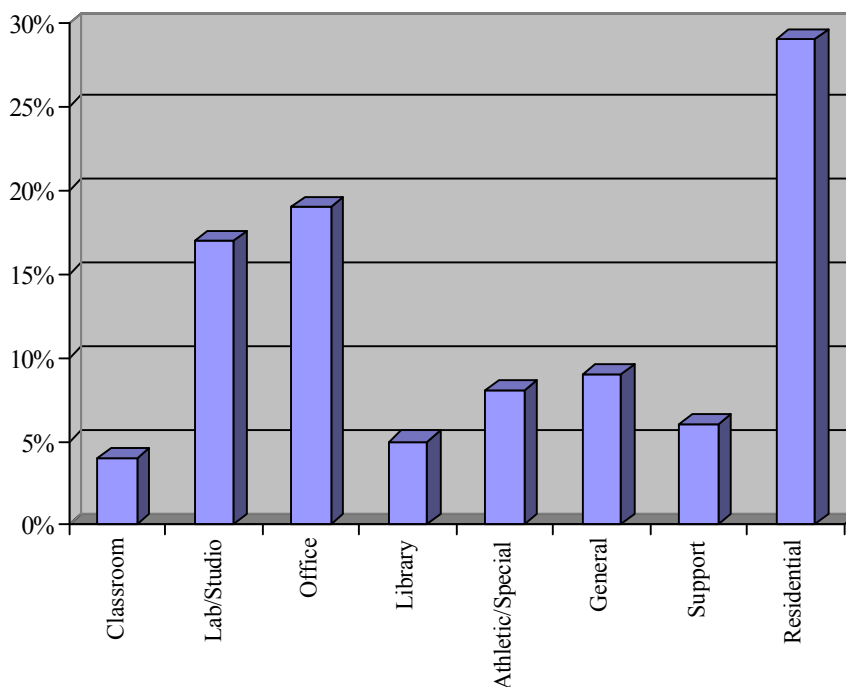
 Table B: Laboratories and Studios — Time Utilization Analysis47

OVERVIEW

The 2002 campus master planning effort at Clemson University included an analysis of existing space on campus — at the University, college, and department levels. Space was analyzed in terms of amount, type, and utilization. The adequacy of the amounts of space assigned for various uses was tested against state and normative standards as well as against the amounts assigned for similar uses at peer institutions.

A facility inventory was created by Clemson University as part of the campus planning process. The inventory encompassed 289 buildings, 11,000 spaces, and 4.1 million net assignable square feet (NASF). Of the total NASF, 4% is assigned to classrooms, 17% to labs and studios, 19% to offices, 5% to library use, 8% to athletic and related recreation use, 10% to resources for general and campus life uses, 6% to campus support, and 29% to residential space. The remaining 2% is unclassified or unassigned. See Graph 1 below.

Graph 1: Percent of Campus Space by Space Type



Space allocation Models were created as another aspect of space utilization. The Models, using data that is readily available, can test a range of space related alternatives. This management tool can predict the implications on assignable space resulting from factors such as changes in enrollment, numbers of faculty, or programmatic offerings.

Classrooms are a major component of the facilities at Clemson. Utilization of this important resource can have a significant impact on perceived space needs as well as management policy.

An analysis of existing Clemson classrooms was conducted to determine if the number is adequate and if the sizes are appropriate for the course sections taught. The number and size of offices are an important issue at any university. The Space Utilization Study analyzed faculty office sizes in a sampling of buildings.

In addition to more generalized utilization studies, an in-depth, Existing Facilities Study of sixteen Clemson buildings was conducted. These key buildings were analyzed in terms of utilization as well as condition and suitability for the uses assigned.

CAMPUS SPACE UTILIZATION

As of the 2001-2002 academic year, there were 5,935,000 gross square feet (GSF) of space on the Clemson Campus on 628 maintained acres. The enrollment was 15,830 full-time equivalent (FTE) undergraduate and graduate students and the number of FTE faculty was 962. Of the total amount of gross square footage, 79 percent was nonresidential — designated for uses such as academic, administrative, athletic, library, student life, and general support. The remaining 21 percent was student housing.

At the time of this study, there were 6,570 beds in the student housing inventory. This number reflects the Johnstone demolition and the replacement beds provided by the New Lightsey Bridge Apartments and New West Hall. Based on an enrollment of 15,830, 42 percent of Clemson undergraduate and graduate students live on campus. In August of 2003, the Fraternity Quad is to be renovated, and its residents will be housed in nearby off-campus housing. This temporary situation has not been factored into the analysis.

With this type of information in place, various data can be extracted such as GSF per student or faculty member, residential GSF per student, and number of faculty per student. To understand the implications, a peer comparison was conducted.

PEER COMPARISONS

The intention of the peer comparison was to contrast the amount of space at Clemson with the amounts at peer institutions. The resulting numbers should not be thought of as standards, or guidelines, or targets to reach or surpass. They are simply a description of immediate circumstances. This information, however, helps to place the University into a broader context and can also assist in understanding Clemson's competitive advantages or disadvantages.

Sixteen peers¹ were used in the comparison, seven of which are ranked within the top 20 public universities.² They were all large, university-level institutions with enrollments of from 13,600 to 40,230 FTE students. In the comparison bar charts that follow, Clemson is orange, and the survey mean is green. Institutions that Clemson considers as peers are gray, and other peers that were applicable to this comparison are blue. The top 20 universities are outlined in red. On Graph 2, graduate student enrollment is shown in the lighter colors at the top of the bars.

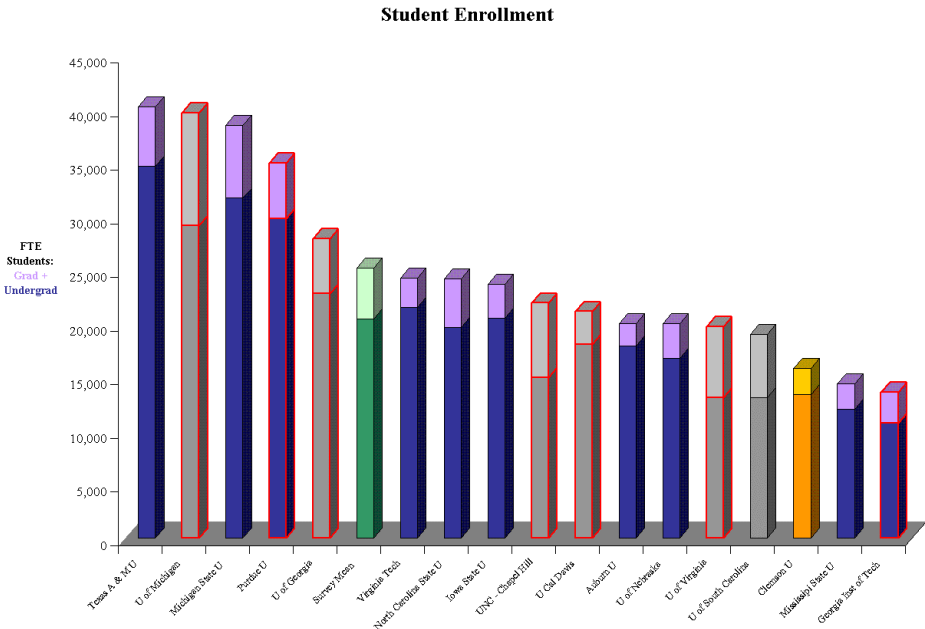
¹Peer institutions were Auburn University; Georgia Institute of Technology; Iowa State, Michigan State, Mississippi State, North Carolina State, Purdue, and Texas A & M universities; universities of California Davis, Georgia, Michigan, Nebraska, South Carolina, Virginia, and North Carolina Chapel Hill; and Virginia Tech.

² The top 20 public universities as listed by *U. S. News and World Report*.

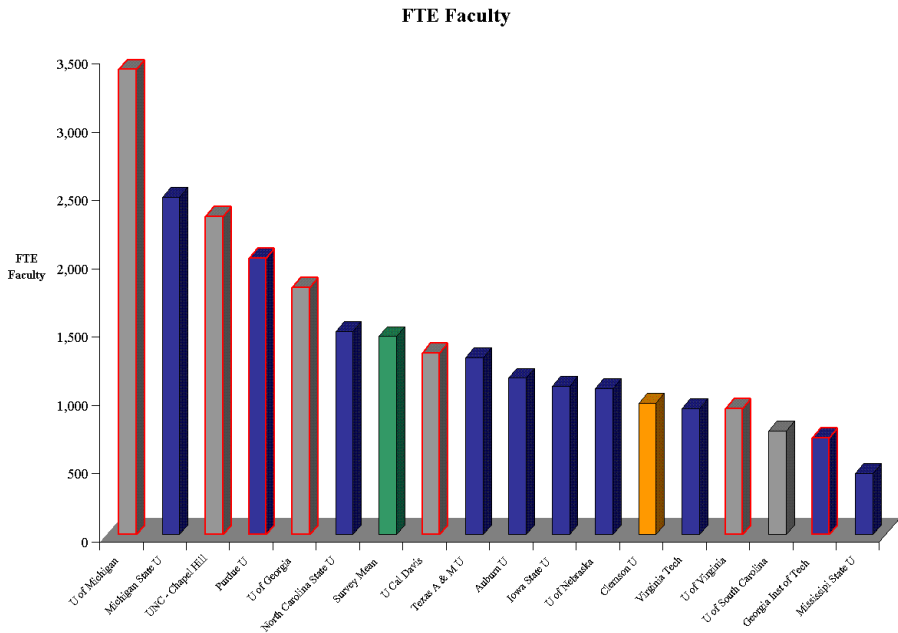
Numbers of Students and Faculty

The highest enrollment in the peer comparison was Texas A & M with over 40,000 students. The mean was 25,200 and Clemson’s enrollment was 15,800. The number of FTE faculty at Clemson was 960 while the mean was 1,450. The number of faculty at the University of Michigan, at 3,400, is well above the others.

Graph 2: Student Enrollment



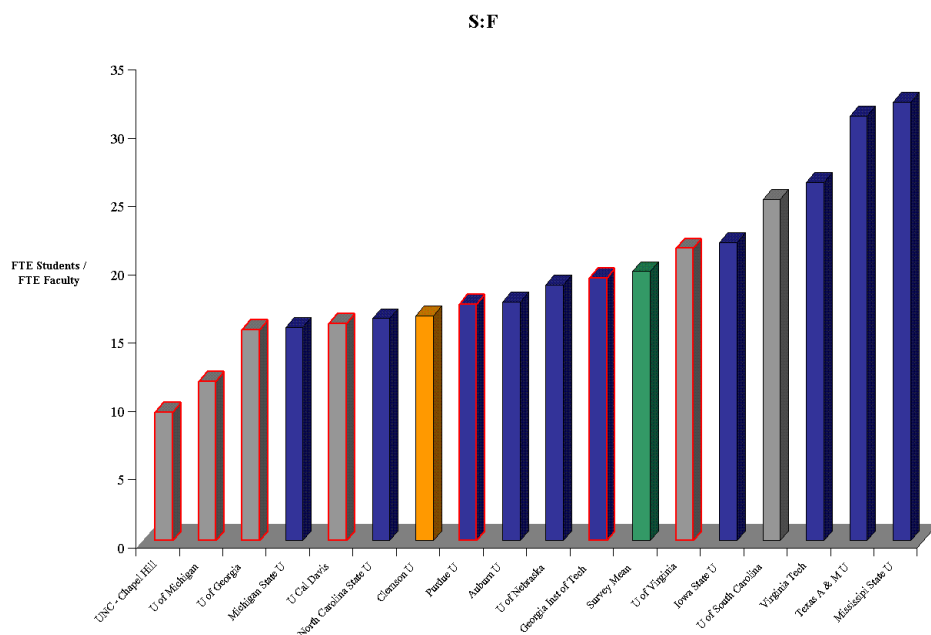
Graph 3: FTE Faculty



Students per Faculty

An academically significant comparison is the student-to-faculty ratio. At Clemson there are 16.5 FTE students per FTE faculty, which is on the low side of the 19.7 mean. Clemson is in a good position in this analysis, even though the data is slightly slanted, in this case by two very high numbers and one very low number. On the other hand, the student faculty ratio at the top 20 universities shown on the chart averages 15.7.

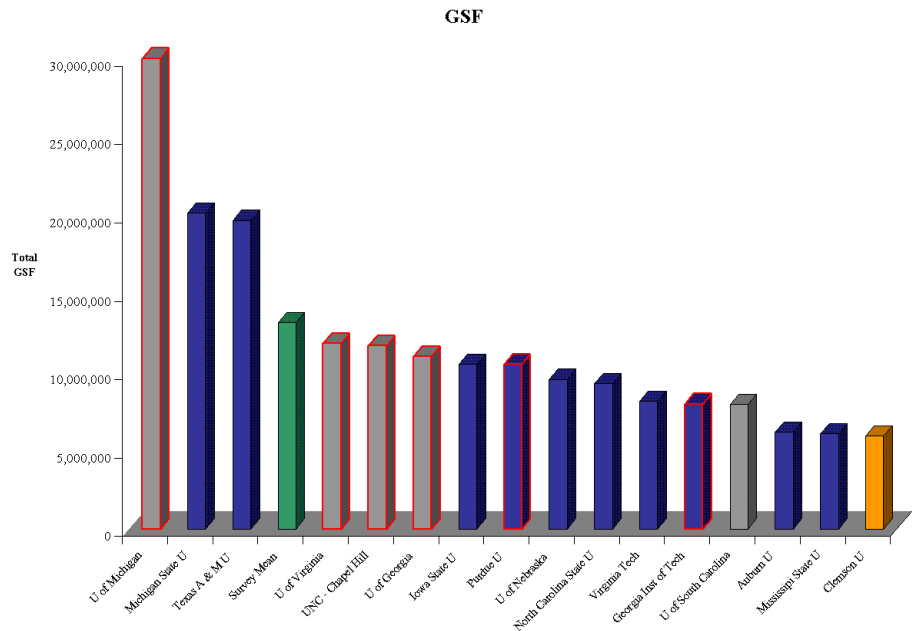
Graph 4: Students per Faculty



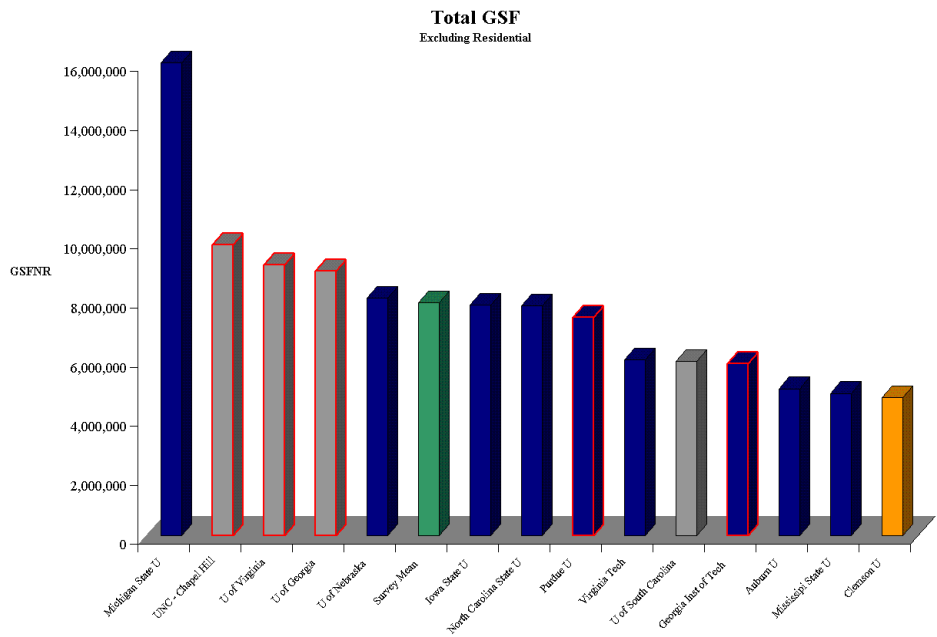
Gross Square Footage

With a total of 5,934,700 gross square feet (GSF), Clemson is at the low end of the comparison chart. The mean is more than two times that amount or over 12,000,000. See Graph 5. Graphs 6 and 7 show the break down of residential and non-residential space. Clemson rises to third from the bottom in residential space.

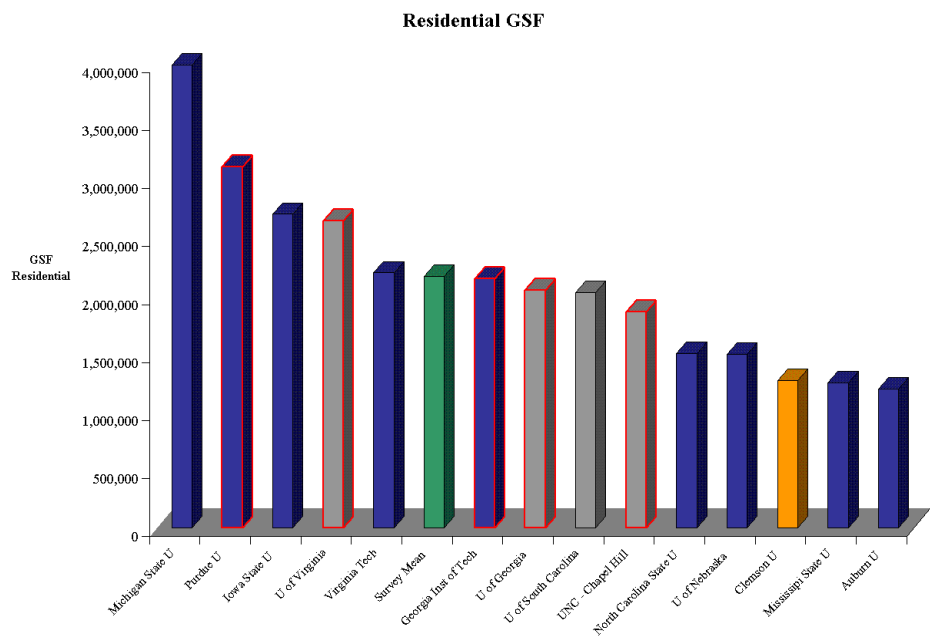
Graph 5: GSF



Graph 6: Total Non-residential GSF



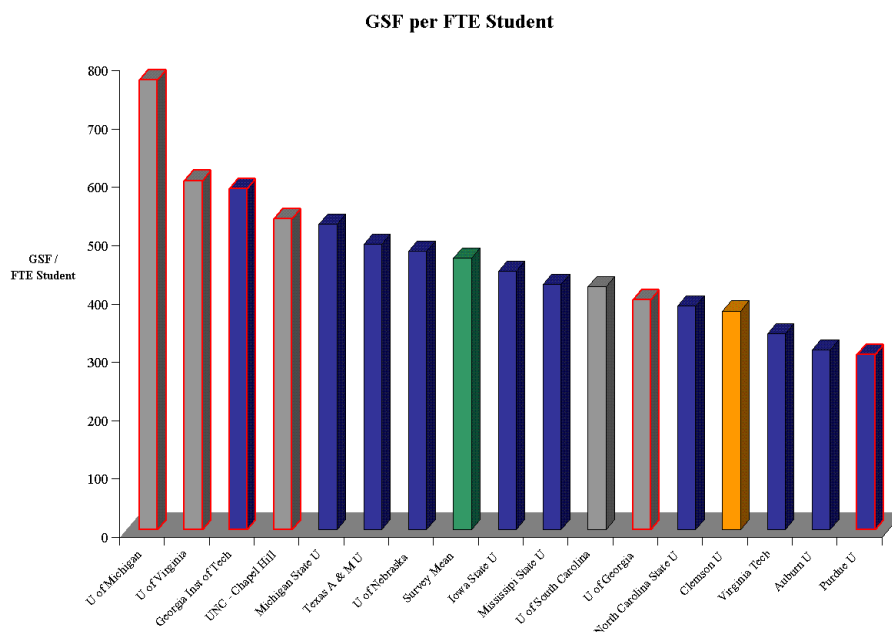
Graph 7: Total Residential GSF



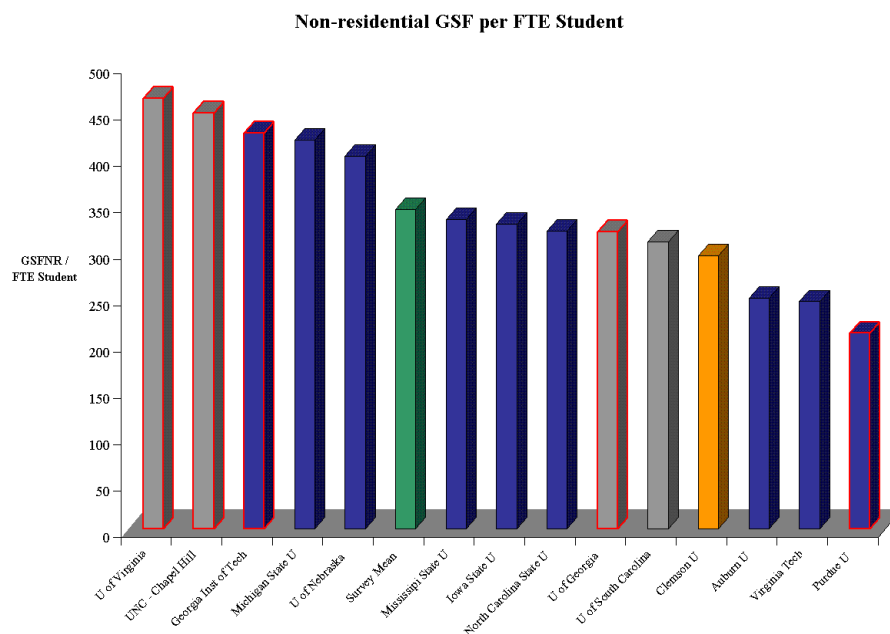
Space Per Student and Faculty

The total amount of space at Clemson per student is shown on Graph 8. Clemson is at 375 GSF/FTE student and the mean is 465. The University of Michigan, at 771 GSF, skews the mean somewhat. Graph 9 shows the nonresidential space where Clemson has 295 GSF per FTE student and the mean is 345 GSF. The differences are more striking when Clemson is compared to just the seven institutions in the comparison that are ranked within the top 20 public universities: 530 GSF to Clemson's 375 GSF per student and 374 non-residential GSF compared to Clemson's 295 GSF per student.

Graph 8: GSF/Student

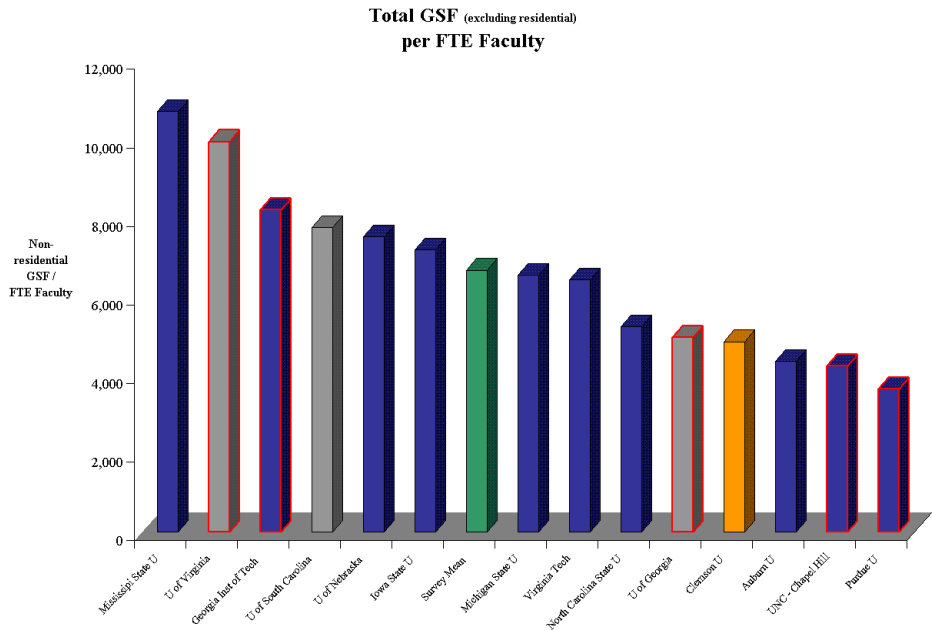


Graph 9: Non-residential GSF/Student



There are 4,846 GSF of nonresidential space per FTE faculty at Clemson, which is about one-quarter from the low end of the comparison on Graph 10. The mean is 6,700 GSF. For the top 20 institutions shown in the chart, the average is 5,700 GSF per faculty.

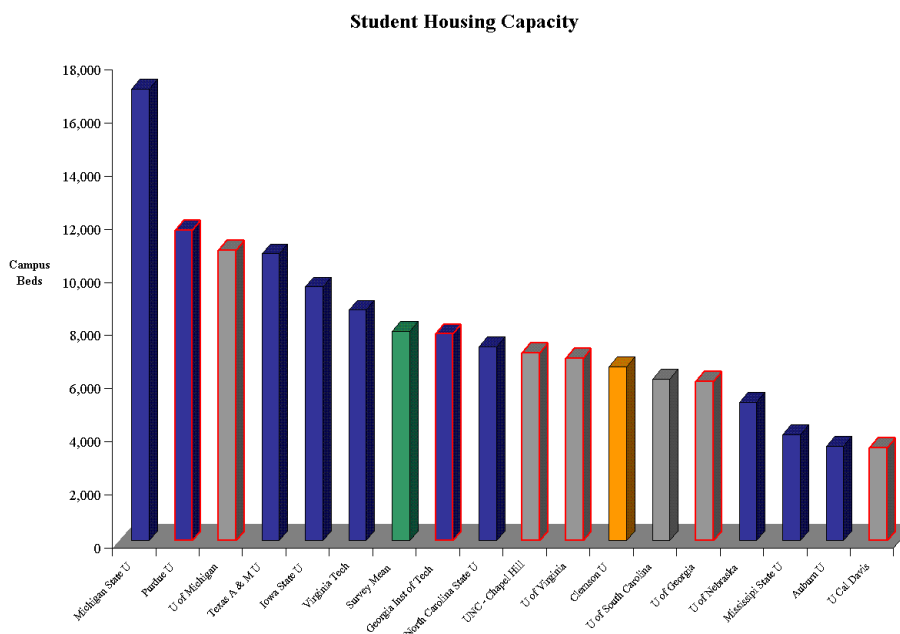
Graph 10: Non-residential GSF/Faculty



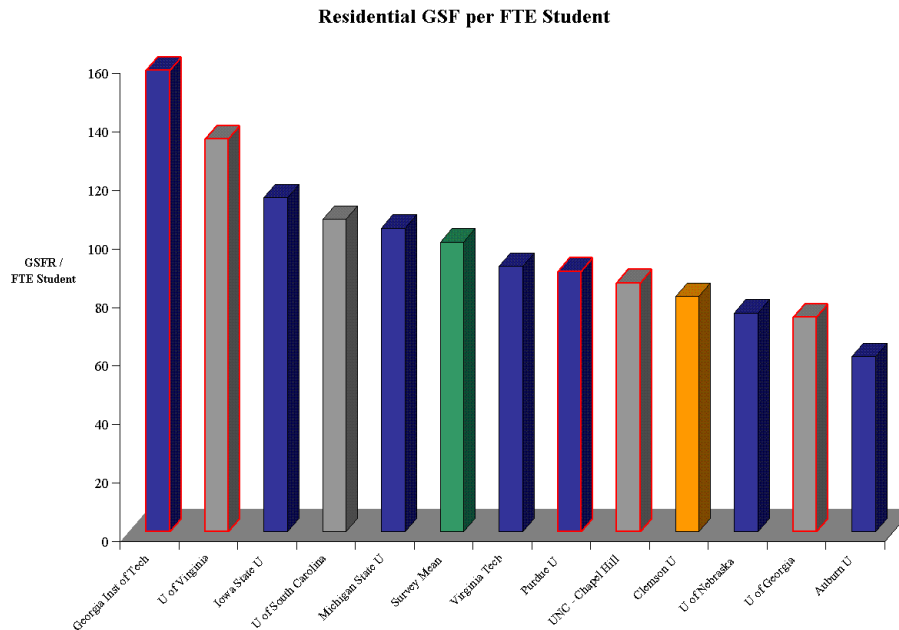
Student Housing

The need for housing on a campus is determined by program, although it is also affected by a number of other institutional characteristics, including the availability of appropriate housing off campus, commuter versus residential campus, strength of the Greek system, and the quality of existing on-campus housing. These factors must be considered in interpreting peer comparisons. Clemson provides 6,540 beds which is fairly close to the survey mean of 7,900 beds. There are 80 GSF of residential space per student at Clemson, which is close to the mean of 95 GSF. The amount of space per bed at Clemson is low, and 96 GSF less than the mean of 291 GSF.

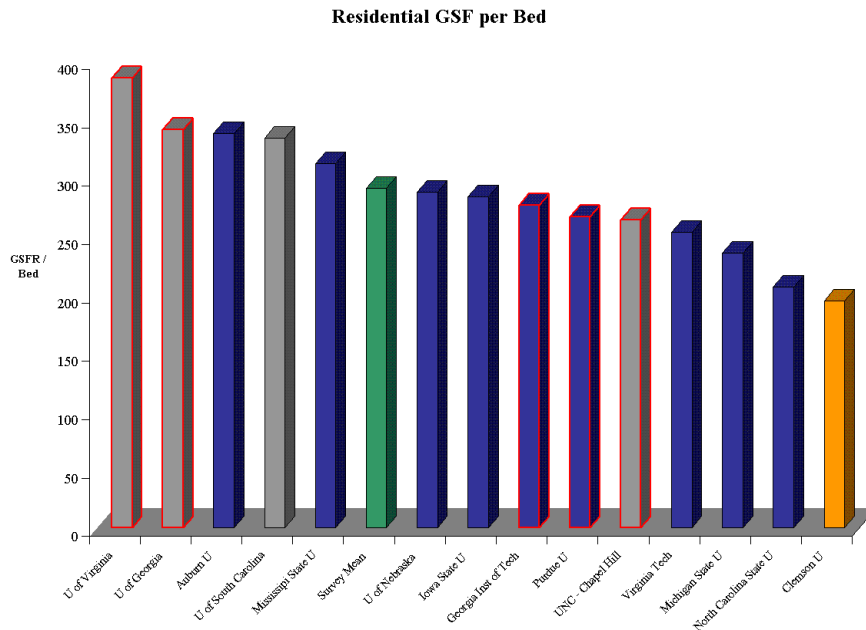
Graph 11: Student Housing Capacity



Graph 12: Residential GSF/Student

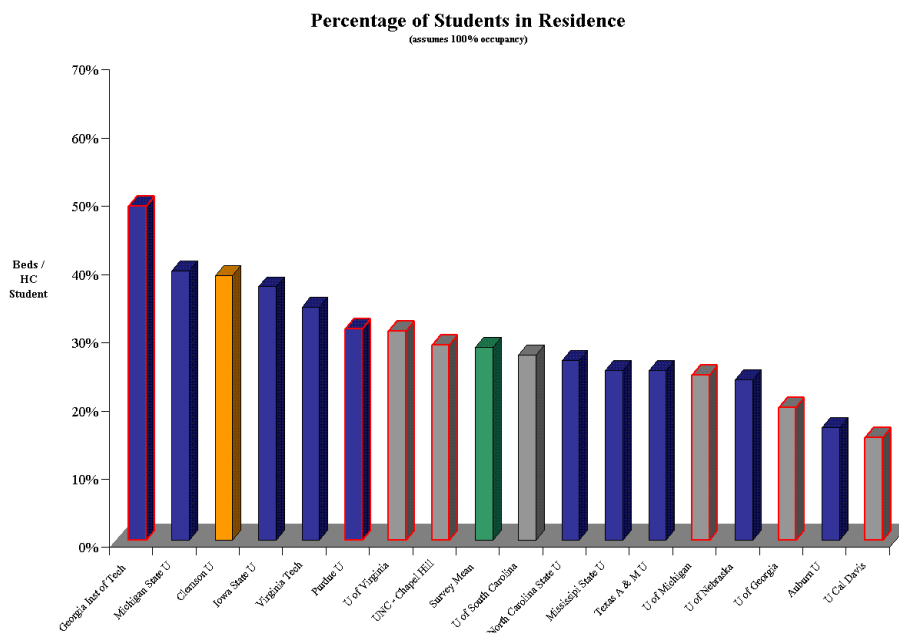


Graph 13: Residential GSF/Bed

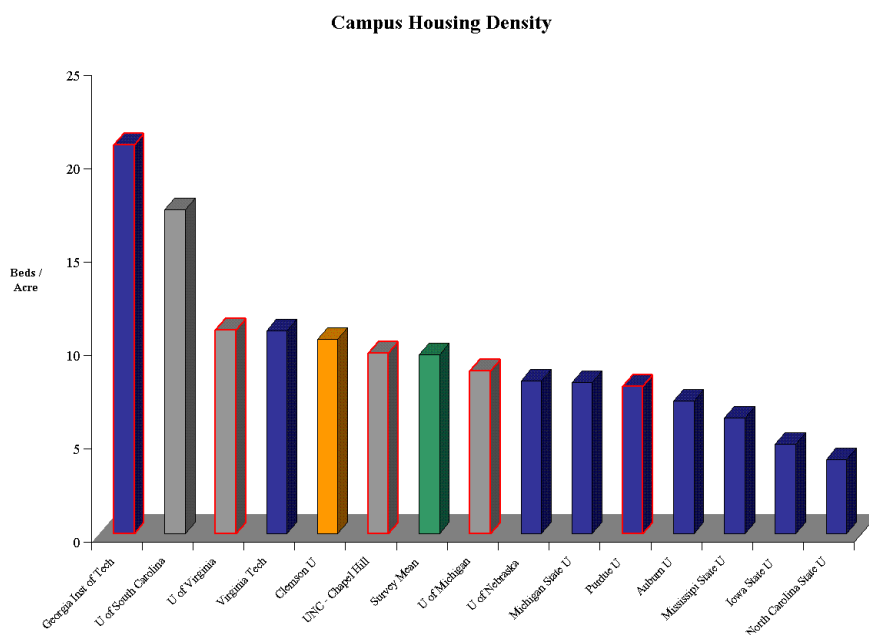


Clemson has a higher percentage of its students living on campus than the average of its peers. Approximately 40 percent of Clemson students live on campus. This is considerably higher than the mean of 28 percent. So although more students than average live on campus, the amount of space per student is low. The density or beds per acres, is shown on Graph 15. There is a wide range of from 4 to 21 beds a per acre. The mean is 10 and Clemson is slightly over.

Graph 14: Percentage of Students in Residence



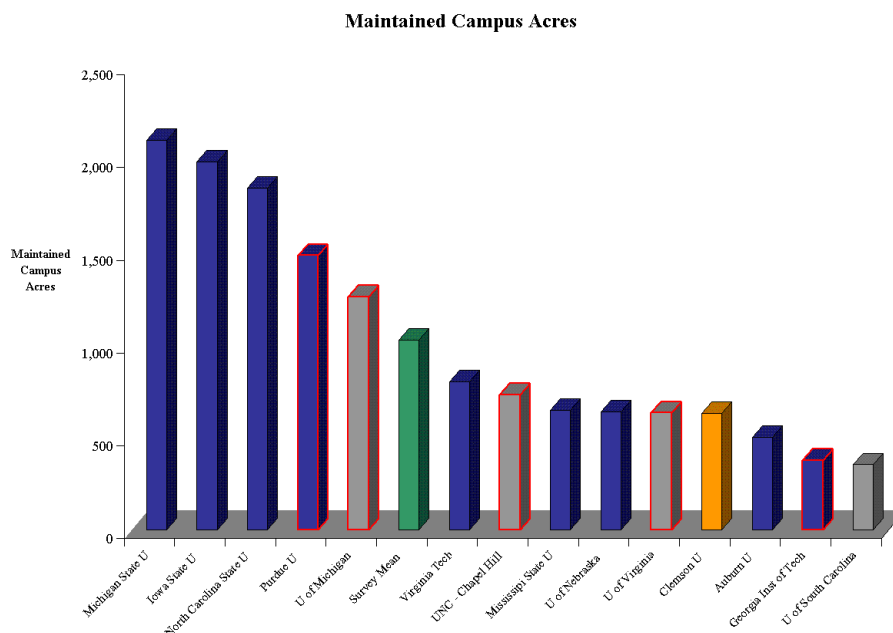
Graph 15: Campus Housing Density



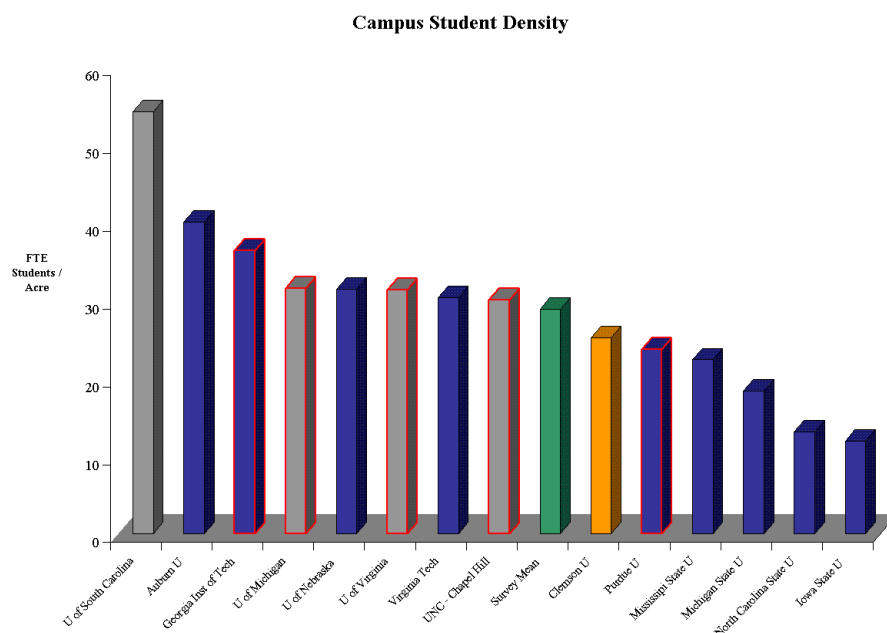
Maintained Acres

The maintained 628 acres at Clemson is on the low end of the comparison. See Graph 16. The lowest is 350 acres, the highest is 2,100, and the mean is 1,000. More important, however, is the Number of students per acre. Here Clemson is at 25 acres and the mean is 29 FTE students per acre.

Graph 16: Maintained Acres

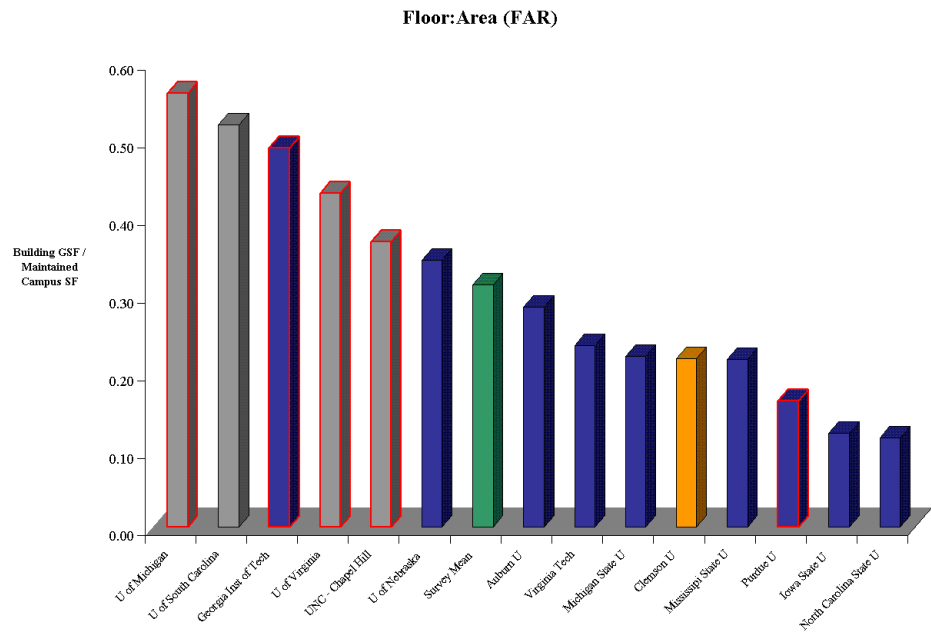


Graph 17: FTE Students Per Acre



The floor area ratio (FAR), or GSF per maintained campus square foot, is another indicator of the density of a campus. Clemson is .22 GSF per maintained square foot, which is between the low end at .12 and the mean at .31.

Graph 18: FAR



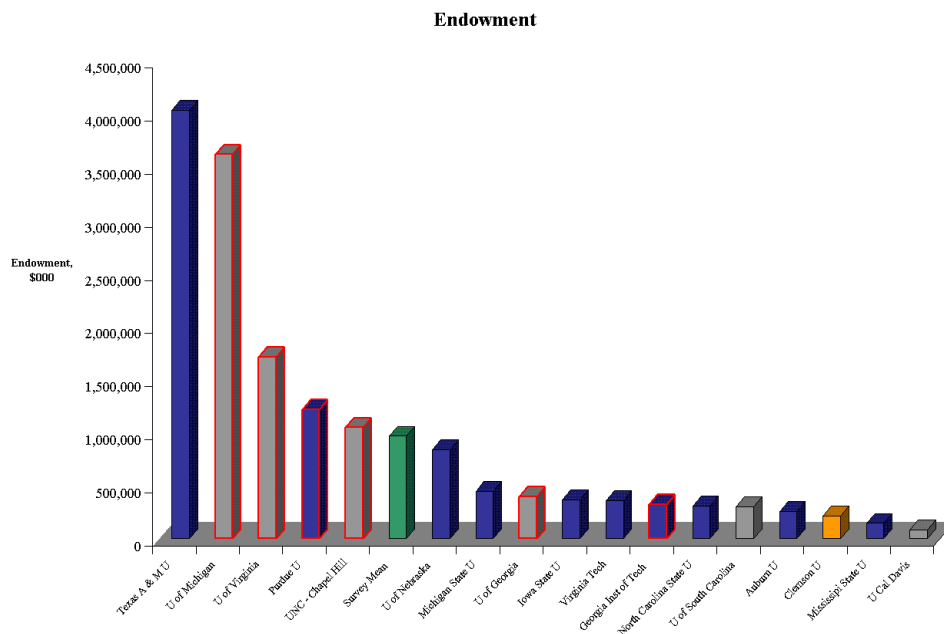
Endowment

A healthy endowment allows a public university latitudes not possible when funds are limited to those allocated by the state. Endowment income can fund special programs that enhance the university's stature and it can supplement faculty salaries and tuition, thereby attracting and retaining the best faculty and students. For such reasons as these, endowment is essential to the operation of a top-ranking university.

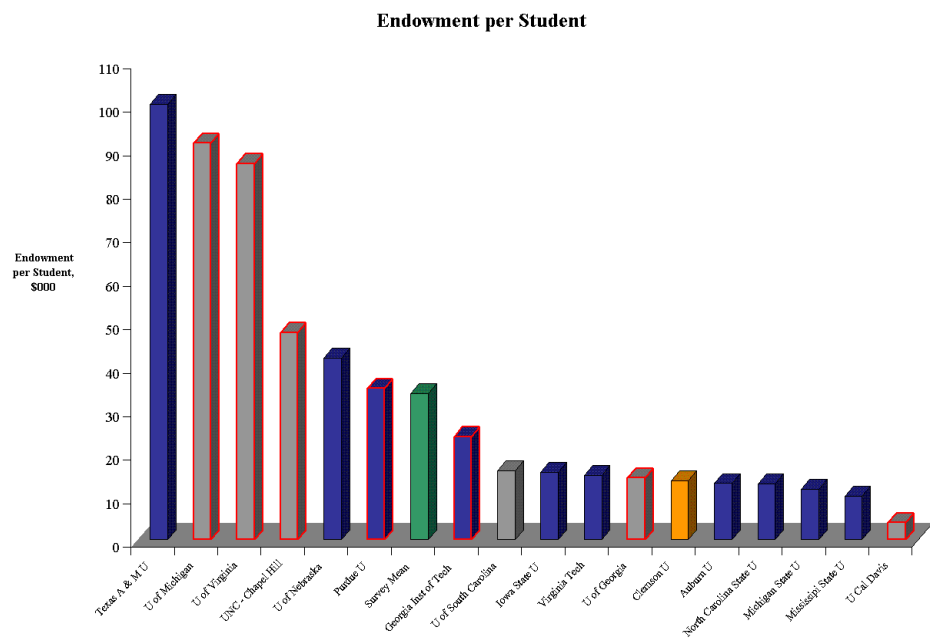
Clemson's endowment is at the low end of the peer survey, shown on Graph 19. It is, at \$214 million, less than a quarter of the survey mean. Although Texas A & M and the University of Michigan are considerably higher than the others, which skews the mean, Clemson is still very low in the comparison.. Graph 20 shows the endowment per student. In this case Clemson's endowment is, at \$13,500 per student, about forty percent of the mean.

Graph 21 compares endowment per faculty. At about \$223,000 per faculty, Clemson's endowment is about a third of the mean. In this comparison, Texas A & M is well above the others, raising the mean.

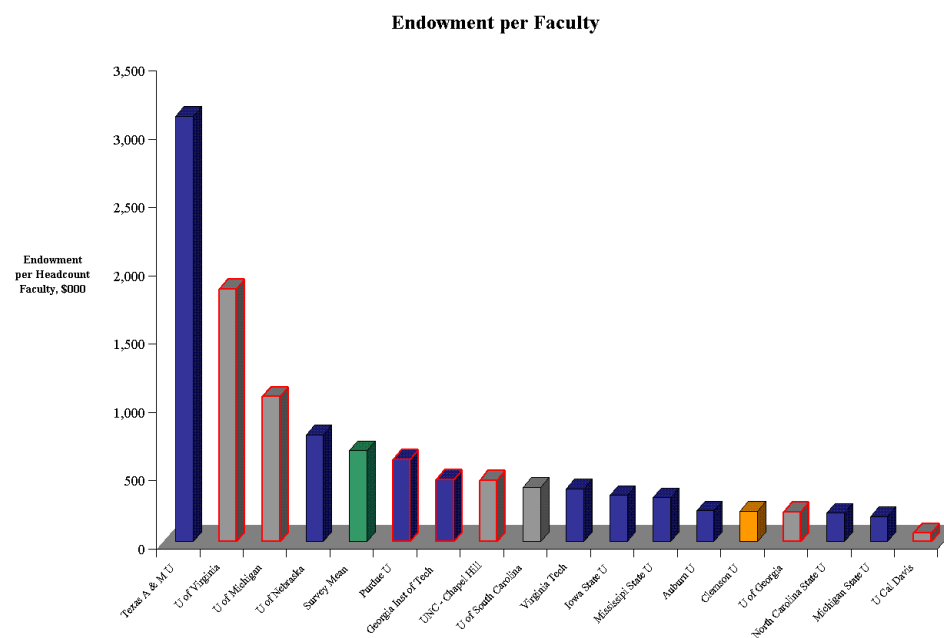
Graph 19: Endowment



Graph 20: Endowment/Student



Graph 21: Endowment/Faculty



MODEL

As part of the space utilization study, department specific-space allocation models using a set of square foot multipliers appropriate to the space use were created. The models provide a set of baselines for space allocation tailored to each department. An important reason to create these models is to provide guidelines for deciding the amount of space departments might require, based on a consistent set of acceptable assumptions. A set of standardized square-foot multipliers, appropriate to the space type, is used to determine how much space should be provided for the number of people or activity that will be accommodated in the space(s).

The model highlights policy assumptions that have spatial implications and allows the Dean, Chair, or Facilities Planning Office to modify those assumptions to test *what-if* scenarios. The model is an Excel file for simplicity of use.

The Model is organized by college and by department. For each department, there is a section on the number of faculty, staff, students, and administrators. Another section summarizes the number of weekly student contact hours in laboratory or studio courses. From this data, projections are developed for the amount of space required for offices, workrooms, file storage, office storage, conference rooms, department offices, GRA and GTA work areas, teaching laboratory and studio space and support, and research space.

In addition, specialized, department specific spaces are defined. For example, performing arts require performance space, green room, dressing rooms, shops, scene storage, costume storage, etc.

To simplify use, user input, or variables, can be inserted in the spreadsheet in areas that are colored green.

In general, the model uses the following assumptions:

- An office is provided to all FTE faculty
- GTAs and GRAs will share space.
- Managerial professionals will have individual offices.
- Clerical staff will share offices.
- Each department will have a department or unit office.
- In addition, each department will have workroom, storage, copier, and file room space.
- Each department will have a conference room
- A typical lower division laboratory will be scheduled for 20 hours per week
- Similarly, a typical upper division laboratory will be scheduled for 12 hours per week.
- Unscheduled labs or “open labs” will be available for 50 hours per week.
- The amount of space per researcher will be dependent upon the type of work and will therefore be department or discipline-specific.
- Research space will be provided to all faculty, research based non-faculty, funded masters and Ph.D. students — GRAs, GTAs and undergraduate researchers.

CLEMSON UNIVERSITY
CAMPUS MASTER PLAN 2002
SPACE UTILIZATION STUDY

Table 1: Summary Program for the Master Plan

CLEMSON UNIVERSITY TOTAL NASF -
EXISTING AND PROJECTED ©

BUDGET CENTER	EXISTING NASF Minus Dept. Clrms	MODEL OF EXISTING NASF	DIFFERENCE EXISTING AND MODEL NASF	FUTURE MODEL NASF	DIFFERENCE EXISTING AND MODEL NASF
COLLEGE OF ARCHITECTURE, ARTS, AND HUMANITIES	137,926	166,285	28,359	187,750	49,824
COLLEGE OF BUSINESS AND BEHAVIORAL SCIENCES	108,886	111,693	2,807	119,228	10,342
COLLEGE OF AGRICULTURE, FORESTRY, AND LIFE SCIENCES	328,916	395,190	66,274	478,591	149,675
COLLEGE OF ENGINEERING AND SCIENCE	477,434	580,945	103,511	670,455	193,021
COLLEGE OF HEALTH, EDUCATION, AND HUMAN DEVELOPMENT	106,815	127,295	20,480	130,885	24,070
RESEARCH	34,682	37,455	2,773	43,220	8,538
Sub Total College Space	1,194,659	1,418,863	224,204	1,630,129	435,470
	EXISTING NASF				
UNIVERSITY CLASSROOMS	158,500	192,812	34,312	192,812	34,312
Total Academic Space	1,353,159	1,611,675	258,516	1,822,941	467,232

CLASSROOM, LABORATORY, AND STUDIO ANALYSIS

Teaching space is a vital resource at any university. At Clemson, classrooms, labs, and studios account for 21 percent of the assignable space. There are several ways to assess the adequacy of teaching space. Measures include how intensely these spaces are being used, if they are the appropriate size for the scheduled classes, and if the size is adequate for the number of students given the desired seating style.

Classroom Utilization

Generally the target utilization for classrooms is between 60 and 75 percent, or 25 to 30 hours per week assuming a 40- to 50-hour week. If the hours of use fall between those numbers, the implication is that the number of classrooms is adequate. The average usage at Clemson for fall 2000 was 28.4 hours per week. This is within the range but on the high side.

Table 2 shows the number of registrar-scheduled classrooms and the classroom usage by building. Although the average usage is 28.4 hours per week, in nine of the twenty-five entries it is above 30.

Table 2: Classrooms by Building

Building	Number of Spaces	Mean Usage Hours/Week
Academic Learning Center (Vickery)	1	15.0
Brackett Hall	16	30.6
Chemistry Auditorium (Hunter)	1	34.0
Cook Lab	1	18.0
Daniel Hall	41	32.3
Earle Hall	5	23.3
Freeman Hall	2	33.8
Godfrey Hall	2	21.5
Hunter Hall	2	22.5
Jordan Hall	2	31.0
Kinard Lab	6	22.3
Lee Hall	3	32.5
Lehotsky Hall	7	30.1
Long Hall	4	19.9
Lowrey Hall	9	25.6
Martin Hall	15	29.3
McAdams Hall	4	21.6
Newman Hall	1	32.0
Nursing (Edwards Hall)	8	28.1
Performing Arts	1	25.5
Poole Agricultural Center	9	27.9
Rhodes Engineering Research Center	1	27.0
Riggs Hall	7	32.8
Sirrine Hall	21	29.6
Tillman Hall	13	20.9
Totals	182	28.4

One reason a lower rate of use is desirable on some campuses is so that students can be involved in outside activities such as athletics or student activities for part of the day, the late afternoon perhaps. A lower rate will also provide time for classrooms to be used for scheduled and unscheduled

meetings, student study, and for small group interaction. Another reason is to allow time between classes for faculty and student dialogues, begun in the class period, to continue; or for informal group interaction. If there is enough time, faculty can arrange the seating to fit a preferred style of teaching — the seminar format, seating in a circle, or seating arranged for small-group discussion. There also has to be enough time to clean and maintain these rooms as they are constantly in use.

The percentage of classroom usage is shown graphically on Diagram 1. The total usage is divided into increments of 14 percent except for the highest grouping, which is 25 percent. Each percentage of utilization is a section of the pie chart. The target usage of 60 to 74 percent, colored light orange, is noted. This category is 47 percent. The next largest grouping in 45 to 59 percent, accounting for 27 percent of classrooms. This shows that, in general, classroom utilization is reasonable.

Classroom Occupancy

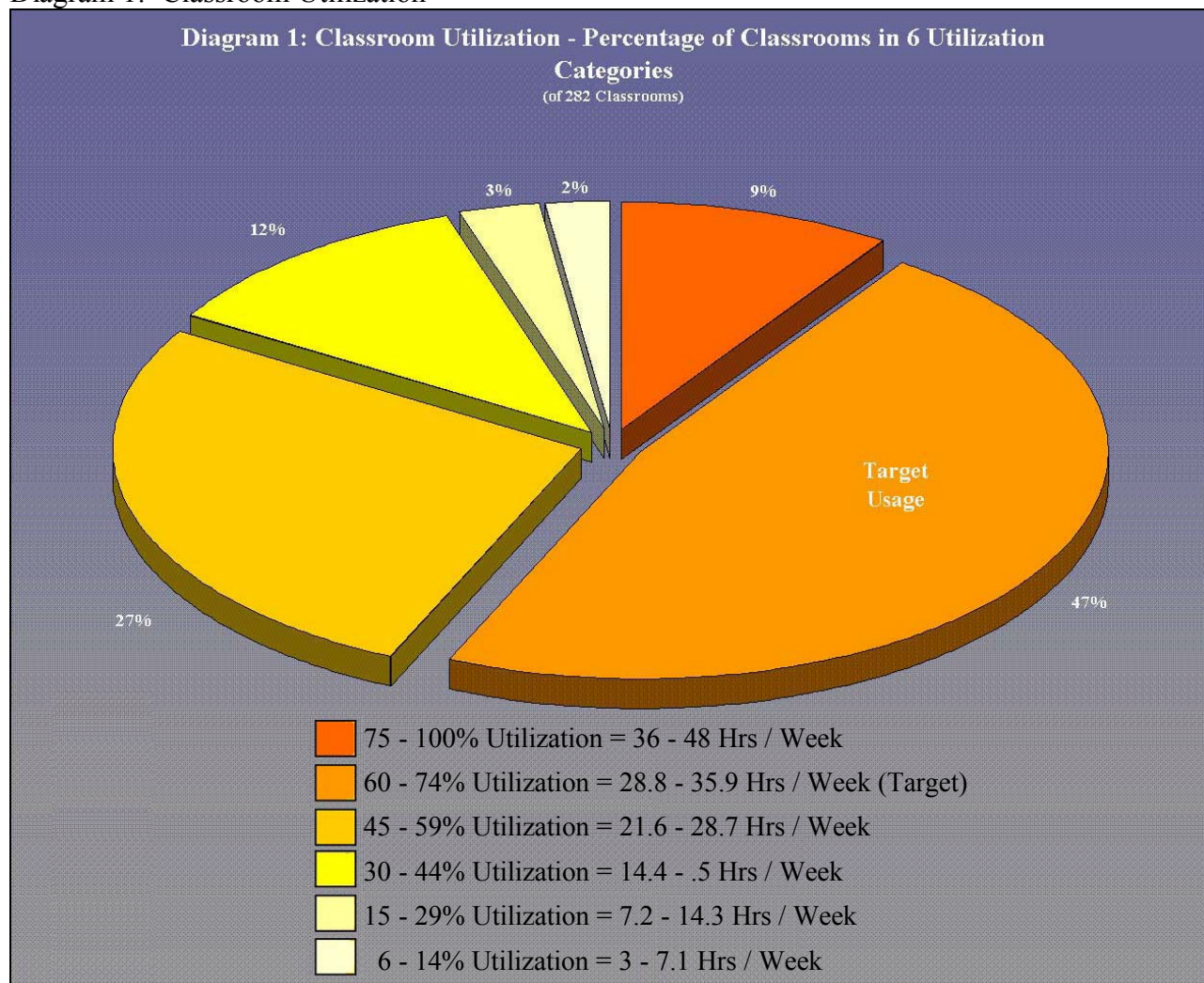
Another indication of the use of classrooms is the occupancy. The target occupancy rate is 60 percent. Table 3 shows the nine classroom size ranges on campus with the corresponding number of spaces and net assignable square feet (NASF) per station. The next two columns show the NASF per station for two types of seating — tablet-arm chairs and tables and chairs — based on normative standards. The last two columns are the mean section size and mean occupancy.

There are only three categories, which provide seating for 60 to 199, that are within the target. The two categories, seating 10 to 19 and 40 to 49, are up to 75 and 76 percent. These high occupancy rates mean the spaces are too small for the section sizes.

Table 3: Classroom Occupancy

Seating Capacity	No. of Spaces	Mean Capacity	Total Stations	NASF/Station	DLCA NASF/Station		Mean Section	Mean Occupancy
					Tablet Arm	Table/ Chairs		
B (10-19)	4	16	63	25.2	22	30	12	75%
C (20-29)	27	26	698	20.1	20	30	17	66%
D (30-39)	58	35	2,035	18.8	18	25	24	68%
E (40-49)	50	44	2,199	18.5	16	22	33	76%
F (50-59)	8	51	408	20.0	16	22	34	66%
G (60-99)	20	71	1,412	14.1	15	22	43	60%
H (100-149)	7	129	902	11.4	14	20	70	54%
I (150-299)	6	207	1,239	10.6	14	20	101	49%
J (300+)	2	345	689	11.0	12	18	246	71%
Totals	182	53	9,645	15.9			35	66%

Diagram 1: Classroom Utilization



Teaching Laboratory and Studio Utilization

Teaching laboratories and studios are analyzed in the same way as classrooms, by intensity of use and adequacy of size. The target utilization for laboratories, however, is between 12 and 20 hours per week assuming a 40 to 50-hour week. This lower rate is due to the fact that labs are used for nonscheduled work in addition to scheduled classes, and require time for set-up and clean-up.

The distribution of teaching labs and studios by building and the mean hours of usage per week are shown on Table 4. The mean usage is 15.3 hours, which is in the middle of the target range. Labs in Hunter and Martin are used over 28 hours per week and those in Godfrey and Long are used about 21 hours per week.

Table 4: Laboratories and Studios by Building

Building	Number of Spaces	Mean Usage Hours/Week
Brackett Hall	9	11.6
Cook Lab	2	13.5
Cooper Library	1	18.0
Daniel Hall	7	13.1
Earle Hall	1	12.0
Freeman Hall	7	10.5
Godfrey Hall	7	21.0
Hunter Hall	10	28.5
Jordan Hall	14	15.2
Kinard Lab	6	12.8
Lee Hall	25	14.3
Lehotsky Hall	3	13.0
Linvil Rich Environmental Research Lab	2	14.0
Long Hall	9	21.2
Lowrey Hall	6	18.5
Martin Hall	3	28.7
McAdams Hall	2	9.5
Newman Hall	2	6.6
Nursing (Edwards Hall)	2	6.0
Olin Hall	1	12.0
Performing Arts	8	10.9
Poole Agricultural Center	8	11.9
Riggs Hall	8	16.1
Sirriner Hall	4	5.8
Totals	147	15.3

Teaching Laboratory and Studio Occupancy

The target occupancy rate for teaching labs is 80 percent. Table 5 shows that the usage ranges from 54 percent to 180 percent. The high, 180% utilization indicates extreme overcrowding but could mean the number of stations was under counted. The amounts of space per station for labs above the 10 to 19-station capacity are low, depending on the subject being taught and the degree to which support space is included.

Table 5: Laboratory and Studio Occupancy

Seating Capacity	No. of Spaces	Mean Capacity	Total Stations	NASF/ Station	Mean Section	Mean Occupancy
A (1-9)	10	6	64	105.6	12	180%
B (10-19)	39	15	577	75.2	14	97%
C (20-29)	66	23	1,537	39.5	19	81%
D (30-39)	18	31	554	33.8	19	63%
E (40-49)	6	41	248	36.4	24	59%
F (50-59)	3	54	161	27.1	29	54%
G (60-99)	5	69	346	36.5	41	59%
Totals	147	24	3,487	44.6	19	78%

Tables A and B in the Appendix show time utilization for classrooms and teaching labs. All such spaces are included whether classes were in session or not. The tables are in two columns showing percent of rooms, to the left, and seats, to the right, in use by day and hour.

The heaviest scheduled time for classrooms is Monday through Friday morning, and Monday through Thursday afternoon until 3:15 PM. The percent of spaces and stations utilized essentially follows the same pattern, except the class size drops off on Friday afternoon. The heaviest scheduled time for laboratories and studios is Monday through Thursday afternoon.

FACULTY OFFICE ANALYSIS

Data used for this analysis was developed during the Existing Facilities Study. Space for about half of the faculty is included in this sampling. The University has other office data, but faculty and staff offices are not distinguished.

Faculty offices in this sample vary in size from 53 net assignable square feet (NASF) to 539 NASF. The mean size is 146 NASF, which is within the 140 to 160 NASF suggested by normative standards.³ Table 6 summarizes the analysis of faculty offices by building, showing the number of offices in each building, the total amount of NASF, the largest and smallest office sizes, the number of stations, and the mean size.

When offices are shared, the number of stations is more than the number of offices, and consequently knowing the amount of space per person is useful. The last three columns in the table show this information; with the mean, the most and the least amount of space per faculty member.

Seventy-six of the 488 offices are less than 100 NASF, and therefore, should be considered substandard. Most of them are in Tillman (30), Sirrine (19), and Barre (18). Most of the offices over 180 NASF are in Sirrine (30), Riggs (15), and Earle (12).

³ There are 34 states that have space allocation guidelines for faculty offices. These guidelines range from 100 NASF to 180 NASF. Usually, the larger allocation includes a prorated amount for conference or clerical offices as well. SUNY suggests 120 NASF. Cornell's guidelines call for 160 NASF. The University of California uses 140 NASF. MIT's guidelines call for 150 NASF. The University of Illinois uses 140 NASF, while the University of Minnesota uses 130 NASF.

Table 6: Faculty Offices by Building

Building	No. of Offices	NASF/ Space			Mean NASF/ Office	No. of Stations	NASF/ Station		
		Sum	Largest	Smallest			Mean	Most	Least
Barre	34	4,012	264	86	118	35	115	264	44
Cooper	8	1,393	325	57	174	8	174	325	57
Earle	12	2,315	279	181	193	12	193	279	181
Freeman	10	1,541	201	123	154	10	154	201	123
Godfrey	3	481	284	97	160	3	160	284	97
Holtzendorf	34	5,356	396	99	158	35	153	367	99
Lee	35	5,880	508	98	168	43	137	300	78
Newman	3	297	115	67	99	3	99	115	67
Olin	11	1,576	340	92	143	15	105	147	64
Poole	96	13,285	338	89	138	101	132	338	62
Rhodes	10	1,885	539	108	189	12	157	180	108
Riggs	29	5,326	368	89	184	29	184	368	89
Sikes	1	269	269	269	269	1	269	269	269
Sirrine	121	17,818	405	76	147	124	144	405	38
Tillman	81	9,707	499	53	120	84	116	499	26
Totals	488	71,141	539	53	146	515	138	499	26

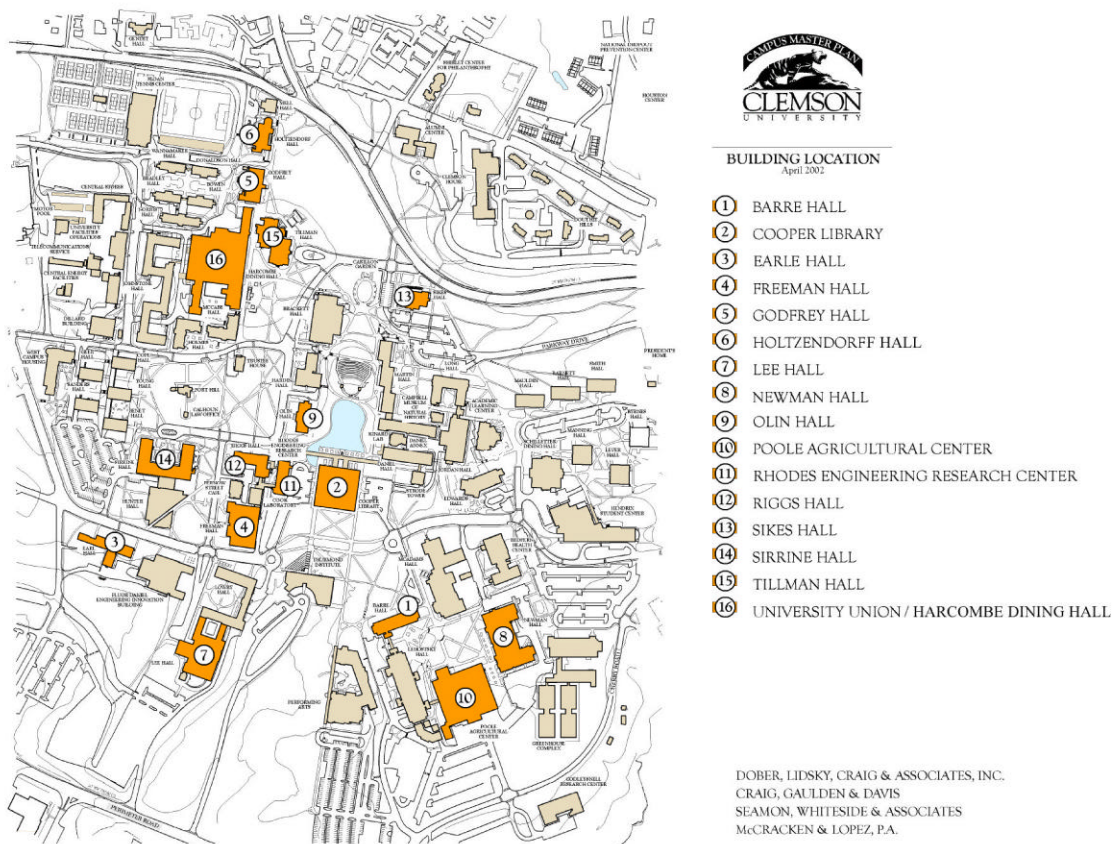
EXISTING FACILITIES SURVEY

A study of key Clemson buildings was conducted as part of the overall campus planning initiative. Sixteen primary buildings on campus, totaling nearly two million square feet of space, were analyzed in this Existing Facilities Survey. See Diagram 2 for building locations.

The Campus Plan addresses broad campus and environs issues within the framework of Clemson's mission and academic plan, and identifies specific facility improvements necessary to support existing and future programs. The Existing Facilities Survey assesses specific Clemson buildings in terms of condition and use, and provides the data necessary to evaluate changes in allocation and configuration.

The Existing Facilities Survey can be used as a management tool. As the Campus Plan is implemented, it will continue to provide use, condition, and budgeting documentation essential in confirming that those assigned to the buildings are allocated the appropriate amount of and type of space. The condition analysis will be used for capital planning, facility planning, and for addressing deferred maintenance. Highlights from the analysis of the sixteen buildings are included here. For detailed information, see the Existing Facilities Survey for each of the buildings.

Diagram 2: Survey Building Locations



EXISTING FACILITIES SURVEY

There are five building assessment categories: space utilization and program; architectural and structural; plumbing, mechanical, and fire protection systems; electrical systems; and landscape. Issues relating to building performance in these areas are highlighted below.

BARRE HALL

26,010 NASF

46,077 GSF

Barre is predominantly an office facility for both faculty and staff. The College of Agriculture, Forestry, and Life Sciences occupies 57 percent of the space and Public Service and Agriculture 30 percent. Barre is appropriate for offices, and could be reconfigured to include some classroom or seminar space. The building is in need of renovation, which could be done in phases.

Building Performance

- The building is less “efficient” than average in that the ratio of net to gross square feet is 56 percent. The target for this building type is 65 percent.
- The current office use works well as the building footprint is narrow. A high proportion of administrative (33 percent) and faculty (53 percent) offices are substandard in size, however.
- Architecturally and structurally the building is in good condition.
- The number of restrooms is marginal, and they do not meet ADA codes.
- The HVAC system is well suited for current use.
- Sprinklers are limited to basement storage areas with none in mechanical and electrical rooms, and no tamper switches were found on the sprinkler riser.
- A new fire alarm system is needed along with expansion of the smoke detector system and audiovisual appliances that meet ADA codes.
- There is a generator to provide emergency power for egress and exit lighting in corridors.
- There are no significant landscape problems associated with Barre.

COOPER LIBRARY

143,118 NASF

185,627 GSF

Cooper is the main Clemson library facility. University Libraries occupies 87 percent of the space and the remaining 13 percent is occupied by Computing and Information and Technology’s Computer Center. Cooper is appropriate for its use, although the collection is comparatively small for a research university. Any renovation that may be required could be done in phases.

Building Performance

- The building is more “efficient” than average in that the ratio of net to gross square feet is 78 percent. The target for this building type is 70 to 75 percent.

- The configuration of the building is ideally suited for its present use as a library. Cooper Library would be graded as a “C” in the Association of College Research Libraries (ACRL) guidelines, which ranks libraries from “A”, excellent to “D”, poor.
- The waffle slab construction does not lend itself to penetrations for additional technology.
- Structurally the building is in good condition. The interior is also in good condition except for the restrooms, which are in fair condition.
- The restrooms do not meet ADA codes.
- The HVAC system plenum return has high pressure losses that cause excessive noise through openings in the mechanical room doors. Humidification is limited and, in some areas, there is insufficient cooling.
- Telecommunications equipment is located in electrical and mechanical rooms, not in dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- The building’s raised entry should be addressed as the campus-green concept is further developed.

EARLE HALL

32,436 NASF
50,168 GSF

Earle is predominantly a laboratory facility. Chemical Engineering occupies 86 percent of the space, and the Center for Advanced Engineering Fibers and Films occupies 14 percent. Earle is appropriate for offices, research or small teaching labs, and small classrooms. The building is not in need of renovation at this time.

Building Performance

- The building is somewhat less “efficient” than average in that the ratio of net to gross square feet is 56 percent. The target for laboratory buildings is 60 percent and for office buildings is 65 percent.
- Laboratory and laboratory-related space accounts for 54 percent of the space, 29 percent is assigned to research, 25 percent to teaching and open labs, 17 percent to offices, 12 percent to classrooms, and 7 percent to shop space.
- The five classrooms are scheduled slightly below the target range of 25 to 30 hours per week.
- Faculty offices are larger than average, determined by a bay size of 19’-6”. This dimension limits the sizes of large spaces such as those required for teaching labs or classrooms. Currently classrooms are somewhat undersized for the scheduled class sections.
- The space works well for research labs now, but relatively low floor-to-floor heights could limit horizontal ductwork that might be required in the future.
- Architecturally and structurally the building is in good to fair condition with the exception some roof areas, which are in poor condition.
- The restrooms do not meet ADA codes.
- Ventilation is substandard for existing uses. Modifications to the current ventilation air distribution system are required to meet current codes.

- Sprinklers are limited to one office area.
- Telecommunications equipment is located in electrical and mechanical rooms, not in dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There is no emergency generator, so emergency egress lighting is supplied by battery packs, most of which do not work.
- High voltage transformer and service equipment are not properly labeled, and there is no surge protection at the main service switchboard or ground fault protection of the main circuit breaker.
- There are some paving failures in the adjacent plaza area, which require minimal work.

FREEMAN HALL

41,745 NASF
55,552 GSF

Freeman is predominantly a laboratory facility. Office and shop uses are major secondary types of allocation. The College of Engineering and Science occupies 75 percent of the space, the Art Department 11 percent, Graphic Communications over 4 percent, Technology and Human Resource Development over 6 percent, and Facilities 3 percent. Freeman is in need of renovation, which could be done in phases.

Building Performance

- The building is far more “efficient” than average in that the ratio of net to gross square feet is 75 percent. The target for laboratory buildings is 60 percent and for office buildings is 65 percent. The high ratio means the building is less flexible. For example, assigned space also serves as corridor space in some cases, which makes navigation difficult and limits usage. The NASF would be decreased in any major renovation.
- Laboratories account for 40 percent of the space; 26 percent is allocated to office and office-related space; 27 percent to campus support shops, two-thirds of which is assigned to the Materials Processing Group (College of Engineering and Sciences); 6 percent to classrooms; and 1 percent to general use.
- The two classrooms are scheduled slightly above the target range; the seven teaching labs are scheduled within the target range for upper division courses, but less than the target for lower division courses.
- Although not ideal for offices and classrooms, due mainly to lack of windows and access and egress problems, these uses are best for this building as there is little likelihood it could be adapted for any other usage.
- Architecturally and structurally the building is in good condition, with the exception of the lower roof area, which is in poor condition; also in poor condition is an area of the first floor slab where reinforcing is exposed.
- The restrooms do not meet ADA codes.
- A partial sprinkler system exists serving one-third of the building.
- Many different air-handling units serve the facility; the rooftop systems are in fair to good condition. Airflow to many areas is poor providing insufficient cooling. A serious condition

exists in the welding shop where there is no venting to the outside. In addition, there are no temperature or humidity controls for any of the shops.

- Telecommunications equipment is located in electrical and mechanical rooms, not in dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There are two emergency generators that provide emergency egress and exit lighting in corridors.
- Some panelboards do not have required code clearance, and there is no surge protection at the main service switchboard.
- The landscape to the west side of the building, along Fernow Street, and to the south side needs to be redesigned and enhanced. Landscape elements would include sidewalks, sitting areas, bike racks, and ramps.

GODFREY HALL

29,484 NASF
47,900 GSF

Godfrey is predominantly a laboratory facility. Aerospace Studies and Graphic Communications, departments of the College of Business and Public Affairs, occupy 74 percent of the space, and Technology and Human Resource Development occupies 26 percent. Godfrey is appropriate for its current use, although there are many building constraints that limit flexibility and reassignment. The building is in need of renovation, which could be done in phases.

Building Performance

- The building is slightly more “efficient” than average in that the ratio of net to gross square feet is 62 percent. The target for laboratory buildings is 60 percent.
- Laboratories account for 77 percent of the space, 11 percent is allocated to classroom and classroom-related space, 7 percent to office and office-related space, 2 percent to general use, and 1 percent to unassigned or unclassified use.
- One of the two classrooms is scheduled above the target range and the other is scheduled below; the seven teaching labs are scheduled well above the target range.
- The current building use is appropriate as it provides space for labs with large pieces of equipment and where sight lines are not an issue, but it is not ideal for small offices and small teaching spaces, especially as the proportion of space with windows is limited. The connection between first and grounds floors is almost nonexistent, which limits allocation flexibility.
- Architecturally and structurally the building is in good condition, with the exception of some timber rafters that are twisted and the roof that is in poor condition. The interior wall finishes and doors are in excellent condition.
- Windows are single pane with no solar coatings.
- Water service to the building enters in unheated space, which should be heated to prevent possible freezing.
- The restrooms do not meet ADA codes.

- The air-handling units are not installed properly, creating excessive vibrations and noise. The ventilation and exhaust systems in the printing and graphic arts shops are inadequate causing fumes that spread to other areas. Thermal zoning and controls are poor creating a wide range of temperatures throughout the building, and the cooling system is not adequate as it is augmented with small, self-contained units.
- The building has a wet pipe sprinkler system; there are no fire hose cabinets.
- Telecommunications equipment is located in dedicated but not conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There is no emergency generator, so emergency egress lighting is supplied by battery packs, most of which do not work.
- There is no surge protection at the main service switchboard.
- Its prominent location on campus; historical appearance; and rich, textured facade make Godfrey an important building in terms of campus image. The west side, a service area, should be redesigned to provide a more attractive entrance to the Fraternity Quad area.

HOLTZENDORFF HALL

28,264 NASF
47,399 GSF

Holtzendorff, formerly the YMCA, is predominantly an office facility for faculty and staff. The General Engineering Department of the College of Engineering and Science occupies 39 percent of the space, the History and Philosophy and Religion departments 32 percent, Student Affairs 27 percent, Aerospace Studies 2 percent, and the University Facilities Landscape Services Department less than 1 percent. Holtzendorff is appropriate for its current use, although only 73 percent of the offices have windows. The building is in need of renovation, which could be done in phases, probably one wing at a time.

Building Performance

- The building is less “efficient” than average in that the ratio of net to gross square feet is 60 percent. The target for office and academic buildings is 65 percent.
- Office and office-related space accounts for 42 percent of the space, 21 percent is allocated to laboratories, 21 percent to general use, 6 percent to classrooms, and 10 percent is unassigned or unclassified.
- There are many floor levels that create accessibility problems. The basement or former pool level needs extensive renovation and study if it is to be used for anything other than storage, and the sub-basement is totally disconnected and only suitable for storage.
- Architecturally and structurally the building is in good condition. There are many exceptions, all in the poor category, that include the roof, soffits and eaves, the cornice, some rafters that are damaged and ceiling joists that are twisted, and the rear exterior stairs that are rusted. The interior is in fair to poor condition.
- The restrooms do not meet ADA codes, and need mechanical exhaust.
- Window sash and glazing allow excessive air infiltration.

- The building has a wet pipe sprinkler system, except in the loggia where there is a dry pipe system, with no tamper switches.
- Telecommunications equipment is located in the electrical and mechanical rooms, not dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- An emergency generator provides emergency power for egress and exit lighting in corridors.
- The electrical system is at capacity and there is no surge protection at the main service switchboard.
- Some panelboards do not have required code clearance, and there is no surge protection at the main service switchboard.
- Its prominent location on campus and historical appearance make Holtzendorff an important building in terms of campus texture. The parking and service area to the west should be redesigned, incorporating an architecturally attractive arch on that side of the building.

LEE HALL

71,571 NASF
112,100 GSF

Lee is predominantly a studio facility, although 15 percent of the space is allocated to faculty and staff offices. The College of Architecture, Arts, and Humanities occupies 91 percent of the space, and University Libraries occupies 9 percent. Lee is appropriate for its current use, although it appears crowded.

Building Performance

- The building is more “efficient” than average in that the ratio of net to gross square feet is 64 percent. The target for studio buildings is 60 percent and for general classroom and office buildings is 65 percent.
- Studios account for 58 percent of the space, 15 percent is allocated to office and office-related use, 9 percent to classrooms; 9 percent to the library; 6 percent to exhibit, 2 percent to support, and 1 percent is unassigned or unclassified.
- The three classrooms are scheduled well above the target range; the twenty-four studios are scheduled within the target range.
- Architecturally and structurally the building is in good condition. There are several exceptions: one section of roof is in poor condition and some cracks, settling, and brickwork damage are also evidence of poor condition. Windows, the exterior brick in general, and the other roof section are in fair condition. The interior is in fair to good condition, except for carpeting and studio finishes which are worn.
- Solar screens on the north side are broken.
- The restrooms meet ADA codes.
- Indoor air quality does not meet codes as no outdoor air is introduced; there is a lack of dehumidification; the fan coil units are not only in poor condition but they generate poor air flow and temperature gradients as they are trying to condition larger spaces than they were designed for; and some faculty offices do not have individual room control.

- The building has no automatic sprinkler system, but fire hose cabinets are located throughout.
- Telecommunications equipment is located in the electrical and mechanical rooms, not dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- An emergency generator, although in only fair to poor condition, provides emergency power for egress and exit lighting in corridors.
- There is no surge protection at the main service switchboard, and there is no ground fault protection on the main circuit breaker.
- The fire alarm control panel is located in the main electrical room.
- The high voltage transformer contains PCB's, and the clearance is not adequate.
- The interior atrium needs to be refurbished and maintained, as do other courtyard spaces at this building except for the courtyard near the entrance to the Gallery.

NEWMAN HALL

38,357 NASF
56,736 GSF

Newman is predominantly a laboratory facility. The College of Agriculture, Forestry, and Life Sciences occupies over 78 percent of the space, the Food Services-Meal Plans Department 8 percent, the Economics Department in the College of Business and Public Affairs 7 percent. A University lecture room accounts for over 6 percent. Newman is appropriate for its current use in terms of research lab space, but is not appropriate for offices. Some of the space is intensely used, and some appears to be unusable. The building is in need of renovation, which could be done in phases.

Building Performance

- The building is substantially more "efficient" than average in that the ratio of net to gross square feet is 68 percent. The target for laboratory buildings is 60 percent.
- Laboratories account for 68 percent of the space, 13 percent is allocated to storage, 8 percent to classroom and classroom-related space, 6 percent to office and office-related space, and 5 percent to general use.
- The one classroom is scheduled above the target range; the two teaching labs are scheduled below and at the low end of the target range.
- Research is a good use as a large proportion of the space is lit from above with clerestory windows or skylights, or is windowless, which would be poor for office or teaching space. The central "locker" block is underused and the configuration for the north wing seems to limit its potential use.
- Architecturally the building is in fair condition except for the general structure and roof, which are in good condition. The small canopy over a door on the north side is in poor condition. The interior lobby and restroom finishes are in good condition.
- The restrooms do not meet ADA codes.

- Two evaporative condensers, which may not be operative, are in poor condition and the amount of outside air introduced into the HVAC system is minimal. The lecture room is served by an old AHU with steam preheat and 3-way chilled water coil, and a life expectancy that is minimal.
- Sprinklers are limited to the storage area under the lecture room.
- Telecommunications equipment is located in the electrical and mechanical rooms, not dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- An emergency generator provides emergency power for egress and exit lighting in the corridors.
- There is no surge protection at the main service switchboard, service equipment is not adequately labeled, and all the electrical distribution equipment is old.
- McGinty Mall to the south will be a welcoming area once a planned renovation is implemented, although the covered walkway to Poole lacks character.
- There is extensive exterior loading and service space, some of which is unsightly, that may become unnecessary as the use of the building changes over time.

OLIN HALL

19,077 NASF

29,286 GSF

Olin is predominantly a laboratory facility, although 17 percent of the space is allocated to faculty and staff offices. All the space is occupied by the Ceramic and Materials Engineering Department of the College of Engineering and Science. Olin is appropriate for its current use, except that many offices have no windows. The building is not in need of renovation at this time, although the *ad hoc* mezzanine office suite should be removed.

Building Performance

- The building is more “efficient” than average in that the ratio of net to gross square feet is 65 percent. The target for laboratory buildings is 60 percent.
- Laboratories account for 68 percent of the space, 17 percent is allocated to office and office-related use, 8 percent to classroom and classroom-related use, 4 percent to study space, and 3 percent to general support.
- The one teaching lab is scheduled within the average range.
- Room layouts are constrained because of structural bay size and column spacing.
- Architecturally and structurally the building is in good condition with the exception of windows and exterior doors that are in fair condition, and the perimeter flat roof that is in poor condition. However, there has been some interior water damage. Some settling and spalling of the basement slab has occurred. The settlement does not appear to have impacted any adjacent structural elements.
- There are soffit cracks and a wall crack on the east side.
- The interior finishes are in good condition with the exception of the lobby that is in excellent condition, and the mezzanine over an existing lab area where there has been water damage. There is some concern as to the structural integrity of this mezzanine.
- The restrooms do not meet ADA codes.

- The condition of mechanical equipment is very good.
- Several exhaust hoods are not connected to ductwork.
- The building has no automatic sprinkler system, but there is a standpipe system and there are fire hose cabinets.
- Telecommunications equipment is located in the electrical and mechanical rooms, not dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There is no emergency generator, and no battery packs, for egress and exit lighting.
- There is a new electrical distribution system, although panels and transformers are located in labs and other public space rather than in electrical rooms. There is no surge protection at the main service switchboard.
- The east side of Olin needs some landscape attention, as this is a prominent view from the amphitheater, the Carillon Garden and the opposite side of the reflection pond.

POOLE AGRICULTURAL CENTER

134,175 NASF
200,577 GSF

Poole is predominantly a laboratory and faculty and staff office facility. The College of Agriculture, Forestry, and Life Sciences occupies 66 percent of the space. Other major tenants are the Communications and Computer centers and Public Service and Agriculture. Poole is appropriate for its current use, except that there is a high percentage of interior space and many offices as well as other types of spaces have no windows. The building is in need of renovation, although this could be done in phases.

Building Performance

- The building is more “efficient” than average in that the ratio of net to gross square feet is 67 percent. The target for laboratory buildings is 60 percent and for office buildings is 65 percent.
- Office and office-related use account for 38 percent of the space, 33 percent is allocated to laboratories. 11 percent to University support, 9 percent to special uses such as media production and animal care, 7 percent to classroom and classroom-related use, and 2 percent to study space.
- The nine classrooms are scheduled within to above the target range; the eight teaching labs are scheduled from below to above the target range.
- The building is simple to navigate, but the only elevator is a freight elevator that is not centrally located.
- Architecturally and structurally the building is in fair to good condition, with the exception of exterior sealants that are in poor condition.
- The interior finishes are in good to excellent condition although restroom finishes are in fair condition.
- The restrooms do not meet ADA codes.
- The HVAC systems are inadequate and problems exist such as use of the corridor for return air, abandoned chillers, and fan coil units in offices with no outside air.

- A wet sprinkler system is limited to the basement, although it does not include the main electrical room, and there are no tamper switches. There are five fire hose cabinets throughout the facility. A small halon system is also located in the basement.
- Telecommunications equipment is located in the electrical and mechanical rooms, not in dedicated, conditioned space.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- Two emergency generators provide for egress and exit lighting in corridors.
- Electrical service is marginal, there is no surge protection at the main service switchboard, and services and service equipment are not properly labeled.
- To the east the paving is heaving and buckling due to pressure from tree roots. Either the paving should be reconfigured or the trees removed. The outdoor seating in this area should be improved and expanded.
- The south side of Poole lacks any planting and the parking lot on that side is devoid of trees. The parking lot between the greenhouses and Poole is relatively inefficient.

RHODES ENGINEERING RESEARCH CENTER

35,359 NASF
56,312 GSF

Rhodes is a College of Engineering and Science research facility. Bioengineering occupies 51 percent of the space, the Center for Advanced Engineering Fibers and Films occupies 19 percent, Ceramic and Materials engineering 15 percent, and Electrical and Computer Engineering 7 percent. The remaining 8 percent is allocated to Computer Network Services, Materials Science and Engineering, Engineering Graphics, Computer Network Services, and the Bioengineering Alliance of South Carolina. Rhodes is appropriate for labs, but not ideal for offices and classrooms due to lack of windows and wide bay size.

Building Performance

- The building is more “efficient” than average in that the ratio of net to gross square feet is 63 percent. The target for laboratory buildings is 60 percent and for office buildings is 65 percent.
- Laboratories account for 67 percent of the space, 27 percent is assigned to office and office-related use, 4 percent to classrooms and classroom-related use, and the remaining 2 percent to study and general use.
- The one classroom is scheduled within the target range, although only 29 percent of the seats are occupied on average.
- Installation of current technology is difficult within the constraints of the building, and the floor-to-floor height is adequate for current use but may not be in the future.
- Architecturally and structurally the building is in good condition with the exception of the roof, inside the screen wall, which is in excellent condition. All roof drains should have trash guards and there should be emergency overflow drains as well.
- Moderate to severe deflection has occurred at both end spandrel beams on the top two floors, causing cracks in the floor surfaces, which have fallen as much as an inch.

- The interior finishes are in good condition, but 75 percent of the flooring is vinyl asbestos tile that should be removed or encapsulated.
- Indoor air quality does not meet current codes, particularly for classroom and office use. Fire dampers are not installed in the ducts that penetrate corridor walls.
- The building has no automatic sprinkler system, but fire hose cabinets are located in the stairwells at each floor.
- Telecommunications equipment is located in the electrical and mechanical rooms, not in dedicated, conditioned space.
- The output of fire alarm audiovisual appliances does not meet ADA codes, and additional fire alarm pull stations are needed.
- There appear to be no spares or spaces available in the main switchboard.
- A generator provides emergency power for egress lighting and the fire alarm system.
- The numerous sets of steps connecting the various building levels and changes of grade on the exterior are not articulated well, and do not provide places for gathering and sitting. The eastern side, adjacent to a small parking lot, lacks adequate landscaping. Other areas of potential improvement are the spaces under the pedestrian connector bridges.

RIGGS HALL

47,455 NASF

70,336 GSF

Riggs is predominantly a laboratory and faculty and staff office facility. The College of Engineering and Science, including the Dean's offices, occupy all the space. Electrical and Computer Engineering is assigned 59 percent of the space; Computer and Network Services, the Dean's offices, and Mechanical Engineering each are assigned approximately 9 percent; and the remaining 14 percent is allocated to Electrical Power Research, General Engineering, the Office of Administrative and Research Support, and PEER. Riggs is appropriate for its current use as a teaching and research facility with office space. The building is not in need of renovation at this time.

Building Performance

- The building is more "efficient" than average in that the ratio of net to gross square feet is 68 percent. The target for laboratory buildings is 60 percent and for office buildings is 65 percent.
- Offices and office-related use account for 41 percent of the space; 38 percent is allocated to laboratories; 15 percent to classroom and classroom-related use; and the remaining 6 percent to library and study, general, and support use.
- Of the laboratory space, 15 percent is assigned to research and 23 percent is assigned to teaching and open labs and related service.
- The seven classrooms are scheduled well above the target range; the eight teaching labs are scheduled from below to above the target range.
- Because of its central campus location, Riggs would be ideal for a variety of disciplines.
- Architecturally and structurally the building is in good condition, with the exception of exterior sealants that are in fair condition, exterior brick that shows some minor deterioration, and reinforcing bars in some of the basement level floor beams that are exposed.
- Exterior glazing is single pane.

- The interior finishes vary from fair to good condition with the exception of the lobby, which is in excellent condition.
- The HVAC system air handling and cooling capabilities need improvement such as the addition of 100 percent outdoor air economizer cycles.
- The water services need to have reduced pressure backflow preventers installed.
- Ventilation air to fan coil units is limited and they do not provide sufficient dehumidification.
- The chilled water system should be expanded so that the entire building is served from the central plant.
- There is no automatic fire protection sprinkler system.
- Telecommunications equipment is located in the electrical and mechanical rooms, not in dedicated, conditioned space.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There is no emergency generator, and no battery pack, for egress and exit lighting.
- There is no surge protection at the main service switchboard; and the panels, which are in poor condition, are located in corridors and stairs as there are no electrical rooms.
- Riggs is in an urban feeling location, at the crossroads of two major pedestrian spines. The streetscapes should be better developed to help prevent conflicts between pedestrians and automobiles. Gathering and sitting space adjacent to the building should be improved, and plantings should be revamped to provide more visual interest at this location.

SIKES HALL

28,467 NASF
42,919 GSF

Sikes is predominantly an administrative office facility. The offices of the Provost and Vice President of Academic Affairs occupy 48 percent of the space. Business Affairs and Financial Affairs are allocated 24 percent, the President's offices 15 percent, the Executive Secretary to the Board of Trustees and Institutional Research 9 percent, and Student Affairs is allocated 4 percent. Sikes is appropriate for its office use.

Building Performance

- The building is relatively "efficient" in that the ratio of net to gross square feet is 64 percent. The target for offices buildings is 65 percent.
- All of the space is allocated to office and office-related use.
- There are many levels that make navigation through the building difficult. Most of the spaces are intensely used, however because of building constraints some are either too large or not dividable, such as the underused, main lobby.
- The building is the *front door* of the campus and holds an important position in the history of the University.
- Architecturally and structurally the building is in good condition with some exceptions. The roof, windows, and exterior doors are in excellent condition. The brick is also in excellent condition except for some minor deterioration. Exterior sealants that are in poor condition.
- Interior finishes vary in condition, but essentially are in good condition.

- The existing air conditioning systems are expensive to operate and noisy and they should be replaced. Adequate ventilation air should be provided to all conditioned spaces, as well as 100 percent outdoor air economizer cycles.
- Fan coil units do not provide sufficient dehumidification.
- Reduced pressure backflow preventers are needed on the water services.
- There is no automatic fire protection sprinkler system.
- Telecommunications equipment is located in the electrical and mechanical rooms, not in dedicated, conditioned space.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There is an emergency generator for egress and exit lighting in corridors.
- There is no surge protection at the main service switchboard; and the panels, which are in poor condition, are located in rooms that do not provide the required amount of access.
- The landscape around Sikes is well designed and well maintained except for the south side parking area, which should be redesigned to reflect the level of care expressed on the other three sides of the buildings. The redesign of President's Park will address connections between the park and Sikes, which need to be emphasized.

SIRRINE HALL

110,149 NASF
172,200 GSF

Sirrine is predominantly a laboratory and faculty and staff office facility. The College of Business and Public Affairs occupies 54 percent of the space. The College of Engineering and Science is allocated 39 percent: 38 percent to Textiles, Fiber, and Polymer Science and less than 1 percent to Physics and Astronomy. Off-campus Distance and Continuing Education occupies 6 percent of the space, and the Computer Center the remaining 1 percent. Sirrine is appropriate for its current use, although many offices are substandard in size and many have no windows. The building is not in need of renovation at this time.

Building Performance

- The building is more "efficient" than average in that the ratio of net to gross square feet is 64 percent. The target for laboratory buildings is 60 percent and for office buildings is 65 percent.
- Office and office-related use accounts for 45 percent of the space, 31 percent is allocated to laboratories, 15 percent to classroom and classroom-related use, 8 percent to general support, and 1 percent to general use.
- The twenty-one classrooms are scheduled within the target range; the four teaching labs are scheduled below the target range.
- The sub-basement space is marginal, and there is no passenger elevator.
- Architecturally and structurally the building is in good condition with the exception of the roof that is in excellent condition and exterior sealants that are in fair condition. There are some cracks and exposed reinforcing in the basement floor slab, which appear to be a cosmetic issue, and a wall crack in the sub-basement.

- The interior finishes are in good condition except for those in the restrooms that are in fair condition.
- There is no ventilation in restrooms and about half meet ADA codes.
- The cooling tower is in poor condition and needs to be replaced.
- A minimum amount of air is introduced into systems especially into the lab and shop space systems; and outdoor intake for new air handling units is next to the cooling tower resulting in high humidity and low quality air intake.
- Stairwells are not conditioned.
- The building has a wet pipe sprinkler system; there are no fire hose cabinets.
- Telecommunications equipment is located in the electrical and mechanical rooms, not in dedicated, conditioned space.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There are two electrical services to the building, but they are not properly labeled; and there is no surge protection at the main service switchboard.
- There is an emergency generator for egress and exit lighting in corridors.
- There is a newly reconstructed courtyard to the north, which provides gathering space. The landscaping on the west side should be enhanced, which would improve the view from Fernow Street, and the sculpture should be moved to a more appropriate location. The dead-end space to the south could be better utilized if it were redesigned.

TILLMAN HALL

51,808 NASF
96,654 GSF

Tillman is predominantly a faculty and staff office facility. The College of Health, Education, and Human Development occupies 66 percent of the space. Student Affairs is allocated 21 percent; the Aerospace Studies, Graphic Communications, and Military Science departments of the College of Business and Public Affairs occupy 12 percent; and the remaining 1 percent is assigned to the offices of Access and Equity and Undergraduate Studies.

Tillman is appropriate for its current use, although many offices are substandard in size and many have no windows. The building is in need of renovation, although this could be done in phases.

Building Performance

- The building is considerably less “efficient” than average in that the ratio of net to gross square feet is 54 percent. The target for office and academic buildings is 65 percent.
- Office and office-related use accounts for 44 percent of the space; 20 percent is allocated to classroom and classroom-related use; 19 percent to general use, namely the auditorium; 6 percent to study use; and 1 percent is general support.
- The thirteen classrooms are scheduled at the low end of the target range.
- The large window sizes work well for large spaces such as classrooms, although this feature along with structural constraints and a high percentage of internal space limit flexibility in room layouts.

- Structurally the building is in good shape, although the roof system is in fair condition with structural deficiencies and some water damage; and there are several floor areas on the third and fourth floors that have dipped and buckled as much as two inches; the original west wall footing has been undermined in several locations, and there are some exterior wall cracks.
- Architecturally the exterior brick is in adequate condition except at the chimneys, wood soffits are in poor condition, and much of the granite needs repointing. Windows and doors are in fair condition; exterior sealants are in good condition; and the main roof is in fair condition, but several other sections are in poor condition while the elevator penthouse roof is in excellent condition.
- The interior finishes are in good condition, except for the auditorium seating and the recently renovated classrooms that are in excellent condition.
- The restrooms meet ADA codes.
- Space conditioning is by fan coil units except for the auditorium, which is served by a new air-handling unit, although without fire dampers.
- The building has a wet pipe sprinkler system except in the attic, which is being used for storage; there are fire hose cabinets throughout the building.
- Telecommunications equipment is located in the electrical and mechanical rooms, not in dedicated, conditioned space.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- An emergency generator provides emergency power for egress and exit lighting in corridors.
- The fire alarm control panel is located in the main electrical room behind the high voltage switchboard; there is no annunciator panel at the main entrance; and there is no surge protection at the main service switchboard.
- Although there are significant mature trees and shrubs around Tillman, the foundation planting in several areas is becoming spotty with age and eventually will need rejuvenation; and the combined service and pedestrian area that connects Tillman with the University Union to the west could be made more welcoming.

UNIVERSITY UNION/HARCOMBE DINING HALL

136,845 NASF

198,284 GSF

The Union is predominantly a food service and administrative facility. Food Services-Meal Plans occupies 45 percent of the space and Student Affairs 34 percent. Space that was formerly assigned to the Bookstore, totaling 13 percent, is now in use as a temporary gymnasium during the Fike renovation. The Post Office, Military Science, and Facilities Maintenance occupy the remaining 8 percent.

The Union space assigned to office use is not ideal; and Harcombe Dining works as a food service facility, but the building is no longer appropriate. The building is in need of renovation. The office portion could be renovated in phases, however renovation of the dining facility would shut the facility down.

Building Performance

- The building is relatively “efficient” in that the ratio of net to gross square feet is 69 percent. The target for office and academic buildings is 65 percent and for dining halls is 72 percent.
- General campus use accounts for 61 percent of the space. Offices and office-related space is allocated 18 percent, 13 percent is temporarily assigned, and the remaining 8 percent is assigned to residential, study, general support, and special uses.
- Much of the space is internal with no possibility of windows, and the windows that exist are inadequate for most uses.
- Structural elements constrict floor layouts on the top three levels.
- Architecturally and structurally the building is in good condition with the exception of a significant crack, seen in the vacated bookstore, that continues over six bays, running north to south; and penetrates the floor slab, floor joists, and girders in the weight room. In addition, some reinforcing is exposed and there are some wall cracks. The exterior doors and windows and exterior sealants are in fair condition, and the Union roof is in excellent condition.
- The interior finishes are in good condition, but need refurbishing.
- The top three levels of the Union, with ceiling heights of only 8’ 6”, are served by fan coil units with no outside air; and the level below (Level 6) and auditorium are served by units where minimum outside air is introduced.
- The Union has no automatic sprinkler system, although there is a standpipe in a stair well but no fire hose cabinets. There are no sprinklers in the auditorium and office areas on the Plaza level.
- Telecommunications equipment is located in the electrical and mechanical rooms, not dedicated, conditioned spaces.
- The fire alarm system does not meet current codes, there is incomplete coverage of smoke detectors, and the number of audiovisual appliances is not sufficient to provide the coverage required by ADA codes.
- There are five electrical services to the building; and there is no surge protection at the main service switchboard.
- The lower-level courtyard is in need of repair and is underutilized; the paving is failing and the outdoor furniture is in very bad condition. The upper level plaza is in a state of bad disrepair and is an eyesore. The paving is loose and traps water; and the raised planters and light wells are too large and contribute to making the space very uncomfortable.
- There is a high volume of illegal parking around this facility making the area uncomfortable and hazardous to pedestrians.

APPENDIX

Clemson University - Space Utilization Study 2002

Table A: CLASSROOMS - TIME UTILIZATION ANALYSIS

HEGIS CATEGORY: 100 (Classrooms)										
Classes Starting at	183 Spaces					9660 Stations				
	Percent of Spaces Utilized					Percent of Stations Utilized				
	M%	T%	W%	R%	F%	M%	T%	W%	R%	F%
8:00 AM	64	68	67	70	65	46	42	47	45	47
8:30 AM	66	68	68	70	65	49	42	49	45	47
8:50 AM	1	63	3	64	2	2	38	3	41	0
9:00 AM	2	63	3	65	4	3	39	3	41	2
9:05 AM	86	63	89	65	86	68	39	69	41	64
9:30 AM	86	86	89	89	86	68	55	69	56	64
10:00 AM	1	86	3	88	3	2	55	3	56	1
10:10 AM	82	86	85	88	83	65	55	70	56	59
10:30 AM	82	81	85	83	83	65	52	70	53	59
11:00 AM	2	86	3	87	4	3	55	3	56	1
11:15 AM	85	86	87	87	79	74	55	74	56	58
11:50 AM	84	78	86	79	79	71	51	72	51	58
12:00 PM	84	77	84	77	76	71	50	71	50	58
12:10 PM	0	77	0	77	0	0	50	0	50	0
12:15 PM	0	0	0	2	0	0	0	0	0	0
12:20 PM	65	0	67	2	55	50	0	51	0	42
12:30 PM	64	80	67	79	55	49	50	51	50	42
12:50 PM	64	80	67	79	55	49	50	51	49	42
1:00 PM	64	80	67	79	55	49	50	51	49	42
1:10 PM	2	80	3	79	0	0	50	0	49	0
1:20 PM	2	77	3	76	0	0	48	0	47	0
1:25 PM	66	77	67	76	58	43	48	42	47	36
1:30 PM	66	77	67	76	58	43	48	42	47	36
2:00 PM	66	80	67	82	58	43	46	42	46	36
2:15 PM	7	80	7	81	3	2	46	2	46	0
2:30 PM	77	81	77	81	25	47	46	47	45	13
2:40 PM	77	81	77	81	25	47	46	47	45	13
2:45 PM	77	81	77	81	25	47	46	47	45	13
2:50 PM	77	76	77	77	25	47	42	47	41	13
3:00 PM	77	76	77	77	25	47	42	47	42	13
3:05 PM	77	76	77	77	25	47	42	47	42	13
3:15 PM	77	10	76	10	25	47	3	46	3	13
3:20 PM	54	10	52	10	4	32	3	32	3	1
3:25 PM	53	10	52	10	3	32	3	32	3	0
3:30 PM	54	57	54	57	5	32	29	32	30	2
3:35 PM	66	57	65	57	8	40	29	39	30	2
3:40 PM	66	56	65	57	8	40	29	39	30	2
3:50 PM	22	55	21	56	8	12	28	12	29	2
4:00 PM	45	58	48	60	9	26	30	25	30	2
4:10 PM	45	58	48	60	9	26	30	25	30	2
4:15 PM	45	58	48	60	9	26	30	25	30	2
4:20 PM	44	53	48	57	9	26	26	25	27	2
4:25 PM	36	53	40	57	5	21	26	20	27	1
4:30 PM	34	53	39	57	5	21	26	20	27	1
4:35 PM	34	53	39	57	5	21	26	20	27	1
4:40 PM	38	53	43	57	5	22	26	22	27	1
4:45 PM	39	13	43	18	5	23	4	22	6	1
4:50 PM	34	14	36	17	5	20	4	19	6	1
5:00 PM	34	23	38	22	5	21	12	20	12	0

Clemson University - Space Utilization Study 2002

Table A: CLASSROOMS - TIME UTILIZATION ANALYSIS

HEGIS CATEGORY: 100 (Classrooms)										
183 Spaces						9660 Stations				
Classes Starting at	Percent of Spaces Utilized					Percent of Stations Utilized				
	M%	T%	W%	R%	F%	M%	T%	W%	R%	F%
5:05 PM	34	23	38	23	5	21	12	19	12	0
5:15 PM	16	22	21	22	4	9	12	8	12	0
5:30 PM	19	21	21	20	2	11	12	9	9	0
5:35 PM	19	21	21	20	2	11	12	9	10	0
5:45 PM	19	20	21	20	2	11	11	9	10	0
6:00 PM	19	21	20	19	2	10	10	9	7	0
6:05 PM	19	21	20	19	2	10	10	9	7	0
6:10 PM	20	21	21	19	2	11	10	9	8	0
6:15 PM	28	21	29	19	4	13	7	11	5	0
6:30 PM	27	21	27	19	3	13	7	11	5	0
6:35 PM	27	21	27	19	3	13	7	11	5	0
6:45 PM	19	16	17	17	3	7	5	6	5	0
6:50 PM	19	15	17	17	3	7	5	6	5	0
7:00 PM	22	17	21	18	3	9	6	7	5	0
7:15 PM	21	16	19	15	2	9	6	7	5	0
7:20 PM	22	17	19	16	3	7	6	7	5	0
7:30 PM	21	17	17	15	3	7	6	6	5	0
8:00 PM	19	13	15	10	2	7	4	6	3	0
8:15 PM	18	12	13	10	2	6	4	5	3	0
8:25 PM	18	12	14	10	2	6	4	5	3	0
8:30 PM	17	13	14	10	2	6	4	5	3	0
9:00 PM	6	5	4	3	2	2	2	1	0	0
Key:	61% - 100%					46% - 100%				
	41% - 60%					31% - 45%				
	21% - 40%					16% - 30%				
	0% - 20%					0% - 15%				

Clemson University - Space Utilization Study 2002

Table B: LABORATORIES & STUDIOS - TIME UTILIZATION ANALYSIS

HEGIS CATEGORY: 200 (Laboratories and Studios)

Classes Starting at	150 Spaces					3548 Stations				
	Percent of Spaces Utilized					Percent of Stations Utilized				
	M%	T%	W%	R%	F%	M%	T%	W%	R%	F%
8:00 AM	7	16	9	13	9	6	11	6	10	6
8:30 AM	7	16	9	13	9	6	11	6	10	6
8:50 AM	3	11	5	11	5	3	9	4	8	4
9:00 AM	3	11	5	11	5	3	9	4	9	4
9:05 AM	17	11	21	11	17	13	9	15	9	13
9:30 AM	17	29	21	27	17	13	23	15	21	13
10:00 AM	9	29	13	27	9	7	24	10	21	8
10:10 AM	20	30	25	28	19	14	24	18	21	14
10:30 AM	21	26	25	25	19	14	21	18	18	14
11:00 AM	8	29	10	27	6	6	24	8	21	5
11:15 AM	21	29	23	27	15	18	24	19	21	13
11:50 AM	19	23	21	23	14	17	19	18	17	11
12:00 PM	19	25	23	25	14	18	20	19	19	11
12:10 PM	6	25	8	25	4	6	20	7	19	3
12:15 PM	5	15	8	16	4	5	13	7	13	3
12:20 PM	26	16	31	17	14	20	13	24	13	11
12:30 PM	31	45	33	38	15	23	37	26	31	11
12:50 PM	31	45	33	37	15	23	37	26	30	11
1:00 PM	33	43	35	37	15	25	36	27	30	11
1:10 PM	28	43	28	36	9	21	36	21	30	7
1:20 PM	27	39	28	33	9	21	34	21	27	7
1:25 PM	57	43	48	36	23	51	35	39	29	20
1:30 PM	57	41	50	36	23	51	33	39	29	20
2:00 PM	57	59	49	52	23	50	42	38	37	20
2:15 PM	45	59	39	52	15	41	43	32	37	15
2:30 PM	63	58	59	52	19	55	41	45	36	18
2:40 PM	63	60	59	53	19	55	43	45	38	18
2:45 PM	63	61	59	54	19	55	43	45	38	18
2:50 PM	63	58	58	51	19	54	41	44	36	18
3:00 PM	64	59	60	53	19	55	42	46	37	18
3:05 PM	64	60	60	53	19	55	43	46	38	18
3:15 PM	64	53	60	47	19	55	38	46	34	18
3:20 PM	47	49	39	45	13	40	36	29	33	12
3:25 PM	45	45	39	44	13	39	32	29	32	12
3:30 PM	47	60	43	56	14	40	47	33	41	13
3:35 PM	65	61	59	57	16	55	48	45	41	13
3:40 PM	65	63	59	57	16	55	49	45	41	13
3:50 PM	62	63	55	57	15	52	49	42	41	13
4:00 PM	62	59	55	53	15	52	47	42	38	13
4:10 PM	62	59	55	53	15	52	47	42	39	13
4:15 PM	62	59	55	53	15	52	47	42	39	13
4:20 PM	59	55	51	49	15	50	43	40	36	13
4:25 PM	44	54	41	48	11	38	42	32	35	10
4:30 PM	45	56	40	49	11	38	43	32	36	10
4:35 PM	45	56	40	49	11	37	43	32	36	10
4:40 PM	51	54	45	48	11	41	40	36	35	9
4:45 PM	51	44	45	39	11	41	32	36	27	9
4:50 PM	49	45	44	39	11	40	32	34	27	9
5:00 PM	50	41	45	32	11	41	31	36	23	9

Clemson University - Space Utilization Study 2002

Table B: LABORATORIES & STUDIOS - TIME UTILIZATION ANALYSIS

HEGIS CATEGORY: 200 (Laboratories and Studios)

Classes Starting at	150 Spaces					3548 Stations				
	Percent of Spaces Utilized					Percent of Stations Utilized				
	M%	T%	W%	R%	F%	M%	T%	W%	R%	F%
5:05 PM	49	41	45	32	11	40	31	35	23	9
5:15 PM	45	41	41	31	11	39	31	34	23	9
5:30 PM	29	37	27	28	2	20	29	21	21	1
5:35 PM	27	37	27	28	2	20	29	21	21	1
5:45 PM	29	35	29	27	2	21	28	23	21	1
6:00 PM	29	33	27	25	2	21	26	22	19	1
6:05 PM	29	33	27	25	2	21	26	22	19	1
6:10 PM	29	33	27	24	2	21	26	22	19	1
6:15 PM	30	31	28	22	2	22	25	23	18	1
6:30 PM	27	19	21	14	0	21	16	17	10	0
6:35 PM	15	21	10	13	0	11	18	8	10	0
6:45 PM	13	19	8	13	0	10	17	6	10	0
6:50 PM	13	14	7	10	0	9	13	6	7	0
7:00 PM	15	15	9	9	0	10	14	6	6	0
7:15 PM	15	15	9	9	0	10	13	6	6	0
7:20 PM	15	15	9	9	0	10	13	6	6	0
7:30 PM	12	15	7	8	0	9	13	6	6	0
8:00 PM	10	12	7	6	0	8	11	5	4	0
8:15 PM	10	13	7	7	0	8	11	5	4	0
8:25 PM	8	11	5	5	0	6	10	3	3	0
8:30 PM	7	9	3	5	0	6	9	2	3	0
9:00 PM	6	9	3	6	0	5	7	2	4	0
Key:	61% - 100%					46% - 100%				
	41% - 60%					31% - 45%				
	21% - 40%					16% - 30%				
	0% - 20%					0% - 15%				

SPACE UTILIZATION STUDY

The space Utilization Study is an analysis of existing space on campus – at the University, college, and department levels. Space was examined in terms of amount, type, and utilization. During the study, the adequacy of the amounts of space assigned for various uses was tested against state and normative standards as well as against the amounts assigned for similar uses at peer institutions.

Space allocation Models were created as another aspect of space utilization. The Models, using data that is readily available, can test a range of space-related alternatives. This management tool can predict the implications on assignable space resulting from factors such as changes in enrollment, numbers of faculty, or programmatic offerings.

Classrooms are a major component of the facilities at Clemson. Utilization of this important resource can have a significant impact on perceived space needs as well as management policy. An analysis of existing Clemson classrooms was conducted to determine if the number is adequate and if the sizes are appropriate for the course sections taught.

Offices are an important issue at any university. The Space Utilization Study analyzed both faculty and staff office sizes.

In addition to more generalized utilization studies, an in-depth study of sixteen Clemson buildings was conducted. These key buildings were analyzed in terms of utilization as well as condition and suitability for the uses assigned.

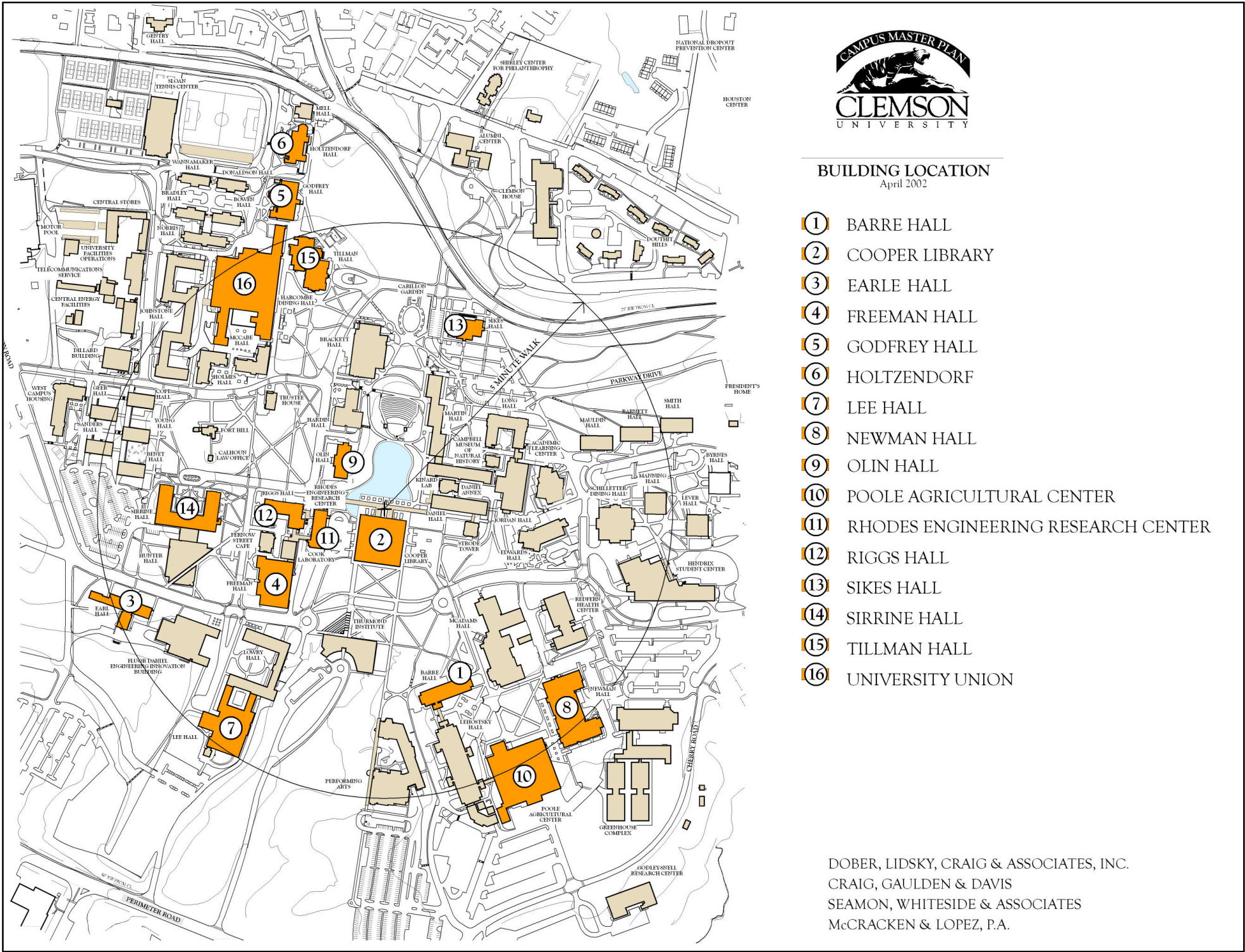
EXISTING FACILITIES SURVEY

A study of key Clemson buildings was conducted as part of the overall campus planning initiative. Sixteen primary buildings on campus, totaling nearly two million square feet of space, were analyzed in this Existing Facilities Survey. See Diagram 2 for building locations.

The Campus Plan addresses broad campus and environs issues within the framework of Clemson's mission and academic plan, and identifies specific facility improvements necessary to support existing and future programs. The Existing Facilities Survey assesses specific Clemson buildings in terms of condition and use, and provides the data necessary to evaluate changes in allocation and configuration.

The Existing Facilities Survey will be used as a management tool. As the Campus Plan is implemented, it will continue to provide use, condition, and budgeting documentation essential in confirming that those assigned to the buildings are allocated the appropriate amount of and type of space. The condition analysis will be used for capital planning, facility planning, and for addressing deferred maintenance. For detailed information, see the Existing Facilities Survey for each of the buildings.

Diagram 2 SURVEY BUILDING LOCATIONS



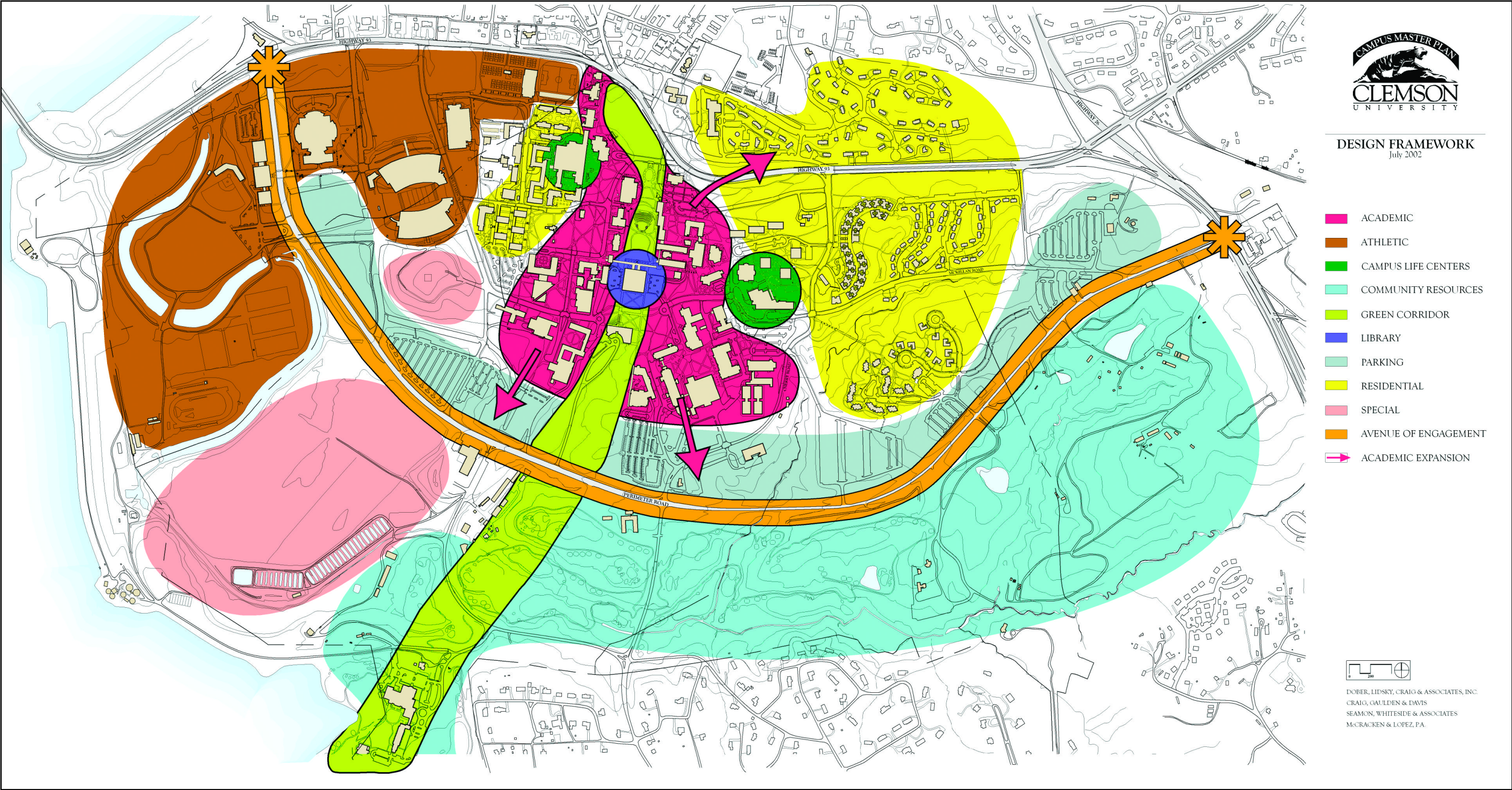
CAMPUS DESIGN ISSUES

The individual Campus Plan projects, located on Drawing 1, fit within the broad development concept shown on Drawing 17. The framework for the Campus Plan is comprised of a series of use zones. Balanced against this structure are opportunities for development that reflect the basic campus design goals.

A prominent campus zone is the green corridor. It begins with Bowman Field and runs south past Perimeter Road to the Madren Center and Lake Hartwell. On the central campus, academic use is to the east and west of the Green Corridor and at its center is the library. The red arrows indicate expansion of academic use into surrounding zones.

There is an area of housing on either side of the green corridor, one bisected by Highway 93. Student life resources, which include dining facilities, are associated with each housing area. The athletic precinct is adjacent to the west housing area, and forms a green buffer along the northern edge of campus to the lake. Woodland Cemetery and the Calhoun Field Laboratory are special zones to be preserved.

Perimeter Road is envisioned as an opportunity to engage the public in the activities and events on the Clemson campus. It will provide access to community facilities, including Schoenike Arboretum and the Botanical Garden, Brooks Center for the Performing Arts, the Lee Hall Gallery, the Madren Center, and the athletic venues. Thus this road is labeled the avenue of engagement. It is outlined in orange, and significant access points from Highway 93 and Highway 76 are marked with orange symbols. To the south is a community resource precinct and to the north will be concentrations of parking to serve the University and the community.



JOHNSTONE REDEVELOPMENT

Johnstone Hall, a 730-bed student residence in the northwest housing sector of campus, was removed in the summer of 2002. It was built in the 1950s and was no longer appropriate for its use, both in terms of program and condition. The building was obsolete and had deteriorated to the point that reinvestment for housing or for any other function would not have been economically feasible.

Johnstone was a large facility, in a prominent location. How this site is reused is extremely important to student life and to the campus as a whole. In view of this, a design workshop was organized during the campus planning to explore possible redevelopment options for this area. The design concept generated by the workshop is described below. See *Rethinking the Johnstone Site* for a more detailed account.

Context

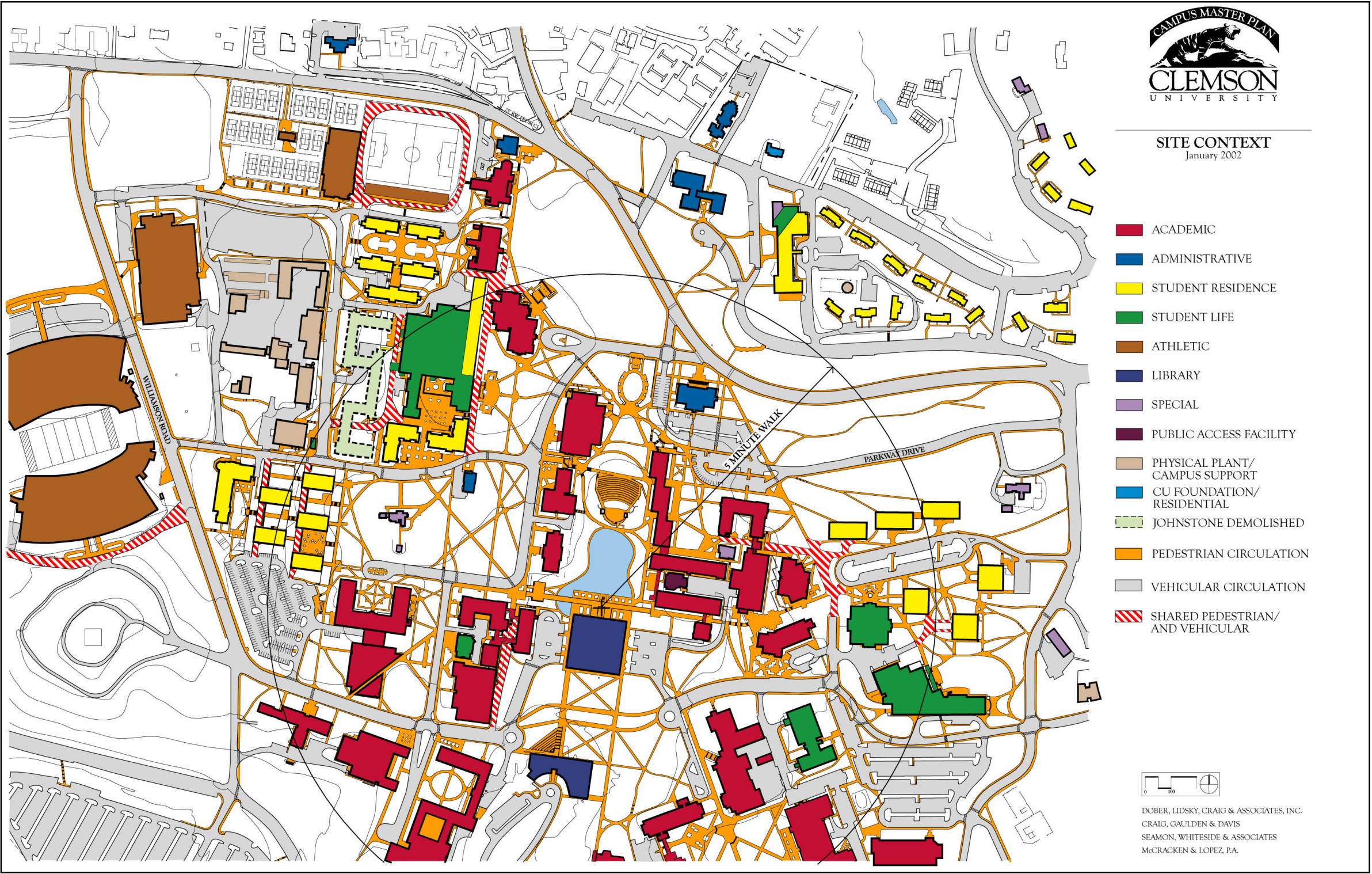
Drawing 18 shows the Johnstone study area with buildings color-coded by function and the Johnstone footprint indicated by dashed line. In addition, pedestrian and vehicular circulation is shown. Paved paths are orange and roadways are gray. Where the road is used for both foot and vehicular travel, it is a red and white striped pattern.

Campus pathways in general are disconnected as they reach the Johnstone site. Access from the north is not attractive as it is through the loading zone for Harcombe Dining. Pedestrians coming from both north and south enter the site through narrow passageways one of which accommodates both pedestrians and vehicles. The path going from north to south on the campus edge of this sector is also narrow and also serves as a roadway. In both instances these pathways are not only awkward, but the conflicts that are created between pedestrian and vehicular rights-of-way are dangerous. For these reasons this type of circulation should be eliminated.

Dedicated campus roads adjoin the site on the three remaining sides. Any renewal should consider closing roads adjacent to the site thus eliminating barriers between site and surrounding campus.

The large student life building in the Johnstone area, colored green, is the University Union and Harcombe Dining Hall. Besides being one of two major dining facilities on campus, this complex also provides activity and administrative space for Student Affairs and shop space for Facilities; and houses the Post Office and Military Science Department. Prior to construction of the Hendrix Student Center, the bookstore was in this location, occupying 13 percent of the assigned space, which is now essentially vacant.

This sector provides housing, colored yellow, for 2,452 students or over 37 percent of the current 6,569-bed housing inventory. This total includes the 660 beds that have been recently constructed in anticipation of the Johnstone demolition, located in this sector and adjacent to the Lightsey Bridge Apartments. The 730 beds Johnstone beds are excluded. To the north there are five buildings that comprise Fraternity Quad (563 beds). East is Johnstone A (315 beds), to the south are Holmes (289 beds) and McCabe (281 beds) halls, and to the southwest are five buildings known as the Shoeboxes (704 beds) and a new residence hall (300 beds).



Issues and Opportunities

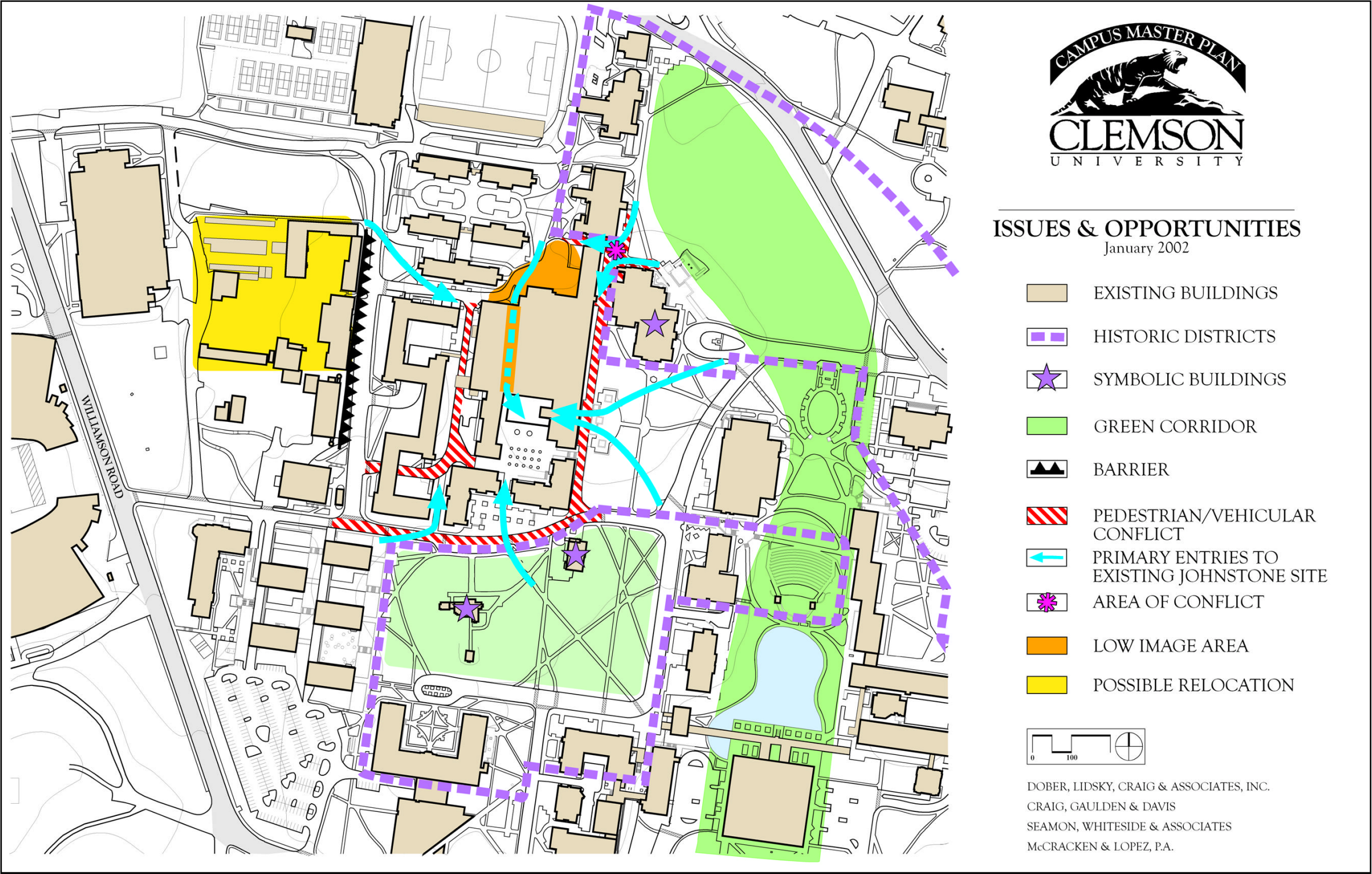
Drawing 19 highlights site issues which, in turn, suggest opportunities for improvement. No significant green space exists in the Johnstone area. Instead there is a central plaza and, due to an appreciable grade change, a courtyard level below. Both of these outdoor spaces are bleak and uninviting. The main pedestrian access is through the University Union building, indicated by blue arrows. The secondary access points are also shown.

Campus pedestrian access from the east and south does not connect well to the Johnstone site, and access from the north, indicated as a low image area, is awkward and unattractive. There are some roads used by both pedestrians and vehicles that should be eliminated. On the fourth or western boundary, the physical plant complex forms a barrier preventing any linkage of the central campus and its housing sector with athletic facilities and playfields beyond. With the exception of the power plant, which is a fixed element, physical plant operations should be relocated to a site on the periphery of campus that would afford easy access for service and delivery vehicles and the ability to expand over time.

A major campus design flaw is the area of conflict created by the relationship of Johnstone A to Tillman Hall, a signature building, and to Godfrey. These buildings should be set off by a more credible neighboring structure that should be sited to allow enough open space to enhance all three buildings. Another campus design fault is the back door approach from the north either by road-path along the west side of Harcombe or through the subterranean passageway under the dining hall, noted by the dashed blue line. The tunnel, a continuation of the low image area, begins at the dining hall service and receiving area, descends rapidly to the courtyard level, passes a fenced mechanical equipment area on one side then the vacated bookstore space on the other side, before finally arriving at the courtyard. Walking along this route is not a pleasant experience.

The drawing shows other relevant design features such as the historic areas that must be protected. The Fort Hill and Calhoun Law Office preserve is immediately south of the site, and Bowman Field is to the east. The historic districts are outlined with the dashed purple line. The open space corridor, an emblematic feature of the Clemson campus, is colored green.

Development in this area of campus should conform to a highly refined design framework that will complement and be sensitive to this central part of the Clemson campus. Open space should be provided that will be respectful of the architectural, historical, and cultural resources of Clemson and of this sector of campus in particular. Pedestrian pathways should be designed to strengthen the relationship of the developed area to the surrounding campus. Vehicular circulation and parking in this zone should be eliminated except for the occasional service or emergency vehicle.



Site Potential

The projected site for development is the area that has become available since the removal of Johnstone. However, the development possibilities increase dramatically if other facilities in the immediate area were replaced thereby expanding this site. The following site options were explored:

- Johnstone site
- Johnstone + Physical Plant Facilities sites
- Johnstone + Physical Plant Facilities + Harcombe Dining-University Union sites

Obviously removing Johnstone provides a substantial site for redevelopment. If, in addition, the physical plant facilities in this area were to be moved to another location, the potential for developing this site for housing, student life, recreation, and academic activities would be greatly enhanced. If this move were accomplished, however, the power plant would remain in place.

The future of Harcombe Dining is another issue that has an impact on development. This facility was built in the 1950s and the systems and kitchen equipment are due for replacement. Functionally the building is also outdated. Food service was much different when Harcombe was built. At that time lunch and dinner were served to large numbers of students at specific times, requiring a much larger kitchen than a new facility would need. Today, meals are offered over longer time periods, decreasing the number of seats needed by almost 30 percent, from 1,400 to 1,000. Although students expect a wider variety of food options, the kitchen area should be smaller for this type of operation.

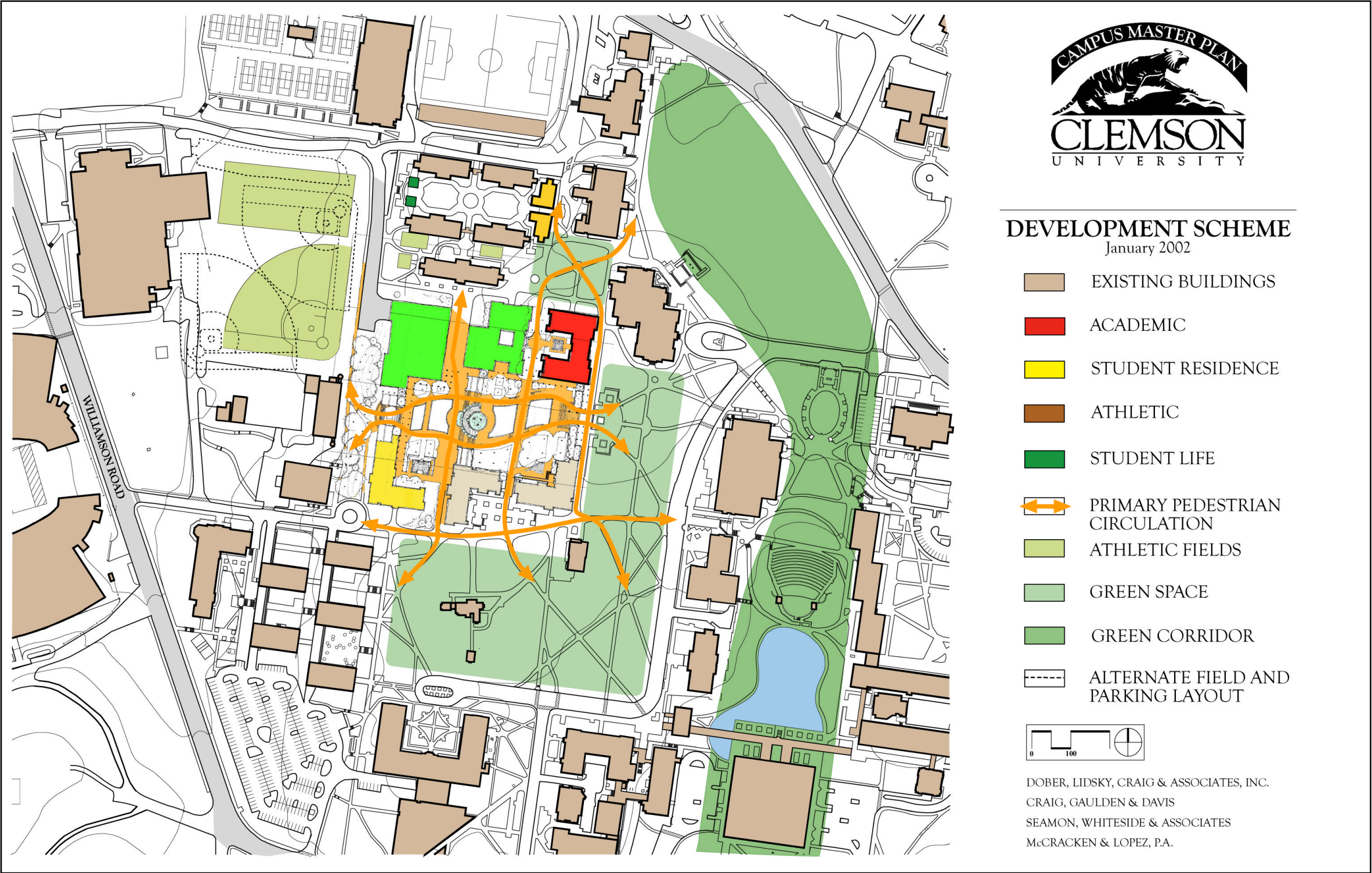
Harcombe should be replaced, as renovating it is unrealistic. The decision is seriously influenced by the impracticality of phasing a renovation. The University cannot do without a large-scale dining facility in this area. Harcombe cannot be renovated and remain in operation during renovation, therefore replacement is the most viable option.

Redevelopment Concept

The consensus of the workshop was that the more inclusive site development area would be notably better than one limited to the Johnstone area, and that Harcombe Dining should be replaced. Another premise was that the area should continue to be a mixed-use site – a combination of housing, student life and academic uses, and open space. The site would then fit into the campus as a whole and would serve as a hub, bringing people together.

A major goal in the redevelopment should be to provide strong links, with noteworthy green spaces and pathways, to the central campus on the east and south borders and to the athletic sector to west and north. This would be achieved with open spaces, pathways, and by placement of new buildings. It should be a pedestrian sector where parking would be eliminated and surrounding roads closed. Service to the new dining hall should be within the building envelope, with the entrance area adequately landscaped to minimize the effect of this utilitarian use on the residential ambience. The site would then become a crossroads while providing replacement housing, student life support, academic space, and more playfields for athletics and recreation.

Drawing 20 shows how the redevelopment might look in the future. The residence hall and replacement dining hall are the first two phases. Later phases would include student life and academic buildings. Playfields would be constructed on the physical plant site north of the existing power plant. The fields are shown in the optimum orientation. An alternative orientation, using less space and retaining some parking, is shown by dotted line. Fike Recreation Center would be expanded with a small addition.



CENTER OF CENTERS

The concept of a Center of Centers sprang from the University's mission statement, in which academics, research, and service are stressed. An especially relevant goal is to:

Foster Clemson's academic reputation through strong academic programs, mission-oriented research and academic centers of excellence, relevant public service, and highly regarded faculty and staff.

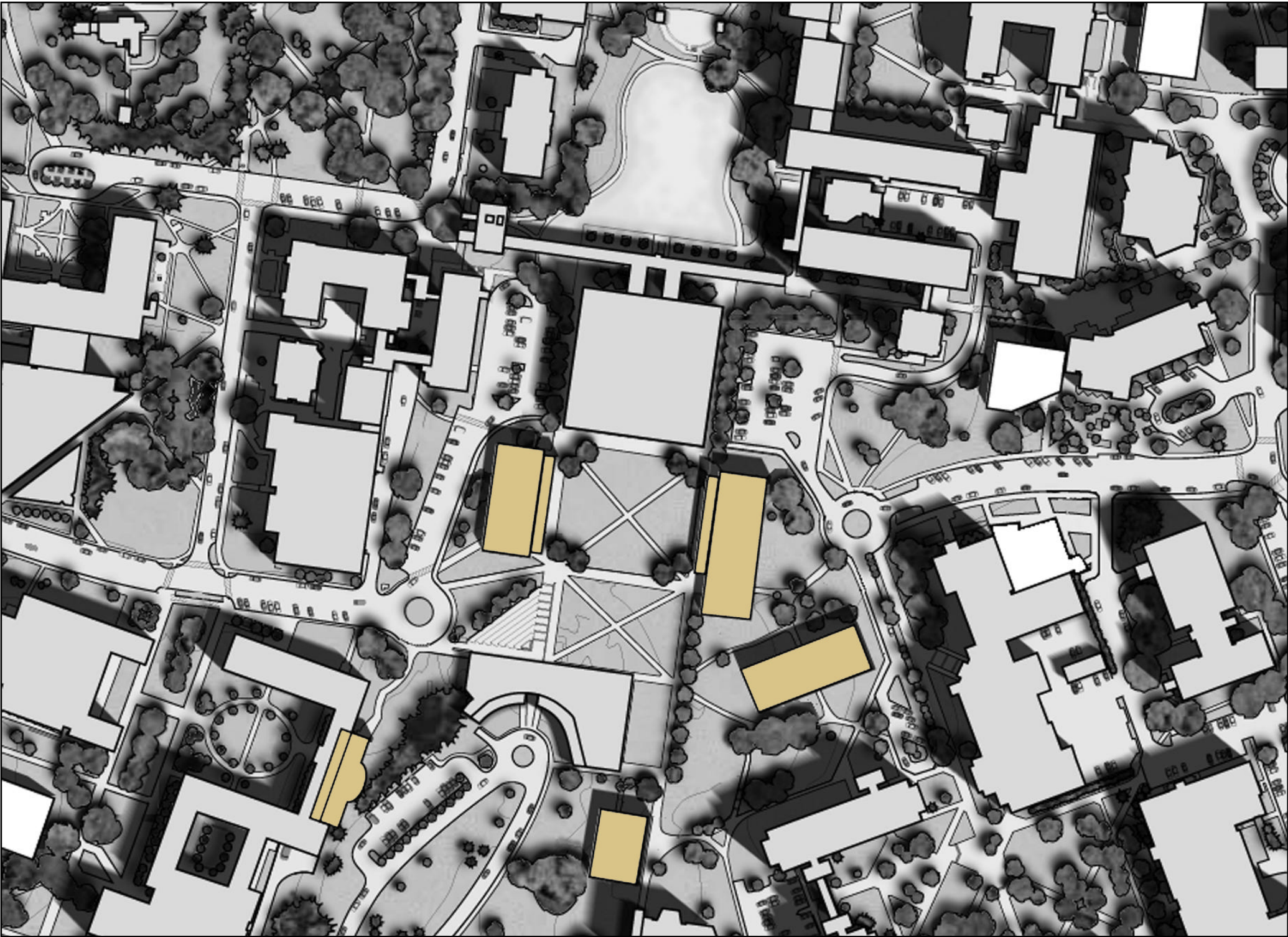
One of Clemson's distinguishing academic features is the nearly eighty outstanding centers and institutes associated with the five colleges that reflect both college and cross-disciplinary interests. These centers and institutes foster the highest qualities of teaching, service, and research; but can be difficult to find on campus as they are often housed in ill-suited, out of the way spaces selected because of space availability rather than purposeful placement. Such random locations discourage spontaneous interaction and exchange of ideas between centers, and appear to diminish the importance of these vital University entities.

The open space between Cooper Library and the Strom Thurmond Institute is a vast, unarticulated green. The development of this space as a Center of Centers will provide a link between the east and west academic communities, and between the Library and the Thurmond Institute.

Placing centers and institutes together – with space for a broad spectrum of activities such as faculty offices, seminar and classrooms, prototypical research modules, service learning workshop and student life-related program space, and a café or coffee shop – will stimulate a fertile cross-pollination of ideas and will strengthen each of the individual units. Possible candidates for location in the Center of Centers are the Pearce Center for Professional Communication, the Rutledge Center for Ethics, the Student Development Center, the Calhoun Honors College, Clemson College, and the University Gallery.

The development will create a place of connections that will encourage the integration of teaching, service, and research. Cloistered spaces around a central garden court are envisioned, designed to combine formal and casual activities and to promote lively associations. Drawing 21 is a graphic representation of this concept. These facilities will be innovative and sustainable buildings that will provide the flexibility required to adapt to whatever facility needs might arise in the future. The open court will be an exciting campus center in itself as a venue for activities ranging from a jazz ensemble concert to the casual tossing of Frisbees.

The Center of Centers will complement the focused research activities that will continue in remote locations and those that are projected in the Douthit Hills development. Research in all three locations will help position the University to become one of the top twenty public institutions in the country.



LANDSCAPES AND OPEN SPACE

Notable design features at Clemson are the landscape and outdoor open space. These components contribute to the beauty and sense of place on campus. The Campus Plan identifies landscapes and open spaces that will be preserved and, in some cases, expanded; and new open space that will be created.

Drawing 22 shows existing and projected landscape elements as well as existing parking lots and projected parking decks. The landscapes that will be preserved are green. On the inner campus those areas are the historic campus green; Bowman Field; the north-south spine from Bowman Field south to the Library and the Strom Thurmond Institute, continuing to Perimeter Road; President's Park; a border north of Highway 93; and Woodland Cemetery. South of Perimeter Road to the west is the Calhoun Field Laboratory; and to the east are the Schoenike Arboretum and Botanical Garden, including the sites of the Hayden Conference Center and Hanover House.

The dotted green line shows the projected extension of the north-south campus green. From Perimeter Road this spine will continue south to the Madren Center and the lake.

Open space used for athletics and recreation is light green and includes athletic fields and the golf course. Jogging trails are indicated with the pink dashed line. Wooded areas, particularly evident along the lake to the west and intertwined with housing to the east, are dark green.

New or enhanced open spaces are blue green. The asterisk indicates that the space is newly created. These areas will be consistently developed throughout the Core Campus to encourage social interaction, an integral aspect of a pedestrian campus.

Parking is also shown. Existing lots are labeled with the letter **P** and new lots with an asterisk. Three new parking decks are shown in gray with a black star superimposed. Three parking decks that will be added at a later time are indicated with a white star.

Campus gateways are red circles on the map: new gates are solid red with a large black asterisk, and existing gates are dotted. There are three gateways along Highway 93. One exists east of campus, and there is a new one at the intersection of College Avenue. The third is a new one marking the west end of Perimeter Road. Two others are associated with the road, one at its east end and one marking the south entrance to campus.



CIRCULATION ROUTES

A major goal throughout the planning has been to advance the concept of a pedestrian campus at Clemson. This idea is strongly reflected in the Campus Master Plan in the pattern of walkways and by the many outdoor gathering places, shown on Drawing 22. Attractively landscaped plazas or courtyards will visually enhance the walking experience while providing social space that will help to build community.

Walkways that link the different sectors of campus will be strengthened. As the automobile will be limited to the periphery, walkways that connect parking reservoirs to the center of campus will also be strengthened. Such changes in primary walks are shown on Drawing 23. Bus use will be encouraged by more effective routing and placement of bus stops, indicated on the drawing by the black dashed lines and blue octagons.

Providing designated bicycle paths and bicycle racks at destination points is another way to support a pedestrian campus. This system is shown by the dashed green line on the drawing. Projected new jogging paths, important to collegial life, are the red dashed lines. Planning for the connections of campus bicycle and jogging paths to those off campus is important to the success of these networks.

Parking

Lack of parking is a common complaint at any university including Clemson. This is often a perceived deficiency as there may be enough parking, but there may not enough spaces in the most desirable places. In any case, availability of parking is critical to sustaining a pedestrian campus.

The University has appointed a Parking Advisory Committee to address parking issues and recommend solutions to any problems that arise. In April of 2002, the Committee adopted ten parking principles that are incorporated into the Campus Plan.

Ten Principles of Parking

1. There should be reasonably convenient, safe and consistently reliable parking options for everyone in the campus community, regardless of income level. "Reasonably convenient" is defined as parking within 20 to 25 minutes of one's destination.
2. Clemson should be guided by a parking philosophy that utilizes both "district" and "perimeter" strategies of parking.
3. Long-range master plans and plans for individual buildings and districts should include plans for parking.
4. The financing framework for parking services should rely more on parking permit revenue and fees than on parking citation penalties.
5. Emphasis should be placed on parking education, managements, and preventative maintenance of all parking facilities.
6. Operating within the framework of principle one, consistently reliable public transit service is integral to the success of an overall parking system.
7. Walking, biking, and other alternatives to single-occupancy vehicle use should be encouraged.
8. The campus should be a "visitor friendly" place with appropriate way finding provided to direct casual visitors to visitor parking appropriate for their ultimate destination.
9. Organized groups of visitors and regular vendors should be expected to help pay for parking services.
10. Thorough and consistent enforcement is critical to ensuring successful management of all parking facilities on campus.

Presently parking is allowed along the central campus streets, which negates the basic planning premise that Clemson be a pedestrian campus. Allowing roads and parking in the center of campus is both unsafe and unsightly, especially on the historic campus. As the amount of parking is increased, these spaces will be eliminated; and bus service will be improved.

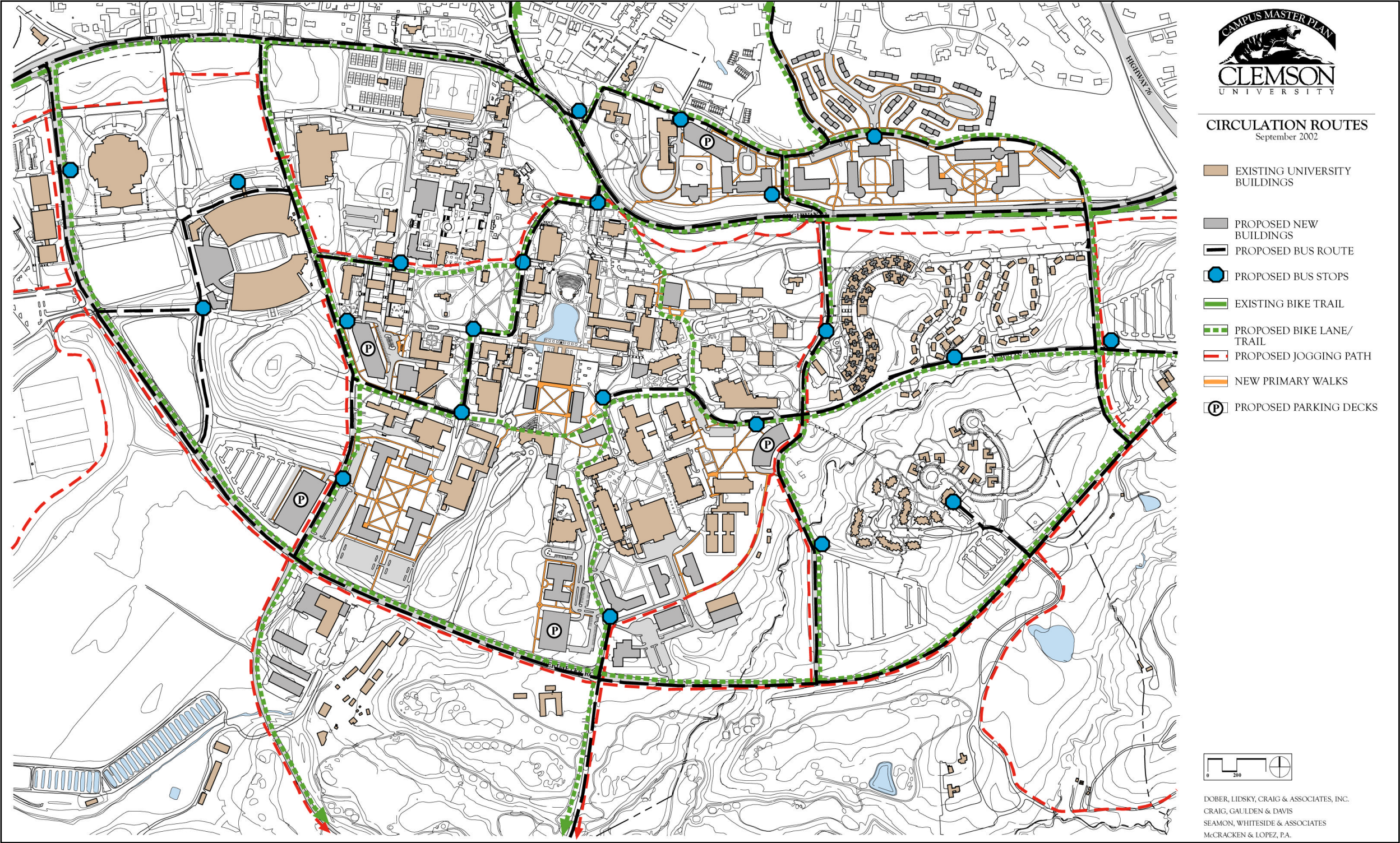
Currently there are 13,158 parking spaces on the Clemson campus. This translates to 83 spaces per 100 students. The average from our database comparing eighty institutions is 55 spaces per 100 students. For a direct comparison, the following table shows the amount of parking at institutions of equivalent size. The numbers range from 36 to 69 spaces per 100 students, well below the 83 spaces at Clemson. This data suggests that either there are more cars per capita on the Clemson campus or that, since there is a feeling that parking is insufficient, concentrations of parking may not be in the preferred locations.

Table 2 PARKING SPACE COMPARISON

	Parking Spaces Per 100 Students
Alabama University	69
University of Virginia	66
University of California, Davis	61
University of Georgia	55
University of North Carolina, Chapel Hill	52
Virginia State University	45
University of Tennessee	45
East Carolina University	36

To alleviate the sense of insufficient parking, the Campus Plan locates five sites for new parking decks. If all five facilities were built, the amount of parking would increase by 1,900 spaces assuming five-level structures and the anticipated loss due to development and elimination of parking on the central campus. The number per 100 students would increase to 95 spaces.

The preferred parking deck locations are north of Highway 93 serving development in the Douthit Hills area, west in the student housing and engineering and chemistry areas, east in the Hendrix Student Center area, southwest serving the future textiles quad area, and south near the Brooks Center for the Performing Arts. Another deck could serve the stadium area to the west. From these parking reservoirs, the walk to almost any location on the main campus would be a maximum of five minutes. If all six of these parking decks were constructed, the University would have a net increase of over 3,500 parking spaces.



CAMPUS DESIGN ALTERNATIVES

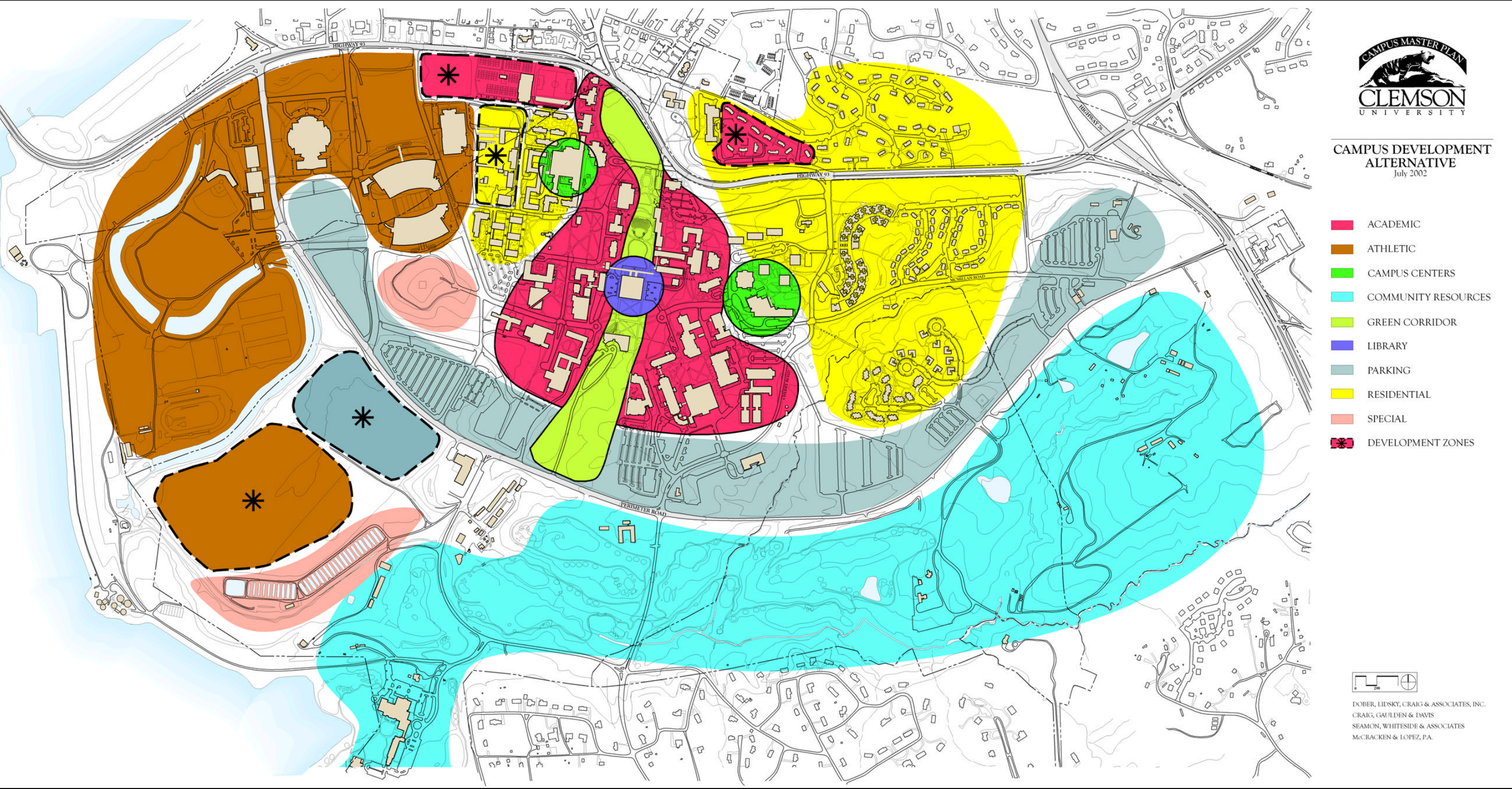
During the course of planning, many development alternatives were considered prior to confirming the 2002 Campus Master Plan. Several of these options are included to help show the depth of study that was involved.

Campus Development Alternatives

Drawing 24 shows several campus development options. One relates to the sector north of the Johnstone area. In the Campus Plan this is developed for athletics, however, academic use would be an option, indicated in red with an asterisk. A similar area that could be dedicated to academic use would be on the north side of Highway 93. The Campus Plan reserves this space for administrative use with research continuing along the highway, backed up by graduate student housing.

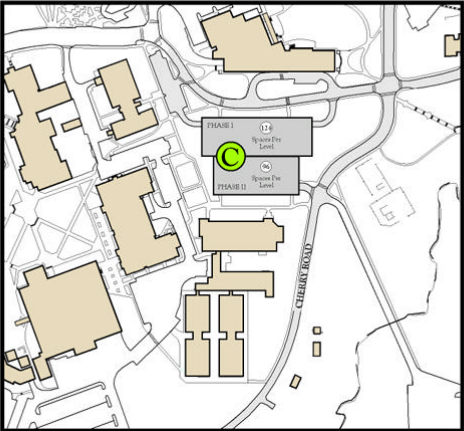
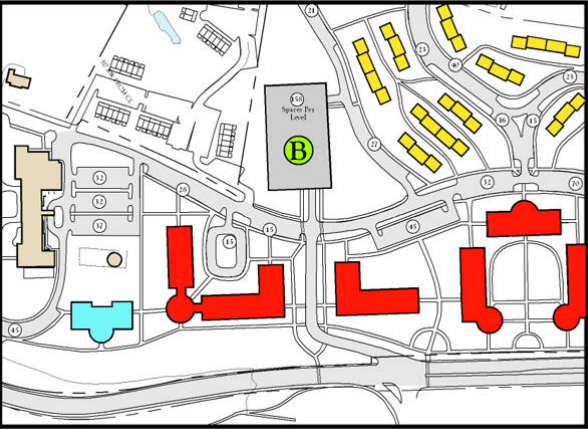
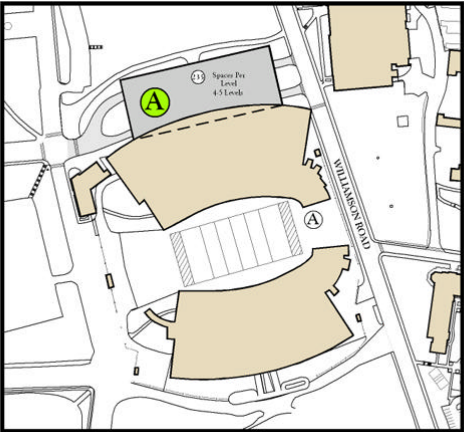
The use of the Calhoun field laboratory land south of Perimeter Road is another area that was studied. The parcel adjacent to the road was considered for parking, shown in gray with an asterisk; and the portion to the south for athletic fields, brown with an asterisk.

This concept did not include development of Perimeter Road as a way to engage the community, nor did it incorporate the extension of the campus green space south to Lake Hartwell. Omitting these features would have detracted from the Campus Master Plan, leading the planning team to reject this alternative.



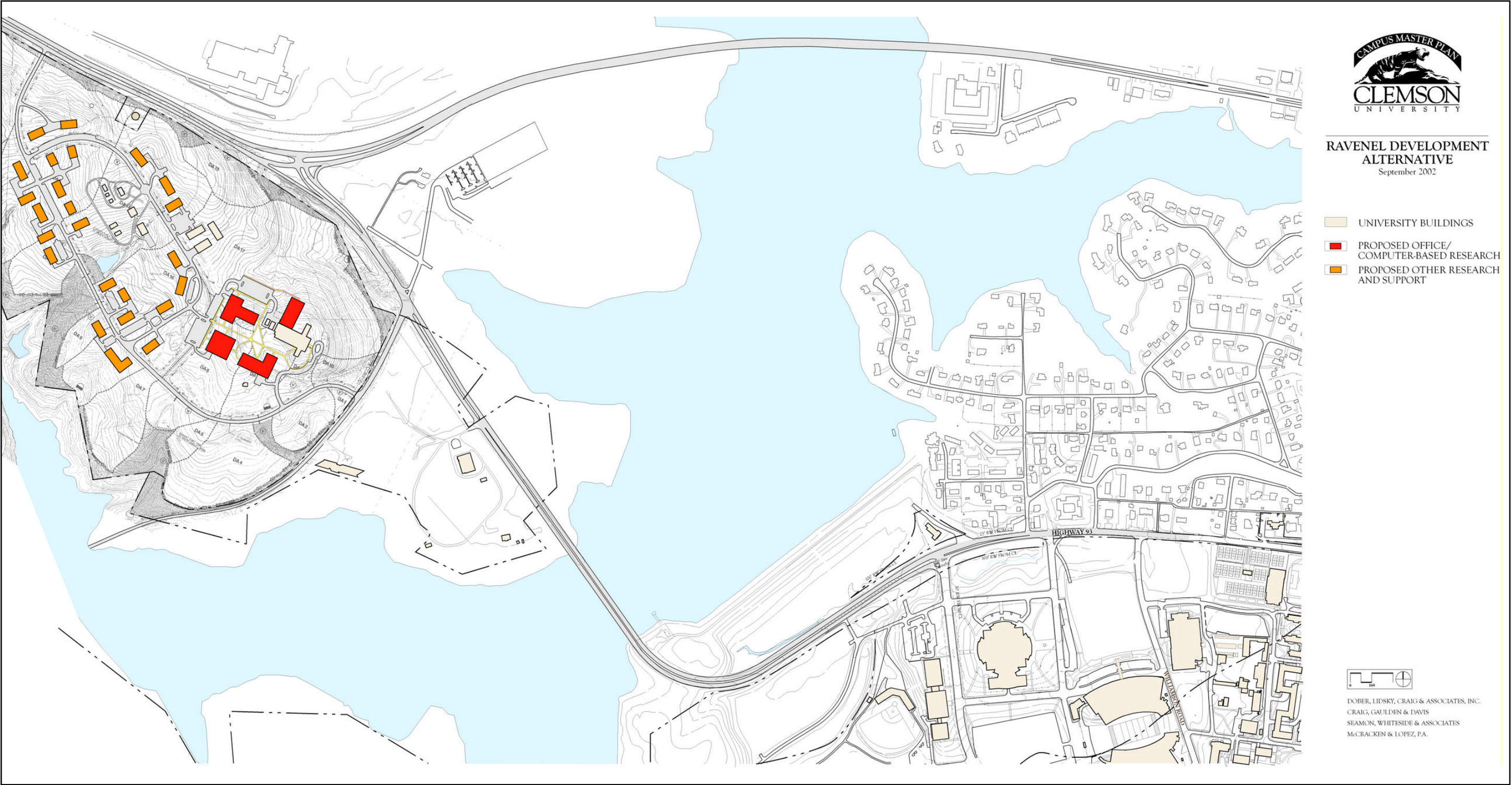
Parking Deck Alternatives

Many parking deck options were studied. Each location had consequences involving such issues as the number of spaces that would be lost in its construction , the number of building levels appropriate for that particular site; and the potential for eliminating a site that would be more appropriate for another use. Some of these options are shown, with a key site map for location.



Ravenel Development Alternative

The Ravenel option shown here is a more extensive development than projected in the Campus Plan. In the clean research area, there is an addition to the existing building. The roads serving the dirty research area have been extended past the turnarounds that exist, continuing north and connecting to the highway. This provides sites for fourteen additional buildings. In this scheme, as in the Campus Plan scheme, the existing ponds and drainage areas have been respected.



INFRASTRUCTURE

As the Campus Master Plan is implemented, 2,500,000 GSF of space will be added to the building inventory. This will have a significant impact on the five, major utility systems – water, heating, cooling, electrical, and telecommunications. Capacities of these systems and the costs involved with extending them and increasing their capacities are described below.

Water

EXISTING WATER AND SANITARY SEWER SYSTEM IMPROVEMENTS

Several areas on campus require improvements, which could require significant funding and should be added to the existing expansion plans. Specific areas are highlighted below:

A new potable water main is planned for Cherry Road from the intersection with McMillan Road to Perimeter Road. The new main would then continue west down Perimeter Road to tie into the existing 10" main on Williamson Road. Preliminary discussions indicate a 12" main will be needed. An existing 6" water main currently parallels Perimeter Road and would be abandoned following the installation of the new main. The planned Agricultural Science expansion dictates the use of a 10" main in this area. Should the 12" main be installed prior to the Agricultural Science campus expansion in 2010, the water main costs for this expansion area would then be reduced by approximately \$15,000.

At fraternity quadrangle there are problems due to the age of the existing sanitary sewer pipes. The sewer pipes are old, vitrified clay lines and with age experience breakdown that exceeds that of better quality PVC or ductile iron pipes. Since the pipes are old and are deteriorating in areas, sewage is periodically entering the storm water pipe system. There is a need to inspect the existing clay pipes to determine their integrity and replace those which do not meet minimum standards for safety and environmental adequacy.

The Douthit Hills housing area for married and international students north of Highway 93, another expansion area, is served by small water lines that are galvanized and are experiencing severe tuburculation (scale and mineral accumulation). The tuburculation decreases the effective flow area and increases the interior pipe roughness thereby creating problems with flow and water quality. The existing pipe sizes average approximately 1 ½" or 2" in most areas and should be replaced to improve the delivery of cleaner water and with greater flow and pressure.

The Thornhill Village Apartments are supplied by 2" water service from the interior streets, which run north to south. These lines are in need of upsizing to provide improved flows from the current 10 gpm (gallons per minute). Flow should be at least 20 gpm.

The Academic Infill expansion area (2015), is in need of a 6" water main extension to improve flow circulation in the vicinity of Jordan and Long halls. The problem is the need to cross an existing breezeway in the immediate vicinity. Construction costs and phasing could be difficult due to working around existing buildings and infrastructure.

Currently, Duke Power has three water taps on campus water lines at Clemson.. The University leases water tanks to Duke Power who provides water to some parts of Anderson County and the campus. Due to periodic pumping scenarios, pressure spikes are created on campus creating a need for pressure reducing valves at several locations on campus.

The campus is now served by a 2.4-mgd (million gallons per day) wastewater treatment plant located north of the levee on the south side of Perimeter Road. The plant is currently utilizing nearly 1.8 mgd of that capacity and may be undersized to accommodate the 2.5 million gross square feet of additional space planned as a part of the future expansion for Clemson University. Additionally, the existing wastewater treatment plant does not utilize the most current technologies and therefore may have some difficulties meeting effluent treatment criteria even within the next year. Further analysis should be considered to ensure the plant is releasing treated effluent that meets existing and/or updated discharge criteria, and that sufficient reserve capacity is available to accommodate the increase in sewage inflows based on implementation of the 18-year development plan. As the plant effluent discharges to Lake Hartwell, a primary recreational waterbody and regional water supply, analysis should be undertaken to ensure no degradation of water quality occurs from insufficient treatment processes at the Clemson University wastewater treatment plant.

In general, many onsite water mains are old, composed of cast iron mains and lead joints. Older sewer mains are vitrified clay in many instances and do not hold up well over time. Expansion plans should include the periodic upgrades of mains to improve environmental and potable water quality, and increase the design life of infrastructure systems.

2010 CAMPUS EXPANSION - AREA OF EMPHASIS 1 & 2

Hunter Laboratory Expansion, Science & Engineering, Animal Research & Agricultural Science

The expansion of infrastructure to serve Hunter Laboratory will require limited funding. Existing water and sewer mains within the immediate area serve the existing facility and expansion site. An existing sanitary sewer main traverses the planned site for the new building and will require relocation. A 6" water main also traverses the building site and can be removed if the existing facilities served by this main can be tied to a nearby 10" main, with no adverse effects to facilities in the area. A 10" water main is directly adjacent to the future building and may not require relocation with careful site planning. Adequate water should then be available. Limited water main improvements are necessary, primarily providing additional fire hydrants at two locations. Existing storm water culverts in this area will require limited expansion.

The expansion of the science and engineering facilities will establish a new mall immediately south of existing buildings. There will be four new buildings surrounding a large open plaza. Only one sanitary sewer collection main crosses this area and will require relocation between future buildings. Additional manholes to serve the new buildings will be extended towards new buildings from both existing and proposed sanitary sewer mains. A new water main, most likely an 8" or 10", will cross through the center of the mall, connecting the existing 6" main along Perimeter Road with an existing 8" main between the Fluor Daniel Engineering Innovation Building and Earle Hall. This will create a loop, from which all four new buildings will be served. Some relocation of existing storm water culverts will be required in addition to the expansion of this system. Expansion of these infrastructure elements will be costly.

Approximately six new buildings will comprise the animal research and agricultural science expansion. The improvements planned for this infrastructure expansion will be the most expensive of all those in the 18-year plan. Relocation of existing sanitary sewer systems and sewer main extensions compose the greatest portion of the cost. Water main service will also be costly due to the number of new buildings under this expansion scenario. Note that some of the new water and sewer mains added under this phase will allow for further building expansion in the future, within the remaining available open areas immediately to the east, with very little cost increase for water and sewer services. The 10" water main that traverses this mall and assumed under this expansion phase may in fact require upgrading to 12" as a part of Facilities Management's greater plan to upgrade water utilities campus-wide. A large portion of the existing storm water collection system will most likely remain in place with limited relocation. However, the physical size of this new mall will require a large expansion to adequately serve the area following full build-out.

2010 CAMPUS EXPANSION - PRIVATE OR SELF-FUNDING

Center of Centers A, Brooks Recital Hall & Gallery, One-Stop Student Services

The first of three Center of Centers buildings to be built in phases for accommodating new faculty office and lecture spaces will require relocation of a nearby 10" water main and a storm water collection trunk line. No relocation of sanitary sewer lines should be necessary for the erection of this facility. Adequate sanitary sewer mains exist to allow direct connection from expanded sewer services. Additionally, several storm water catch basins will need to be removed and relocated elsewhere around the building perimeter.

The site for the planned Brooks Recital Hall and Gallery is surrounded, on three sides, by all three infrastructure types. Only a limited-length run of sanitary sewer and associated manholes should be required to serve this site. An existing 6" water main is nearby, and an existing stub-out can most likely be lengthened to serve domestic water needs for the building. Two ends of the building have parallel storm water collection lines and should allow for an easy tie-in from roof drains.

A situation, similar to the Brooks Recital Hall, exists for the planned One-Stop Student Services building. Adequate utilities of all three types are nearby but existing water and sewer mains currently traverse across the planned building site. With careful site planning, the 6" water main immediately south of the new building can be maintained with no required relocation. However, a second water main will surely require relocation around the new building. In addition, an expanded storm water collection system will be necessary to intercept runoff from the north of the site.

2015 CAMPUS EXPANSION - PRIVATE OR SELF-FUNDED

Center of Centers B, Johnstone Redevelopment, Academic Infill

The second of the three Center of Centers buildings will require additional relocation of a 10" water main, which traverses across the planned building site, and that of existing sanitary sewer and storm water mains as well. This relocation work and addition of mains should complete all infrastructure improvements required for the second and the third Center of Centers buildings.

All available information on existing utility infrastructure within the Johnstone expansion area indicates limited costs can be anticipated for the addition of all new buildings. Most utility routings currently traverse around proposed building sites with the exception of the two, new fraternity quadrangle dorms and existing storm water culverts. An existing water main nearby will require relocation prior to construction of these two dorms. Only one run of sanitary sewer should require lengthening, as there are sufficient sewer manholes and collection pipes for all proposed buildings.

The expanded buildings within the academic infill area will require relocation of all three utilities. Existing mains do traverse directly through the proposed building sites. However, the small building sizes will limit the amount of main rerouting around the new buildings. Sufficient fire hydrants and mains are directly nearby to allow simple service connections.

2020 CAMPUS EXPANSION - PRIVATE OR SELF-FUNDED
Center of Centers C

Water and sewer infrastructure established for the first two Center of Centers buildings, combined with the existing infrastructure, will nearly eliminate the need for additional infrastructure for this phase of expansion with the exception of storm water utilities. Added storm water culverts and catch basins will be required. However, this total infrastructure cost will be quite low.

POST 2020 CAMPUS EXPANSION
Future Academic Center and Housing Rehabilitation

This study did not include infrastructure analysis for this expansion due to the extreme long-term plan for these campus improvements.

CONCLUSION

Review of this analysis will help the current and future administration understand an overview of the water, sanitary sewer, and storm water infrastructure as it relates to the planned expansion of several new buildings that are a part of the Clemson University 18-year improvement plan. A summary of broad-based costs is shown on the table below. Due to the conceptual nature of the Campus Master Plan upon which cost estimates were based, these numbers will need to be analyzed in greater detail when more substantive information is available. These included costs have not accounted for such projects as relocation of the physical plant facilities.

Table 3 Summary of Water, Sanitary Sewer, and Storm Water Infrastructure Costs

	Total Construction Costs Water & Sewer	Contingency (20%)	Engineering Fees (10%)	Total Cost
2010 - Area of Emphasis 1 & 2	\$361,815	\$72,363	\$36,182	\$ 470,360
2010 - Private or Self-funded	\$468,815	\$93,763	\$46,882	\$ 609,460
2015 - Private or Self-funded	\$233,430	\$46,686	\$23,343	\$ 303,459
2020 - Private or Self-funded	\$ 22,770	\$ 4,554	\$ 2,277	\$ 29,601
				\$1,412,880

Steam

The campus is heated from an existing 225,000 pounds/hour high-pressure steam plant located at the Central Energy Facility just west of Klugh Avenue and north of Fort Hill Street. The winter steam demand for the campus is nominally 110,000 pounds/hour.

The growth of the campus outlined in the 18-year improvement plan will add approximately 2.5 million gross square feet of academic and research facilities requiring some 120,000 pounds/hr of additional consumption. Balancing this added demand against energy conservation programs for the existing buildings on campus, should result in the existing plant capacity being maximized during periods of the coldest weather.

High-pressure steam is currently generated for the campus by utilizing three techniques:

- | | |
|------------------------------|--------------------|
| • Gas turbines | 75,000 pounds/hour |
| • Dual fuel packaged boilers | 75,000 pounds/hour |
| • Coal boiler | 75,000 pounds/hour |

The decision as to which technique to use for providing steam to the facilities is based on the economics of plant operation. This ongoing evaluation includes the comparable fuel and maintenance costs of each generator.

To allow for similar life cycle cost optimization at the expanded load, each of the three generating capacities should be doubled as a part of the 18-year improvement plant. A cost of \$30,000,000 should be budgeted for this work.

Steam is supplied to the campus through an underground concrete pipe conduit at nominally 115 psi during the heating months and nominally 90 psi to 115 psi during the summer months.

The concrete conduit looped through the campus typically contains an 8" high-pressure steam main, a 4" pumped condensate return main, and a 2" high-pressure condensate drain main.

The proposed locations of the campus expansions are such that the existing steam mains are not of sufficient capacity to handle both the present and proposed loads. As a result, replacement and extension to the existing mains will need to be routed from the steam plant.

To serve the campus expansion to the south of Cooper Library, a new thermotile 8" high-pressure steam main and 2 ½" thermotile pumped condensate main should be routed from the Central Energy Facility to this area at a nominal cost of \$600,000.

To serve the campus expansion to the north of Highway 93, a new thermotile 8" high-pressure steam main and 2 1/2" pump condensate main should be routed from the Central Energy Facility to this area at a nominal cost of \$740,000.

Chilled Water Distribution

The campus is served from chilled water generated at three plants. The first plant is located at the Central Energy Facility and generates 6400 tons of air conditioning. The second plant, known as the east campus energy facility, generates 2200 tons of air conditioning. A third plant located at Calhoun Courts generates approximately 300 tons of air conditioning. This third, stand-alone plant is not connected to the underground chilled water distribution system that interconnects the first two as described above.

All three plants have reached their cooling capacities to the extent that a loss of one chiller due to maintenance or life expectancy will inhibit the ability of portions of the campus to be properly cooled. In addition, the chilled water plant serving Calhoun Courts may be abandoned due to its age, size and low efficiency.

The Central Energy Facility and the east campus energy facility respectively contribute 10,000 gpm and 3,600 gpm of 40°F chilled water to the campus distribution loop.

Based on the 18-year facilities improvement program, approximately 2.5 million gross square feet of academic and research space will be added to the campus. This growth program will require additional chiller plant capacity of at least 3500 tons and will also require that additional distribution mains be provided.

Currently, planning is underway to provide a 2500 ton satellite plant at the research quad to the south of Lee Hall. This plant will be tied into the existing campus chilled water loop.

Longer range planning also includes a 2500 ton expansion at the east campus chiller plant site. This may be a mirror image of the footprint of the existing facility and be located across the street. This plant will also be tied into the exis ting chilled water loop.

The first cost of these plants will be in the order of \$5,000,000.

In regard to expansion of the chilled water distribution system, several pipe extensions are being planned. For the buildings south of Cooper Library, a new 16" chilled water loop will be routed from the existing system along South Palmetto Boulevard, to the south of Lee Hall, and to a tie-in at the east campus chiller plant. For the building program to the north of Highway 93, a 16" chilled water loop will be routed northwest of Sikes Hall, under Highway 93, to a location where at some time beyond the 18-year program a satellite chiller plant could be constructed. A third extension will be to loop the piping back around Newman Hall and provide chilled water to Calhoun Courts.

The first cost of the loop extensions and necessary size increases to the existing loop will be in the range of \$2,700,000.

Electrical Distribution

The campus is presently served from Duke Power Company at a delivery type substation on the east side of campus near the intersection of Cherry Road and McMillan Road. The substation has two transformers with total power rating of 34 MVA (44.82 MVA emergency rating in accordance with Duke Power Company) at 12,470 volts. The campus delivery is rated at 2000 amps (43.2 MVA) at 12,470 volts. From the east campus substation, power is distributed via 7 circuits: 6 at 300 amps and one to the west campus substation at 600 amps. Generally, power is distributed on campus through the University's underground distribution system at 12,470 volts; however, there are two substations that step the voltage down from 12,470 volts to 4,160 volts. The west substation has a nominal capacity of 10 MVA, and the east substation has a nominal capacity of 5 MVA (through 2-300 amp distribution circuits).

The University presently has a demand contract of 23 MW with Duke Power Company. The highest summer peak demand has been 21 MW at a power factor of approximately 0.87 (or 24.1 MVA).

The growth of the campus outlined in the 18-year improvement plan will add approximately 2,500,000 gross square feet of academic and research facilities which will add approximately 10 to 12 MVA (at approximately 4 watts/square foot) of load to the main substation. The current spare capacity is approximately 19.1 MVA (43.2 MVA (2000 amps @ 12,470 volts) - 24.1 MVA (highest summer peak demand), so the existing substation has the capacity to serve the expected loads for the next 18 years; however, the current 23 MW Duke Power demand contract will have to be increased (incrementally) as building square footage is added to the campus.

NORTH CAMPUS EXPANSION

To serve the proposed construction to the north of Highway 93, a new 12,470-volt loop will be constructed from the east campus substation. This loop will replace two existing 4,160-volt circuits. The circuits will be extended from the east campus substation, north on Cherry Road to South Palmetto Boulevard. From there, the circuits will be extended across Highway 93 where they will serve approximately 1,000,000 gross square feet of new academic/research and academic buildings. The Clemson House will also be fed from this loop by way of a new 12,470-volt, pad-mounted transformer. The existing 4,160-volt overhead lines (served from circuit #7 from the west campus substation) will be removed from the area near the soccer fields east to Newman Road. The remaining overhead 4,160-volt lines to the east of Newman Road will remain and will be re-fed at 4,160 volts from a new 12,470 volts to 4,160 volt pad-mounted transformer.

The estimated cost for this new underground loop, including pad-mounted transformers to feed Clemson House and existing overhead 4,160-volt lines, is approximately \$1,370,000.

SOUTH CAMPUS EXPANSION

The remainder of the 2,500,000 gross square feet of construction will take place in the south and west areas of campus.

In the area of the demolished Johnstone Hall, existing Harcombe Dining Hall and the existing University Union, four new buildings are proposed. These buildings include a new dining facility, a new student activities center, a new academic building and a new residence hall. Also, in the same general area are five dormitories on Fraternity Quad. These existing dormitories will be renovated, and two smaller dormitories will be built next to the existing fraternity dormitories. Because of demolition of Johnstone, Harcombe, and the University Union, the utilities are in place to accommodate the proposed construction; therefore, there is no projected cost to upgrade the infrastructure in this area.

In the central area of campus, two new academic/research building additions are proposed at Hunter Chemistry Lab and at Edwards Hall. Also, a new academic/research building is proposed adjacent to Long Hall. Once again, these buildings will be fed from existing utilities in the area, so the infrastructure will not require upgrading.

In the area near Cooper Library, a group of three new buildings and one addition are proposed. These buildings, called the Center of Centers, will be fed from the existing 12,470-volt circuit #4. The estimated cost for the high voltage duct bank, switches, and manholes for this portion of the site will be approximately \$269,000.

Two new groups of proposed buildings will be located on the south side of campus just inside perimeter road. These two groups will be fed from a loop that is an extension of existing circuits 5a and 5b. These circuits currently feed to the area between Poole Agricultural Center and Godley Snell Research Facility. There is 8 MVA available from these circuits, so there is capacity to feed approximately 1,700,000 gross square feet of new construction (based on 4 w/ft2 at 0.87pf). The first group of buildings is located near Lee Hall and consists of 4 academic/research facilities, a parking deck and a new 2500-ton chiller plant. The second group of buildings is located near Poole Agricultural Center and consists of five new academic/research facilities, one new academic/student life building, one new parking deck and an addition to the Godley Snell Research Facility.

The estimated cost of extending the two circuits including duct bank, manholes, and high voltage switches is approximately \$1,250,000.

The cost of the 12,470-volt underground distribution is for conduit encased in concrete. It includes two 15KV circuits; 4 spare 5" conduits; medium voltage, pad-mounted sectionalizing switchgear; and manholes as required. The duct bank can be installed in phases if the construction schedule allows for it. The costs shown in this report do not include any work associated with the Power Company or pad-mounted transformers serving individual buildings.

Cost Summary

	Power Distribution	Telecommunications Distribution
North Campus Construction	\$1,370,000	\$ 945,000
South and West Campus Construction	<u>\$1,519,000</u>	<u>\$1,240,000</u>
	\$2,889,000	\$2,185,000

Telecommunications Distribution

The University currently distributes all telecommunications cabling underground in duct banks. Included in these duct banks are telephone, data, fire alarm, and cable TV. Both copper cabling and fiber optics cabling are included in the duct banks. All cables are furnished and installed by the University vendors.

The growth of campus in the 18-year improvement plan will add approximately 2.5 million gross square feet of academic and research facilities.

NORTH CAMPUS EXPANSION
To serve the proposed building construction on the north side of Highway 93, a new telecommunication duct bank will be required. The duct bank will consist of twelve 4" conduits encased in concrete and will run parallel to the 12,470-volt duct bank. The estimated cost of this duct bank is \$945,000.

The cost of the duct bank includes conduit, concrete encasements, manholes, trenching, and backfill. The cost does not include any cables for voice, data, fire alarm, cable TV, etc. Also, the entire duct bank is not required at the same time and can be added in phases.

SOUTH CAMPUS EXPANSION
To serve the proposed building construction on the south side of the campus, a new telecommunications duct bank will be required. The duct bank will consist of twlevetwelve 4" conduits encased in concrete and will run parallel to the proposed 12,470-volt duct bank. The estimated cost of this duct bank is \$1,240,000.

ILLUSTRATIVE CAMPUS MASTER PLAN

The drawing opposite is a rendered air view of the campus as it might look when all the Campus Plan projects are complete. This vision of the Clemson University campus expresses all of the ideas discussed above, collected from the many on-campus interviews, discussions, and review sessions; and quantified in the programmatic analysis.

The Campus Plan concept is illustrated on this drawing. It shows buildings of the sizes prescribed by the programmatic analysis and landscapes that were conceived through the campus design process. The architects for each of the construction projects will determine final building form and position on each site. The University, too, will influence the final physical resolution of the Campus Plan, as projects may need to be redirected in response to changing academic and programmatic requirements. Funding opportunities will also be a factor in the realization of the Campus Plan, both in sizing and sequencing.

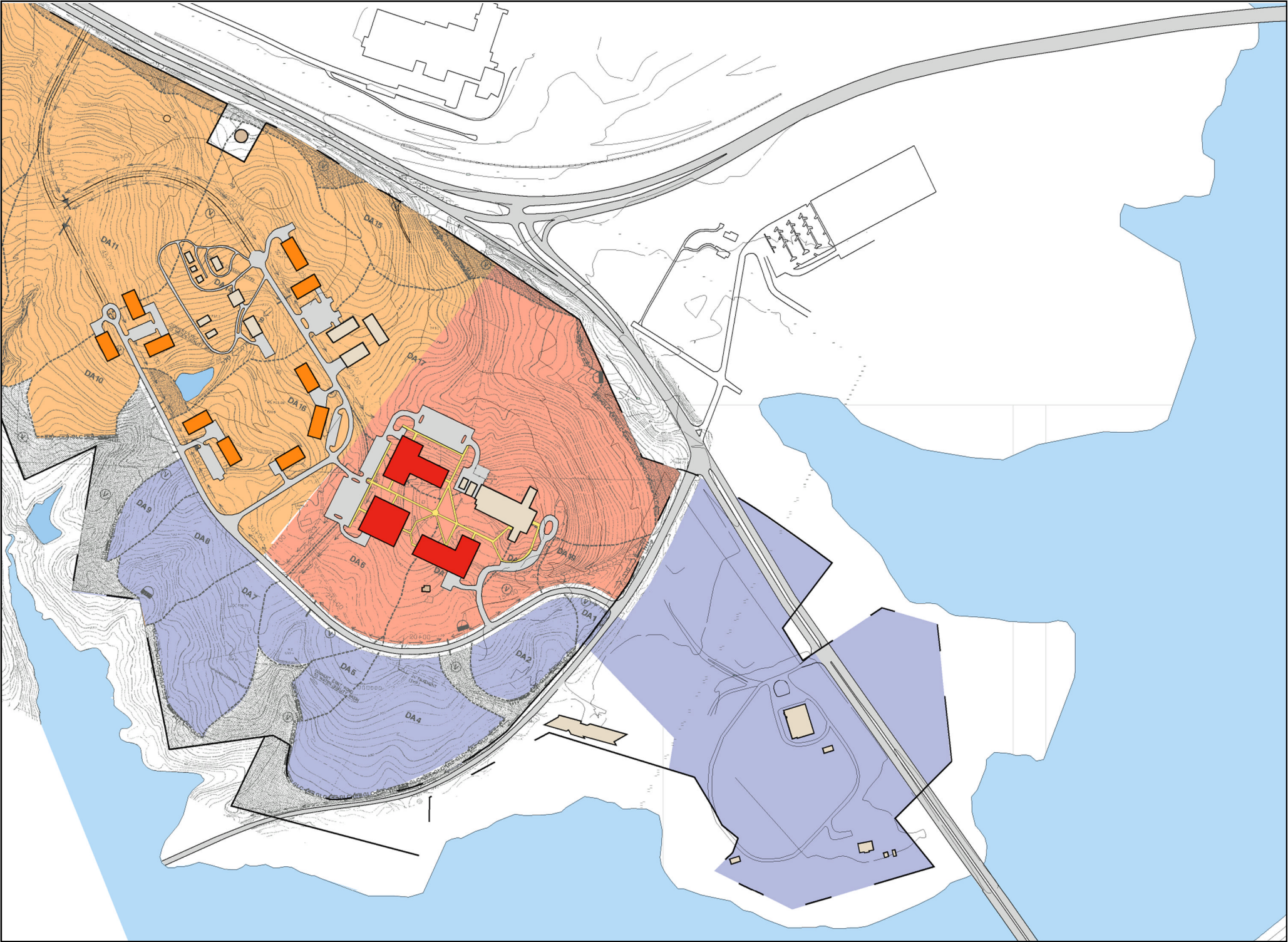


RAVENEL SITE PLAN

This drawing reiterates the Campus Master Plan concept for development of the Ravenel site. The research use will continue, in two forms. One type will be computer- or office-based, indicated by the red zone. The other will be project-specific research of a type not as suitable for an on-campus location. This area is shown in orange. The area colored purple will be retained for other development more fitting for its lakefront setting.

Other use options were considered for the Ravenel campus. There are significant limitations to this site, however. The distance from campus is a major problem - 2.8 miles from central campus parking. The site is constricted by a hilly topography and crisscrossed with utility right-of-ways. In addition there are drainage and retention issues.

The continued University use of this area for certain types of research was considered the best use. The idea of a research park where partnerships with private industry could be encouraged was investigated; but to fulfill the Clemson experience, student and faculty research should be conducted on campus. There is sufficient land near the core campus that has been set aside for this. Ravenel, then, will be reserved for types of research that are not as appropriate for an on-campus location, with a buffer zone to protect the valuable lakefront property.





CLEMSON UNIVERSITY CAMPUS MASTER PLAN 2002

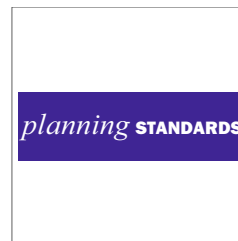
design **PRINCIPLES**

design **GUIDELINES**

planning **STANDARDS**

CLEMSON UNIVERSITY

CAMPUS MASTER PLAN 2002



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Preface



Clemson University's 2002 Campus Plan identifies goals and objectives for campus development that benefit both the community and the individual. The Design Guidelines provide a philosophy, which is the foundation, basis, or grounding for ensuring that the campus and its buildings will support overall University goals as well as the individual's purpose, good health, and well-being.

In preparing design guidelines for future development, the University has identified overarching Design Principles. The principles fall into three categories — to promote intellectual and social interaction, to respect cultural and historic resources, and to value sustainable design. From these principles, the Design Guidelines and Planning Standards follow.

All landscape and facility development on the Clemson campus should satisfy the design criteria that were originally stated by Marcus Vitruvius Pollio in his *De architectura* written in the first century BC. In Sir Henry Wotton's 1624 rendition of Vitruvius's maxim, the first of these criteria is commodity or utility, the second is firmness or durability, and the third is delight or beauty. The University's overarching Design Principles will be applied through the execution of projects that exhibit these qualities.

Design **PRINCIPLES**

PROMOTE INTELLECTUAL & SOCIAL INTERACTION

Purpose

The purpose of the Clemson campus, as the physical manifestation of the idea of a university, is to bring together a diverse group of people by providing settings that foster learning, creativity, collegiality, and intellectual growth — consistent with the charge of its founder, Thomas Green Clemson, that Clemson be “a high seminary of learning.” The principle of promoting interaction extends beyond the development of appropriate classrooms, courtyards, or quads, to the purposeful creation of many different types of spaces strategically planned, placed, and furnished to encourage informal dialogue in teacher-to-teacher, student-to-teacher, and student-to-student situations. There are three major campus components the principle applies to — outdoor space and indoor space woven together by a pedestrian campus — each of which has a distinct role.





Outdoor Space

Open space should support a sense of community, by providing many types and sizes of outdoor meeting and recreation areas. In addition, open space should be designed and maintained to unify the campus by connecting diverse site and building elements together as an attractive whole. The Campus Green is such a space as it connects the east and west sides of campus serving as the fabric that ties building and site elements together. Further, each outdoor space, large or small, should be seen as a garden to cultivate the minds of Clemson students.



Indoor Space

Where outdoor space is common to all campus constituents, individuals occupy indoor space. The building walls mitigate between the two environments. In buildings, opportunities for the exchange of ideas should also be maximized. As with outdoor space, many types and sizes of indoor meeting spaces should be provided for both planned and unplanned interaction. The amount of public space in buildings should be sufficiently generous to allow for this interaction to occur.



Pedestrian Campus

Fundamental to the idea of social interaction is the notion of a pedestrian campus. Only when people are outside of their cars do they have an opportunity to engage in the campus environment and community in a meaningful way. Through its design, the campus should encourage the individual to walk or use the transit system to move from place to place, experiencing things such as art and artifacts, and conversations with people along the way.





RESPECT CULTURAL & HISTORIC RESOURCES

History and Culture

In order to meet Thomas Green Clemson's charge to be a "high seminary of learning," Clemson University has been a science and service oriented institution. The culture that has evolved from this pragmatic worldview is one that cultivates talents in a wide range of disciplines. These traditional values and beliefs contribute to Clemson's sense of place.

Many of the existing spaces and structures on campus have local, regional or national historic significance; several are included on the National Register of Historic Places or are identified as National Landmarks. Clemson University treasures these historic resources by maintaining and preserving a campus historic district, and by acknowledging and respecting this past through a considered approach to the planned environment.

New and Old

Campus architecture and landscapes communicate something important about the issues and priorities of the present generation. New buildings, modifications to existing facilities, and even minor changes to the campus should respect the legacy that will be left to future generations. The quality of the built environment is key to the distinctiveness, long-term viability, and image of the University.

Rural and Urban

Significantly, another cultural resource is the campus, considered as a whole. The campus is a representation of the past and the future, the rural and the urban. Within seconds one can go from a highly developed urban zone to a peaceful, pastoral setting. These contrasting qualities should be maintained and used to contribute to the unity of the campus.

Intended Aesthetic

Some buildings and landscapes reflect the past; new ones will frequently point to the future. Despite this mix of past and future, rural and urban, the entire campus should maintain an intended aesthetic in an on-going effort to preserve continuity and enhance coherence and relevance. At Clemson University, these seemingly opposite characteristics bring life and excitement to the campus. Clemson should protect and enhance this unity while allowing for diversity between its various districts, developing a reasoned consistency within districts, and encouraging creativity for a single project.

VALUE SUSTAINABLE DESIGN

Life and Living

The responsible use of all forms of energy and the good health of the community are high priorities of Clemson University. Consistent with its mission of teaching, research, and public service, Clemson University intends to be a leader and champion of sustainable design as a tool to help educate the Clemson community. At the same time, energy consumption and the “ecological footprint” of the University will be reduced while the productivity and health of the community will be improved. Balanced with other University priorities, sustainable principles that promote these objectives shall be incorporated into all building and infrastructure projects to the fullest extent possible in an effort to create environmentally responsive facilities.



Past, Present, Future

Clemson University is an institution entrusted to the present generation. The natural and built environments of the campus and other properties should be cared for, developed, and administered in such a way that they are protected, utilized appropriately, and positively changed for future generations. Through all efforts, vigilance should be applied to ensure that planning, design, and construction are targeting efficient use of resources, and that careful and responsible actions are taken to ensure that University resources are utilized in the best possible way while achieving the other primary principles of design.

Stewardship

Stewardship is the concept of responsibly managing all resources for the benefit of present and future generations of people, plants, and animals. Objectives in the stewardship of resources should include such goals as:

Manage resources in a manner that is fiscally responsible.

Manage resources in a manner that is compliant with the rules and regulations established by society.

Manage resources in a manner that provides the facilities necessary for Clemson to perform its mission of education, research, and service in order to better society.

Design **GUIDELINES**

INTRODUCTION

The Design Principles — based on interaction, culture and history, and sustainability — provide a working framework to guide any changes to the Clemson University campus that might be considered. The Design Guidelines are more specific, and provide planning and design direction for all landscape and building projects. The primary audiences are those involved in the planning and design of such projects that include university user groups and design consultants to Clemson University.

These guidelines apply a philosophy that does not intend to be so constraining as to inhibit creativity. Rather the opposite, their intention is to provide design parameters in which creativity can flourish and still maintain overall campus planning objectives that reflect both broad philosophic principles and specific standards.

The information presented herein is a supplement to “*Instructions and Information for Commissioned Engineers and Architects at Clemson University*” (the Green Book).

LANDSCAPE

Beauty

Although located in one of America's first college towns, Clemson University has traditionally been thought of as a rural campus, because of what was once a remote location in the state and because of the agricultural history of the college. However, in form and in culture, the campus is no longer rural, it is decidedly urban. Also, despite the hundreds of changes that have occurred over the years, Clemson's inherent beauty has been maintained, in all forms: landform, landscape, built form, and townscape. Many factors work in concert to create this beautiful setting.

Landform and Elements

The land itself, a rolling, hilly topography, plays a vital role in creating interest. The buildings themselves, in many cases, are individually very handsome structures. The buildings also perform the valuable function of creating meaningful open space by their form and siting. Some of the elements in the landscape such as plazas, fountains, and public art contribute to this beauty. Even the actual arrangement of elements on the land adds to the overall aesthetic quality by creating vistas, framing views, or providing visual termini.

*“We should be thinking about the campus
as a garden.”*

President James F. Barker, FAIA

*“...ultimately all culture is a convention, particularly if
we remember that culture means tilling the soil in
patterns and with purpose, making as Thoreau said, the
earth say beans instead of grass, that is, putting design
and shape into a common environment, beginning in the
mind whence all design flows.”*

A. Bartlett Giamatti





Landscape Character & Trees

Policy: New trees will be planted on a regular basis and significant existing trees and quality woodland should be protected as important natural and cultural resources. Efforts will be made through planning, design, construction, and maintenance processes to ensure that these trees are protected and remain a viable, valuable part of the Clemson University Campus.

Trees and Space

The most important resource that contributes to the acknowledged beauty of the campus setting is the hundreds of large, grand trees. The landscapes of the campus are the series of spaces that connect buildings and knit together often-diverse functions. Some of these spaces are better defined than others. Some have more of the character of a garden than others. However, the common thread that runs through every landscape is the ubiquitous presence of trees. The tree canopy is the single defining element that makes the Clemson campus memorable and beautiful. The trees shape and reinforce the campus character.



Trees and Development

As development on campus becomes denser, compaction of the root zone and loss of structural roots will place more pressure on these existing trees. For this reason, all projects should carefully consider the impact on existing trees, and the enhancement of the project through the planting of new trees.

Trees and More Trees

As older trees become less viable and are lost to disease or other causes, there should be a very active tree maintenance and replacement program. A program exists at this time to manage this resource. The care and protection of these trees should be a very high priority for the University. The preservation, protection, and ongoing health of these existing trees should never be made a second priority. In addition, the replacement of trees that are either removed or near the end of their life span should be an ongoing program.



Landscape Character & Open Space

Policy: Although the center of campus will increase in density, the dedicated open space of the campus should be protected from campus development and will be preserved or enhanced as appropriate. Clemson is blessed with a remarkable “endowment of land.” However each acre is precious and should be as carefully planned as if it were Clemson's last one.

Space and Development

Open space preservation is a very important component of any responsible development or land use strategy. Depending on scale, open space provides several benefits, which may include enhanced water and air quality, improved habitat, decreased storm water run-off and the desirable aesthetics of natural surroundings.

Some open spaces are in a dedicated open space category – Bowman Field, President’s Park, the North Campus Green, the historic Core Campus Green, and Woodland Cemetery – and can be modified only by action of the Executive Administration. Other spaces shall be preserved and protected, but in a less rigorous way. These include the South Campus Green, the Bottoms, and the arboretum and Botanical Garden area. See Drawing 1, page 21, for open space locations.



Space and Associations

There are many areas of landscape that are not readily associated with a particular building or function. These are general open spaces that, in fact, may be the most important landscapes on the campus. These are the areas that weave the fabric of the campus together, making it a memorable place. These are the areas that are essential to setting the campus comfortably into its environs. These spaces have great value and should be carefully considered.

Space and Infill

Ironically, these are the areas that are under the most pressure of becoming future building sites. As the campus grows, it could either take up additional land by spreading out and expanding or by seeking areas within the core that can be filled in by new structures. If the campus continues to expand, by taking in new land, it will eventually exceed the limits of a pedestrian campus to the detriment of the University's social and intellectual responsibilities. Open space needs to be protected from haphazard infringement and degradation and a balance between expansion and in-fill should be achieved.

Space and Well-being

The open space corridors that exist on campus are vital to the health, function and beauty of the environment. As an example, the Hunnicut Creek corridor provides habitat for wildlife; provides for the stormwater management needs of the campus; and serves as an effective buffer. Also, the area known as the Campus Green, that area which links Bowman Field to the Madren Center is vitally important to the physical organization of the campus and is essential in maintaining the character of the campus landscape.



Landscape Character & Planting

Policy: Planting design should consist predominantly of mass plantings of shrubs and groundcovers, native to the region, in arrangements that are simple in geometry and form, do not require significant maintenance, and are appropriate in scale for their specific context.

Plant Life and Well-being

The appropriate use of vegetation in the built environment is a major influence on the quality of human life. Shrubs, herbaceous plant material, and trees filter pollutants in the air and water, mitigate wind and solar heat gain, stabilize soil to prevent or reduce erosion, and provide an aesthetic counterpoint to the built environment. These attributes are essential to balancing the effects of humans on the land. Furthermore, the native plants of a region provide some of the strongest cues to the unique identity of a place. In turn the creation of a healthy growing environment for the plants requires the collaboration of arborists, horticulturists, landscape architects, and native plant biologists.



Plant Life and Scale

The various landscapes are important in maintaining the human scale of the campus. Planting design should be within the concept of reasoned consistency and should reflect the nature of the place, the requirements of maintenance, and the intended aesthetic of the campus. Plantings should always be designed in the context of the greater campus. Continuity in plant selection and arrangement is integral to unifying the campus landscape.



“Circulation patterns should be regarded as major instruments for achieving better urban forms”

Paul Spreiregen

design **PRINCIPLES** · design **GUIDLINES** · planning **STANDARDS**



CIRCULATION

The image of the campus depends on legibility and clarity from multiple vantage points in motion, at various speeds. The range is from a walking pace of three miles per hour to a driving rate of forty-five miles per hour. The pedestrian and vehicular systems should be designed to reflect this.

Car Circulation and Entry

Policy: All planning and design for facilities near the periphery of campus should consider the impact of the project on the campus gateways. The campus road system should provide for the safe and efficient movement and parking of automobiles, and, at the same time, promote the pedestrian nature of the place.

Approach, Entry, and Threshold

The approaches to the campus are very important in that they set the tone for what is to be expected and indicate points of orientation for the visitor. They signal arrival and often stimulate a flood of memories in the returning alumni. The approaches and entrances should be gateways, not necessarily in the literal sense, but definitely in the figurative sense. There should be no ambiguity of when one enters the campus of Clemson University.



Car Parks and Structures

Parking reservoirs should be located near the campus perimeter, allowing convenient pedestrian access to the campus core while minimizing vehicular access into the center of campus. This concept depends on a strongly defined perimeter circulation system. Siting parking decks and large parking lots, and integrating them into a definable, landscaped edge that is consistent with order and continuity is as important as the equivalent goals in the campus core.

Pedestrian Circulation

Policy: Pedestrians' needs are of the highest priority and take precedence over the demands of the motorist. All planning, design, and development should support this priority while meeting the basic needs of emergency service, maintenance services, disabled individuals, and mass transit.

Walking and Beauty

Clemson University is a beautiful campus and is very enjoyable to walk. The topography of the campus provides interest and the many large trees provide shaded walks throughout much of the area. Adding further to the experience is the diversity of walkways, ranging from sidewalks on busy streets to garden paths. Walking also promotes physical well-being and, with adequate lighting and safety measures, can be pleasurable both day and night.



Walking, Campus Fabric, and Interaction

The pedestrian circulation system links the various facilities and open spaces together into a cohesive fabric for the campus community. It is also where meaningful interaction between members of the Clemson community often occurs. The essential components of the pedestrian circulation system are major walkways; minor walkways; and plazas, quads, or malls. The major walks within the pedestrian circulation system comprise the mainstream of campus pedestrian traffic. These walks should afford the most direct line to the major buildings and building groups. Secondary to the major walks is the system of minor walks, which serves each building on campus. Minor walks should be scaled to the function and character of the buildings they serve and to the open spaces they traverse.



Walkways and Courts

The plaza or court, as a defined space, is an opening or gathering place and a special feature in the circulation system. It is an essential element in providing focus and meeting opportunities on the longer walkways and a means for collecting and distributing pedestrians.



The types of outdoor open spaces suggest various aspects of Clemson's history. The field is a rural element, the quad is a feature of the military heritage, and the court is urban. By providing all types of gathering spaces the student can learn to be respectful of the rural and military heritage, and mindful of the civil, urbane way of living in years to come.

Walkways and Gardens

If we are to think of the campus as a garden, then these pedestrian sidewalks are the garden paths. They should be places of beauty, and elements of visual interest, such as specimen plantings or sculpture, should be found along the way. Also, there should be numerous opportunities to stop and sit along the paths. If Clemson University is to become a truly pedestrian campus, then the pedestrian areas should be comfortable, functional, and beautiful.

Walkways and Traffic

However, there are some areas where pedestrians must share their path with automobiles, walking in the street or through a service lane. This type of situation is highly undesirable and should be eliminated by the separation of pedestrians and automobiles wherever possible.

Walkways and Safety

Vehicular circulation should be clearly discernable, in terms of the hierarchy of various streets and drives, as well as being safe and attractive. Care should be taken to minimize possible conflicts between automobiles and pedestrians using well-marked crosswalks and curb ramps at all intersections. Also, transit stops should be safe and conveniently located.

Bicycles and Jogging

Dedicated, safe paths for joggers and cyclists should be provided, as indicated in the *Campus Master Plan*. In addition to bike lanes, racks and other means of secure storage should be available to encourage use of the bicycle.

“The terror of being lost comes from the necessity that a mobile organism be oriented in its surroundings.”

Kevin Lynch

“Unfamiliar environments make special demands upon us. Even the simplest of settings can involve a jumble of information that has to be sorted and processed before it becomes meaningful.”

Dorothy Pollet

SIGNAGE

The clarity of Clemson's image should be enhanced by both the outdoor and indoor signage systems. The public's impression of the University is a reflection of the quality of design, coherency, and consistency of these important systems. Policy: *A well-designed and consistent signage plan will aid the public in identifying and locating facilities. The system should focus on providing information to the predominant user of the Clemson campus — the pedestrian.*

Outdoor Signs

The information system on a campus reflects the image of the institution. The design, readability, and consistent placement of signage on the Clemson campus are necessary factors that help people find where they need to go in an efficient and pleasant way and thus create a positive image of the University. All signage should conform to Clemson's Sign Program. The signage information system includes campus identification at major entry points, information maps, vehicular directional signs, information kiosks, area identification, building names, building directories, temporary signs and notices, signs for special events, and banners.

Indoor Signs

The signage inside a building is equally important. All elements, such as directories, and room names and numbers, should be consistent across the campus, yet appropriate to and in scale with the interior spaces and their functions.



“In architecture, as in all operative arts, the end must direct the operation. The end is to build well. Well building hath three conditions: Commodity, Firmness, and Delight.”

Sir Henry Wotton, from “Elements of Architecture”, 1624;
Paraphrased from Marcus Vitruvius Pollio

Commodity: “That which affords ease, convenience or advantage; anything that is useful ...”

*Firmness: “... solidity, ... stability, strength ...” Delight:
“A high degree of pleasure, satisfaction of mind, joy”*

Noah Webster, 1828

“My purpose is to establish ... a high seminary of learning in which the graduate of the common schools can ... pursue ... thorough theoretic and practical instruction which bear directly upon agriculture ...”

“I trust that I do not exaggerate the importance of such an institution for developing the material resources of the State by affording to its youth the advantages of scientific culture ...”

Thomas Green Clemson



ARCHITECTURE

Architecture is the background to purposeful and beautiful outdoor space as well as the background to the surrounding landform and landscape. As the container of space, architecture must be useful and flexible and appropriately accommodate the assigned learning, living, and teaching activities that occur within. At the same time, architecture must instill in its users a high sense of pleasure.

A Pragmatic Architecture

Policy: *Campus architecture will reflect the pragmatic culture of the University.*

Clemson University was established as a scientific institution for the purpose of serving the region with the development of useful solutions to its most critical needs. This scientific, service-oriented purpose has given rise to a pragmatic Clemson culture; and consequently to the expectation of architecture that is both practical and sincere, demonstrating commodity, firmness, and delight.

“Strengthen our sense of community and increase our diversity.”

“Increase our focus on collaboration.”

Clemson University 2010 Goals

“The job of buildings is to improve human relations: architecture must ease them, not make them worse.”

Ralph Erskine

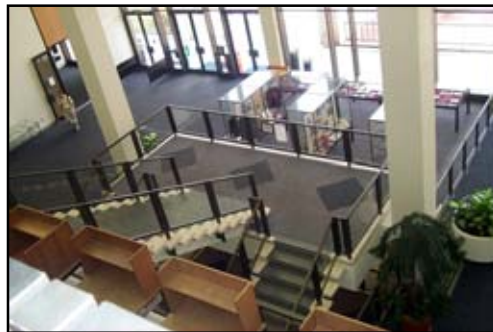
“Excel in teaching, at both the graduate and undergraduate levels.”

“Foster Clemson's academic reputation through strong academic programs, mission-oriented research and academic centers of excellence, relevant public service and highly regarded faculty and staff.”

Clemson University 2010 Goals

“Maintain an environment that is healthy, safe and attractive.”

Clemson University 2010 Goals



Commodity — Utility

Policy: *Campus architecture will be designed and maintained to advance the design principle promoting social and intellectual interaction.*

Campus Architecture and Interaction

At Clemson, part of a building's purpose is to create an environment that promotes intellectual and social interaction. Buildings should provide informal learning spaces that encourage interaction among users. If possible, these spaces should be located near high traffic areas such as lobbies; toilets; stairs; elevators; copying and vending areas. If feasible, provide corridors wide enough for people to stand and talk comfortably without interrupting normal pedestrian circulation. Provide stairs spacious enough to encourage conversation, kitchenettes adjacent to assembly areas, and furnishings designed and arranged to promote discussion.



Campus Architecture and User Needs

Another of the purposes of architecture at Clemson is to accomplish specific practical objectives. Buildings should be composed of spaces that are sized and arranged from a thoughtfully considered space plan, in turn based on a thorough analysis of user requirements. Each building should provide for the physical and psychological needs of its users so that the fundamental purposes for occupying the building are maximized. This includes such provisions as appropriate for thermal comfort, indoor air quality, and access to daylight and views that support the productivity, health and performance of building occupants. In addition, because programs change over time, buildings must be flexible.

Campus Architecture and Sustainability

Campus architecture should support the University's commitment to optimize energy usage, protect air and water resources of the general environment, and conserve materials and resources associated with the construction of buildings. The LEED system is but one example of the type of standards that the University will consider for sustainable design.



"All architecture is shelter, all great architecture is the design of space that contains, cuddles, exalts, or stimulates the persons in that space."

Phillip Johnson



"Architecture, in general, is frozen music."

Friedrich Wilhelm Joseph Von Schelling



"Architecture is inhabited sculpture."

Constantin Brancusi

Firmness — Durability

Policy: Buildings will be solid, stable and strong — both physically and visually — yet allow for flexibility and change.

Architecture at a Scientific Institution

In every aspect, architecture is held in check by the laws of physical science. All architectural components are subject to the laws of statics and dynamics. In a scientific institution these components must have successfully passed the tests of scientific experimentation. The architecture of a scientific campus should include materials that are the logical expression of material properties and laws. The systems and materials should be durable — having demonstrated longevity and permanence — and consequently capable of creating a secure sense of place for campus inhabitants. To be successful, the architecture must be logical; it must accomplish certain mechanical purposes; and, it must be constructed well. Contemporary thought in architecture values "light construction" along with weighty construction; a "dynamic, disordered form" along with a stable, logical form.

Measuring Firmness

Firmness necessitates that buildings and their components, when put in use, will endure without significant failure over the long term. The primary tool for measuring firmness is life cycle costing — an economic assessment of competing design alternatives, considering all significant costs of ownership over the economic life of each alternative. To be most effective, the structural frame should be designed to allow for changes in space configurations and adaptations of systems over time.

Delight — Beauty

Policy: Campus architecture will be beautiful and provide delight.

The Means to Delight in Architecture

The buildings of the University should be beautiful and provide delight. This delight may be derived from successfully achieving "utility." A pragmatic worldview associates beauty with utility. If a building successfully fulfills the principles and other design guidelines of the University, in a certain sense, it will be beautiful. In addition, a building may provide delight because it successfully embodies "firmness." Or, the means of providing delight may be independent of both "utility" and "firmness." Nevertheless, architecture must provide intellectual and spiritual satisfaction; it must provide pleasure; it must provide delight.

Architecture and the Individual

University buildings should be concerned with the welfare and dignity of each individual in the Clemson community. The buildings should be pleasant for both their users and for those on campus that experience them only from the outside. Buildings should be welcoming, with clearly defined entrances, and achieve a symbiotic relationship between the indoors and the natural environment outdoors. Building exteriors should be pedestrian-friendly and scaled to relate to the size of the human form.

“Architecture is the triumph of Human Imagination over materials, methods, and men, to put man into possession of his own Earth. It is at least the geometric pattern of things, of life, of the human and social world. It is at best that magic framework of reality that we sometimes touch upon when we use the word order.”

Frank Lloyd Wright

“Always design a thing by considering it in its next larger context — a chair in a room, a room in a house, a house in an environment, an environment in a city plan.”

Eliel Saarinen



Honest Architecture

The architecture should be reflective of the building's use, integrating the interior and exterior for a unified building design.

Relationship of Architecture to the Natural Environment

Buildings should engage with the adjacent natural environment; capturing outdoor views for building occupants from regularly occupied areas such as classrooms, laboratories and offices. As much as practical, plan buildings to bring the natural environment into the building interior.

Policy: A building will be visually compatible with other buildings in its immediate context and with the campus as a whole.

Relationship of Architecture to Historic Resources

Repetition of historic colors, materials, proportions, and roof forms should be the primary method for creating and maintaining an architecturally unified campus. Exterior materials of the historic campus — red and brown brick, stone, concrete, and clay tile and metal roofs — should be used as the primary source of a color and material palette for buildings both inside and outside the historic district.

Architecture Inside the Historic District

Without creating a false history, new buildings or additions in the historic district should either be designed with similar attributes of the original building, or designed to be compatible in a manner that enhances the original work.

Architecture Outside the Historic District

New buildings and additions outside the historic district may be designed with less constraint regarding form, material, or detailing. Nevertheless, they should be sensitive and respectful of their immediate contexts and should contribute to the unity of campus architecture as a whole.

Building Height

The height of a new building should be respectful of the other buildings in that context and to the outside space that it contains. In most instances, intellectual and social interaction is encouraged among people when they work or live on one floor. For that reason, buildings with fewer levels are preferred. In general, building heights should be limited to four stories. When necessary, exceptions will be considered subject to special review.

In the past, "...architects created buildings for ... universities that were designed to meet the needs of specific programs or individual faculty. It was assumed that these programs would remain constant, and buildings were constructed accordingly. They were solid and often inflexible. Today buildings must be designed to accommodate change."

Arthur J. Lidsky, AICP

"The arts provide a more comprehensive and insightful education because they invite students to explore the emotional, intuitive, and irrational aspects of life that science is hard-pressed to explain."

Charles Fowler

"The arts are acts of intelligence no less than other subjects. They are forms of thought every bit as potent as mathematical and scientific symbols in what they convey."

Charles Fowler

"The arts are so close to our psychological and biological core that rather than think of these courses as a sort of whipped cream or luxury, they must become basic experiences in education."

Abraham Maslow



FLEXIBILITY / EXPANSION

Policy: *New facilities will be designed and constructed for first uses as well as possible next uses.*

Continuity and Change

The assumption in higher education today is that programs, teaching, research, and technology will change over time. The rate of change is increasing in all fields and services, but it is especially rapid in the sciences and engineering. New facilities on the Clemson campus should be designed so that interior space can be adapted to new use patterns. To achieve this degree of flexibility, building components such as walls, wiring, information technology services, and other systems should be designed and configured so that changes can occur. A broader issue is the possible need for more space in the future. A new building should be designed and sited so that space can be added. As part of new building design, the architects' charge will be to present future expansion possibilities to the University.



PUBLIC ART

The presence of art, in all forms, on the campus is an extension of the University's values. Beauty is found not only in the creation of practical knowledge and tools for the betterment of humanity, it is also found in art which stimulates and provokes an intellectual or emotive response in the viewer.

Art on the Campus:

Policy: *All capital development projects that are anticipated to exceed two million dollars will consider the benefits of public art and will apply 1/2 of 1 percent of the construction budget for such work. In addition, extreme care will be exercised in the location and subject matter for memorials and other forms of commemoration.*

Landscape/Art/Buildings

Public art is a very important ingredient in the campus landscape of Clemson University. It is, indeed, essential to creating a campus that contributes to the educational process and to the intellectual and emotional enlightenment and development of its constituents. Exposure to art and appreciation of art is essential to the development of well-rounded, educated individuals.





Art and Interaction

Public art and monuments promote social gathering and interaction and significantly contribute to place making. The piece of art itself automatically becomes an identifiable point, a landmark, in the campus environment and often becomes a place of gathering, identification, and orientation. Public art can reflect the history or culture of the place and serve as an intellectual and emotional stimulus. Art in the university setting exists mainly for the sake of the campus community, providing another level of meaning in the landscape.



The Place of Art

Because of its importance in the life of the community, art should be thoughtfully executed and placed. Placement of each artwork or memorial should relate the work to its immediate surroundings, its context within the campus. Public art should not be placed where it impedes pedestrian movement. Public art should be vandal-resistant and not require on-going, significant maintenance needs.

Art and Memorials

The greatest care should be taken in the design of public memorials — sculptures, buildings, fountains, or other forms of commemoration. Unlike most of our built environment, commemorative works are kept in the public trust in perpetuity. Thus, their siting, design, and quality of materials should be given extremely careful consideration.



Planning **STANDARDS**

INTRODUCTION

The purpose of the Planning Standards is to provide information that will inform and guide the planning of facilities on the Clemson University campus. This information will be used predominantly in the pre-design phase of a potential project. Typical users of this information will be Clemson's administration, faculty, and staff. It will be used in evaluating potential sites for buildings, massing constraints, access, and impacts on parking. Consultants to the University, involved in these planning efforts, will use this information in the early planning stages. The Green Book will continue to be a primary reference source.

The information provided in the Planning Standards is a supplement to the Campus Master Plan, the Space Utilization Study, and the Design Standards/Green Book. This information does not supersede any of those documents and discrepancies between documents should be brought to the attention of the Campus Master Planner.

SITE DEVELOPMENT GOALS

The planning goals set forth in the 2002 Campus Master Plan are to become part of these standards. Planning factors are highlighted below.

The Campus Green will be enhanced and extended south from Bowman Field to the Madren Center and west along Highway 93. President's Park will also be preserved and strengthened, and will complete the green buffer along Highway 93. Other open areas to be preserved and enhanced are the historic Core Campus Green, Woodland Cemetery, the Calhoun field laboratory or the Bottoms, and the arboretum and Botanical Garden area.

The pedestrian nature of the Main Campus will be reinforced. This will be accomplished by enhancing open green space and pathways, and by replacing parking on Core Campus roads with parking reservoirs on the campus periphery.

Outreach to the community will be reinforced. This will be realized by making the campus inviting and visitor access easy. Perimeter Road will be a zone to engage the public. This road — the *avenue of engagement* — will provide access to community facilities, which will be served by adequate parking facilities. Attractive landscaping and signage will further enhance this area.

Sites for new buildings on the Main Campus must be carefully planned. When a new facility is designed, the building site must be selected to fit within the broad campus design parameters. Designating open space and other space that should not be built upon is essential to preserving the integrity of the Clemson campus.

OPEN SPACE

Dedicated Open Space, as defined by the Campus Master Plan, shall be protected from all types of campus development. These areas include Bowman Field, President's Park, the North Campus Green, the historic Core Campus Green, and Woodland Cemetery. Landscapes to preserve are spaces that shall only be altered with just cause and any change shall be carefully considered. Spaces in this category include the South Campus Green, the Bottoms, and the arboretum and Botanical Garden area.

Additionally, those areas identified as “*Landscapes to Protect*” and “*Landscapes to Maintain*” in the *Landscape Assessment* (June 2001) shall be afforded a high level of protection and may not be impacted by development without the express permission of the Campus Master Planner.

Open Space areas that are environmentally sensitive, such as major drainage-ways, shall also be protected from impact of development by vegetative buffers. Buffers along streams or creeks shall be a minimum of 35 feet from the top of the bank. These buffers shall be left natural where significant vegetation exists or planted with indigenous plant material to help prevent erosion.

Generally, sites with slopes of 3:1 or greater will be protected from development. Steeply sloped areas may be developed only with the express permission of the Campus Master Planner and site solutions must address the issues of erosion and drainage.

FACILITY PLANNING

The general development pattern on the Main Campus is rational and workable in that the various uses are clustered together. In any space reallocation plans as a general principle, departments should be kept together and Budget Centers should be consolidated.

The process for initiating new construction or renovation of an existing facility should begin with a thorough investigation of need. To help in substantiating need, an outline facility program should be developed that reflects the requirements of the users involved and defines and quantifies the individual spaces projected. To assist the facility planner, space allocation standards and a method for modeling space is included in the Space Utilization Study. The facility program can be expanded to include the necessary design detail, once the project is viable.

The budget for construction cost will be based on the facility program. The outline facility program will define an amount of assignable square footage. This number can be translated into gross square footage by using multipliers appropriate for the building type. The resulting gross square footage will be the target size of a new building and the basis for a construction cost budget. If the project is a renovation, the outline facility programs will be the basis for testing whether the existing building is appropriate for the desired use, and if additional space will be required.

BUILDING MASSING

Generally, buildings on the main campus should be limited to four floors. The Campus Master Planner must approve exceptions to this rule.

FLOOR AREA RATIOS

The impervious area of a building “site” shall not exceed 60%. Impervious areas include the building footprint, paving, courtyards, service areas, and sidewalks. For the purpose of this document, the “site” shall be measured as:

- Half of the distance to the next building or 1.5 times the overall, above grade height of the subject building on the facing side, whichever is less;
- Back of curb for adjacent drives or parking areas;
- Half of the average distance from the building to prominent landscape features; or
- The edge of property lines, rights-of-way, vegetative buffers or other setbacks.

PEDESTRIAN WALKWAYS

The minimum width of campus walks shall be six feet (6'-0") for walkways in general. The vast majority of campus walks will be wider than six feet in order to handle pedestrian loads during class change.

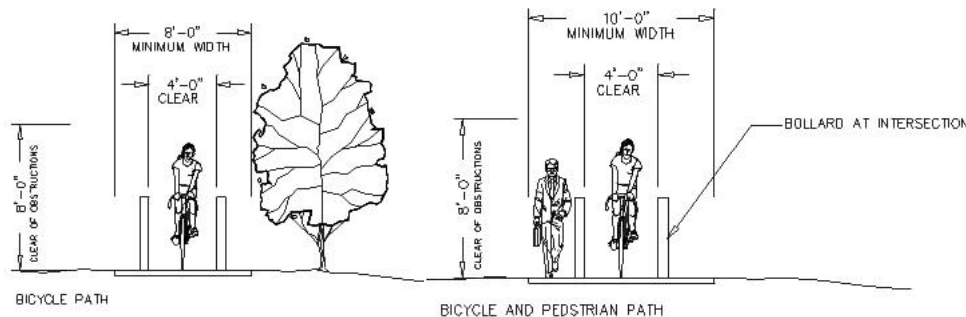


BICYCLE PATHS

Where dedicated bicycle paths are provided they should consider safety issues of design speed, sight lines, stopping distances, curve radii, intersection design, surfacing, and protection from hazards.

In general arterial roads should have a bike path that roughly parallels the road but does not share the right of way. All collector roads should have a dedicated bike lane within the right of way and bikes should share distributor roads with vehicular traffic.

Bicycle paths should have a minimum width of eight feet (8'-0") or ten feet (10'-0") where shared with pedestrians. There should be a minimum of eight feet (8'-0") above the path, measured from the edge, that is clear of all side and overhead obstructions. Where possible, paths should be widened slightly in a curve and super-elevated at a maximum rate of six inches (6") per foot. This is especially important for short-radius curves.



RUNNING PATHS

Running paths may be shared with either bicycle paths or pedestrian paths as long as paths are of adequate width to accommodate both.

The design criteria for running paths are the same as bicycle paths in terms of sight lines and intersections. The materials, however, should be more forgiving, using asphalt instead of concrete wherever possible, or even softer surfaces depending on conditions.

Dedicated running paths should have a minimum width of four feet (4'-0") in areas where wider paths are not possible. All other areas should have a minimum width of six feet (6'-0").

ROADWAY STANDARDS

Roads on the Clemson Campus shall accommodate vehicular traffic while ensuring pedestrian safety, and shall retain the aesthetic qualities of the campus. For the purposes of this document, all Roads on the Clemson campus will be described as the following:

- Arterial Roads
- Collector Roads
- Distributor Roads

Arterial Roads

Arterial Roads are for moderate-speed traffic looping around the periphery of the campus. These roads will bring traffic to and from the campus and provide linkages to collector roads and parking areas. These roads serve as the primary entrance into the campus and consequently provide the initial impression of the campus. These roads include:

- Highway 76
- S.C. Highway 93 (Walter Cox Boulevard)
- Perimeter Road (Silas M. Pierman Road)

Highway 76 serves as the entrance from the north and south and, as such, shall be landscaped to emphasize its “gateway” character and shall receive proper maintenance.

- No buildings or parking areas shall be permitted within the corridor.
- Pedestrian crossings shall be permitted only at the signal-controlled intersection with Perimeter Road.
- Funds permitting, bikeways shall be developed with appropriate signage.

S.C. Highway 93 from the overpass at Highway 76 to the Hartwell Bridge serves as the entry leading to Tillman Hall and Bowman Field.

- Protecting the dedicated open space areas of President's Park and Bowman Field will preserve the existing character of the approach along Highway 93 from the east.
- No buildings or parking areas shall be constructed in these open spaces or within 150' of the southern edge of the highway and west campus, (with the exception of Riggs Field and Sloan Tennis Center), or along the lake dike.
- Pedestrian crossings shall occur where signals control vehicular traffic.

Perimeter Road and Newman Road connect U.S. Highway 76 and S.C. Highway 93, and Highway 93 and Perimeter Road, respectively. This forms a loop on the southern edge of the campus core. They will serve as the major transportation corridor for visitors, staff, and commuters.

- Provide a 20' utility easement, free of trees and shrubs, along both sides of the pavement to accommodate future utilities.
- Provide a 75' parking setback and a 100' building setback.
- All intersecting roads shall have a 45' visibility triangle, measured from the edges of the roads.
- Pedestrian crossings shall occur at traffic signals and shall be well delineated.
- Provide a bicycle path along Perimeter Road from U.S. Highway 76 to S.C. Highway 93, and on the western side of Newman Road between U.S. Highway 93 and Perimeter Road.

Landscaping Requirements on Arterial Roads

- Informal, naturalistic clusters of large, native, deciduous and evergreen trees
- Masses of large shrubs
- Create a sense of arrival by bringing material close to the road and then opening these plantings up at entry points.

- Median plantings can be utilized to supplement this effect and create emphasis and hierarchy. Groundcover versus grass on the ground plane in these medians is preferred because of mowing issues.
- The use of fine-textured grasses and overseeding in winter will enhance the lawn effect.

Collector Roads

Collector Roads provide access to the campus core from the Arterial Roads. These roads will also collect traffic from parking areas and from Distributor Roads. They will be more pedestrian in scale and have more uniformity. These roads include:

- Cherry Street Road
- McMillan Road
- Newman Road (Consider as a collector road.)
- S. Palmetto Boulevard
- Williamson Boulevard Road

General Requirements

- Parking Setback to be 40' from edge of road.
- Building setback shall be 75' from edge of road.
- Maintain 150' separation between roads and parking access.

- All intersecting roads shall have a 45' visibility triangle, measured from the edge of the road.
- Pedestrian crossings shall be provided at all Collector Road intersections, and be well delineated. Provide similar signage, lighting, and landscaping treatments to establish uniformity and pedestrian scale.
- Provide similar treatment to the entrances of parking areas on Collector Roads to differentiate them from Arterial Roads.
- Maintain a 25' visibility triangle, measured from the edges of the roads, at parking lot entrances.

Landscaping Requirements on Collector Roads

- Informal groupings of deciduous and evergreen trees under planted with flowering trees can be brought up to the roadside edges, no closer than 15' to accommodate utilities.
- Planting on these roads can also double as a screen from parking areas.
- A streetscape effect can be achieved with similar trees planted in sequence with a common distance "on center." This will also establish uniformity and identity.

Distributor Roads

Distributor Roads are low speed access roads within the campus core building, parking, and service areas. They incorporate on-street parking for visitors, staff, and students and are shared by vehicles and bicycles. Their character is extremely different from Arterial and Collector Roads. They are classified as two types:

- Distributor/Collector
- Distributor/Cul-de-sac

Distributor/Collector Roads connect parking and service areas with Collector Roads and are generally vehicular in nature. These roads include:

Avenue of Champions
Bryan Street
Calhoun Drive
Centennial Boulevard
Fernow Street
Fort Hill Street
Heisman Street
Klugh Avenue
Old Stadium Road
Press Road
Ravenel Road
Sherman Street

Primary characteristics:

- Road widths shall be 20' where no parallel parking is present.
- Horizontal alignment of these roads shall incorporate turning radii and clearances that are in accordance with fire department regulations.
- They shall be designed to accommodate vehicles having special requirements such as service vehicles or buses, and shall be evaluated individually.
- Intersections of all Distributor and Collector Roads shall have a 25' visibility triangle, and intersections with Arterial Roads shall have a 45' visibility triangle, measured from the edges of the roads.
- Building setback shall be a minimum of 45'. In every case, the setback shall accommodate future pedestrian walks and utility requirements in the area.

Distributor/Cul-de-sac Roads shall be of pedestrian scale throughout the entire road and intersection.

These roads include:

Alumni Circle
Barre Street
Baton Circle
Bradley Street
Collings Street
Daniel Drive
Dunavan Road
Hunter Street
Jersey Lane
Martin Street
Mills Road
Morrison Street
North Palmetto Boulevard
Parkway Drive

Primary characteristics:

- Bicycles share the road with vehicles; signage shall designate Distributor/Cul-de-sacs as “Bike Routes” and require bikes to yield for pedestrians at pedestrian crossings.
- Roadway/Parking aisles shall be 24'-0" wide.
- 90-degree parking spaces measuring 9'-0" x 18'-0" (face of curb to aisle) shall occur only on one side of the road, with the exception of Morrison Road.
- Cul-de-sacs on these roads shall be designed with the minimum turning radii determined by fire department regulations and the required turning radii for service vehicles. Bus drop-off/pick-up needs shall also be addressed.

- Cul-de-sacs that must be shared by vehicles, pedestrians, and bicycles shall be designed with pedestrian paving materials, furnishings, plantings, lighting, and other devices to identify the cul-de-sacs as a pedestrian zone. Bollards can also provide security when used to delineate the end of vehicular traffic at locations where walks join cul-de-sacs, and where service vehicles must share walkways.
- Building setback shall be a minimum of 25'. In every case, the setback shall accommodate future pedestrian walks and utility requirements in the area.

Landscape Requirements on Distributor Roads

- Keep plant groupings close to road so that ultimately, the tree limbs will overhang and cause an enclosed effect. Keep a minimum 12'-0" vertical clear space for the passage of cars beneath limbs.

- Because of the pedestrian scale of these roads, the material will be viewed at close range. Pruning and maintenance is essential for aesthetics and safety. Always use accessible material.
- Delineate pedestrian crossings with feature material.
- Plant the centers of cul-de-sacs, when space permits, with trees, shrubs, and groundcovers.

PARKING AREAS

No new parking lots over 100 spaces in size shall be constructed on the Clemson campus.

The Board has approved the construction of carefully planned, designed, and landscaped parking decks to increase or replace parking, rather than expanded on grade parking lots.

Existing Parking Lots shall be renovated, as possible according to the following criteria:

- Parking lots shall be redesigned as a series of smaller areas providing space for no more than 300 cars, with a 20' minimum planted buffer between areas.
- Handicapped spaces shall be provided per the requirements of the American's With Disabilities Act.
- Parking space dimensions shall be a minimum of 9'-0" x 18'-0" and shall have an aisle width of 24'-0".
- Motorcycle/scooter parking spaces shall be provided in all lots located close to dormitories and walks that connect the main lot to the buildings they serve. They shall be located such that maneuvering cycles in and out of spaces does not interfere with automobile traffic. They shall measure 5'-0" wide by 11'-0" long.

- All lots shall incorporate visual screen plantings to enhance the aesthetics of the campus environment and to reduce the impact the lot will have on adjacent roads, buildings, and open spaces.
- The screen, however, shall not be so dense as to preclude the opportunity for surveillance of the lot by campus security and passersby from surrounding roads.
- A maximum of 12 parking stalls will be allowed between tree islands.
- Tree Islands must have a minimum width of 9'-0".
- Deciduous Shade trees must have a minimum setback of 4'-0" from back of curb and under planted with groundcover and/or mulch.

TRANSIT STOPS

Each CAT stop shall be designed with:

- Ample space for pedestrians to gather with seating, trash receptacles, lighting, and shelter from inclement weather.
- Directive signage indicating the location of the stop and its relationship with the transit system on campus.
- Safe routing for bicycles through the bus stop.

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Alan Grubb	Associate Professor, History; Faculty Senate President '01-'02	Barret Anderson	Campus Landscape Architect
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